NRC93-002

Westinghouse Electric Corporation
Commercial Nuclear Fuel Division

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January 29, 1993

Mr. J. Philip Stohr, Director
Division of Radiation Safety and Safeguards
U.S. Nuclear Regulatory Commission
Region II
101 Marietta Street, N.W.
Atlanta, Georgia 30323

SUBJECT: NRC INSPECTION REPORT NO. 70-1151/9204

Gentlemen:

Westinghouse Electric Corporation hereby submits a response to the above-referenced Inspection Report pertaining to the NRC Operational Safety Assessment of our Columbia Fuel Fabrication Facility conducted August 17-28, 1992.

While this response is directed at the Weaknesses identified in the Inspection Report, we were pleased that your inspection report identified the many program Strengths at our facility. We believe that these Strengths are a direct result of proactive management and safety-first initiatives that assure compliance with regulatory requirements.

Our response describes initiatives taken, or planned, to address our mutual concerns regarding the following:

Appendix A contains our responses to the four Weaknesses addressed in your letter, specifically: (1) control of non-favorable geometry containers, (2) authority of process engineers to make substitution changes without proper training, (3) evaluation of facility changes, and (4) radiation protection practices concerning the contamination control and survey program. The Unresolved Item dealing with consideration of an overflow section of in a Raschig ring-filled tank is also addressed in Appendix A.

Appendix B contains our responses to the remaining eighteen Weaknesses listed in the Assessment Summary of your inspection report.

Appendix C contains an overview of our Safety Margin Improvement Program, which integrates many planned improvements to our environmental protection, radiation protection, nuclear criticality safety, industrial safety, fire protection, and emergency planning programs.

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Appendix D contains details regarding the integrated improvements in our nuclear criticality safety program.

If you have any questions, please contact me at the above address or telephone me at (803) 776-2610 Ext. 3301.

Sincerely,

WESTINGHOUSE ELECTRIC CORPORATION

Ronald H. Koga
General Manager
Commercial Nuclear Fuel Division

APPENDIX A

RESPONSE TO ITEMS OF PARTICULAR CONCERN

The following is a description of actions taken or planned in response to the four Weaknesses of particular concern, specifically: 1) control of non-favorable geometry containers, 2) authority of process engineers to make substitution changes without proper training, 3) evaluation of facility changes, and 4) radiation protection practices concerning the contamination control and survey program. Actions taken with regard to the Unresolved Item dealing with consideration of an overflow section of a Raschig ring-filled tank are also described.

1. Weakness 92-04-20 -- Control of Non-Favorable Geometry Containers.

   Following the NRC Operational Safety Assessment, a comprehensive plan was initiated to minimize non-favorable geometry (NFG) containers and to provide nuclear criticality safety controls on those remaining. This plan included: 1) the formation of a multi-disciplinary task team to review and make recommendations to management regarding the control and use of movable NFG containers; 2) conducting an inventory of NFG containers; 3) removing unnecessary containers; 4) performing additional personnel training on the use of and controls for NFG containers; and, 5) implementing a new procedure to establish plant policy and criteria for NFG containers (RA-306, "Movable Non-Favorable Geometry (NFG) Containers" in the Chemical Area). These actions were summarized in a series of five letters to NRC Region II from September 4 to October 16, 1992. Two routine, unannounced inspections conducted by NRC Region II in September and October, 1992, resulted in no identified violations involving NFG containers.

   The plant policy (as stated in RA-306) is to minimize the use of movable NFG containers throughout the Chemical Area, and where continued use is necessary, to perform a Nuclear Safety Analysis (NSA) of, and establish adequate controls for, continued use. If it is necessary to use an NFG container in the main process areas

of the plant, it may only be used after the completion and approval of an NSA, including a double contingency evaluation, and the establishment of specific, proceduralized controls.

Currently, NSA's and procedure revisions are ongoing to analyze, justify, document, and control movable NFG containers that are necessary for operations. After procedure revisions are approved, training will be conducted as the revisions are issued to Manufacturing for use. The task team meets weekly to evaluate continuing items and make recommendations to management as appropriate. Surveillance for compliance with NFG container policy is performed weekly by task team members and by Safety Observers during their regular inspections. On an interim basis, joint Regulatory and Management tours were also conducted to audit for NFG container control compliance.

Many NSA's have been completed for "high priority" NFG operations. The remainder of the NSA's are scheduled for completion by March 31, 1993. Each affected procedure will be completed within one month of approval of the applicable NSA.

Procedure changes for which no NSA is required are in process and are expected to be completed by February 26, 1993.

2. Weakness 92-04-10 -- Training for Process Engineers.

Regarding the authority of process engineers to make substitution changes, the Configuration Control program has been modified to delete such authorization. If there is a future change in this policy, appropriate documented training and qualification by the Nuclear Criticality Safety Function will be provided to specific process engineers.

3. Weakness 92-04-14 -- Evaluation of Facility Changes.

Specific problems with the two Regulatory Affairs Review Requests noted in the report have been resolved. One of the Review Requests, waste sorting, was never

approved or implemented. The other one, a low level waste treatment operation, was suspended and will not be restarted until a new Change Authorization is approved by Regulatory Affairs. Both of these were initiated before the plant Configuration Control procedure (TA-500) was implemented. This new procedure and the revised Regulatory Affairs procedures described below will correct facility change concerns.

Procedure RA-104, "Regulatory Affairs Review Request" is being revised and re-titled. The revised RA-104, entitled "Change Authorizations" requires Regulatory Affairs review of all steps in a facility change, up to and including implementation. This new Change Authorization process requires Regulatory Affairs review of changes during design conceptualization; installation and construction; preoperational testing; and operation. The change authorization process also requires a more detailed up-front review of system documentation, indicating revisions as a result of proposed changes to the process. (The old version of the procedure required review and approval of a facility change, but did not address details for the implementation phase of the change.) The new Change Authorization Request form requires information regarding reference drawings, assessment of accident scenarios, independent reviews, and limits and controls. This new document will contain the evaluations being performed or indicate where the information can be found, and will clarify the purpose of the documentation signatures. This procedure will be fully implemented by February 28, 1993.

The nuclear criticality safety evaluations that accompany Change Authorizations governed by revised RA-104 will be performed in accordance with a revised Procedure RA-300, "Nuclear Criticality Safety Design and Review Criteria". This procedure identifies the parameters for normal conditions of operation that may be applied to the system being reviewed. The procedure also requires that accident scenarios and appropriate controls be documented, and that (as a minimum) double contingency protection to preclude an accidental criticality be demonstrated and documented. This procedure identifies the terminology and methodology for nuclear criticality safety evaluations; and, identifies the requirements for personnel performing, reviewing, and approving the evaluations.

4. Weakness 92-04-30 -- Contamination Control and Survey Program.

Regulatory Operations procedures have been revised and administrative controls have been implemented to improve contamination control and survey practices identified as deficient in the report. In addition, a review is being performed of the overall contamination control and survey program to determine whether there are additional improvements that could further increase the margin of safety. Items under consideration include: 1) enhanced program audits; 2) Health Physics Technician training; 3) development of a plant-wide program on contamination control and survey practices to assure that the program fully meets site needs; and 4) an evaluation of employee contamination control practices. This review will be completed by April 30, 1993.

5. Unresolved Item 92-04-17 -- Raschig Ring-Filled Tanks.

The on-line Q-tanks have automatic level controllers set to maintain the liquid level between 20% and 80% full (the Raschig ring level is approximately 99% full). A high level alarm is set at 80% full, and operators are trained to discontinue feed to the tanks if the high-level alarm point is reached. This and other administrative controls have been in place to support double-contingency protection for the Q-tanks. In order to improve the margin of safety for this operation, however, Westinghouse will add Raschig rings to completely fill the tanks and manholes to a level such that the remaining void is less than a safe slab dimension. The additional Raschig rings needed to fill all six tanks were promptly placed on order. Half of the order was received in December, 1992, and three of the six tanks were filled at that time. The other half of the order was received January 26, 1993, and the remaining Raschig rings are scheduled to be placed in the last three tanks by January 30, 1993.

APPENDIX B

RESPONSES TO SPECIFIC PROGRAM WEAKNESSES

Weakness 92-04-01 -- Adequacy of Staffing.

Regulatory staffing at the Columbia Facility is based on the philosophy that Regulatory Affairs provides oversight and overall policy direction for plant operations regarding regulatory requirements -- including environmental protection, radiation protection, nuclear criticality safety, and industrial safety. The successful implementation of this philosophy is the safe and compliant performance to requirements by manufacturing personnel.

To further amplify staff resources, the following actions have been taken: 1) functions within the Regulatory Affairs organization have been reassigned; 2) a technician has been added to assist the Nuclear Criticality Safety Function; and, 3) a Safety Margin Improvement Project (SMIP) organization is being established to plan and direct all improvement projects in an integrated fashion (Appendix C). The SMIP organization will consist of a Project Manager/Leader, two professionals (one plant systems engineer and one regulatory engineer), and a Configuration Control technician. This organization will serve to further augment resources in the Regulatory Affairs organization.

Requests for these additional personnel have been approved, and the recruiting effort to hire is ongoing. Resource requirements will continue to be evaluated to assure that they are consistent with high quality safety and regulatory performance.

Weakness 92-04-02 -- Adequate Reviews of Technical Documents.

A Westinghouse evaluation method called WesTIP (a structured process by which appropriate management and other employees are assembled to examine a process using total quality tools that lead to process redesign) has been initiated to provide an

evaluation of this concern; and, will develop a mechanism to apply appropriate technical disciplines to procedure and other document reviews to assure that all technical concerns are addressed. Areas to be reviewed include identifying specific procedural changes to assist reviewers, and providing improved distribution of procedures to cognizant individuals. The WesTIP review will be completed by June 30, 1993. *(Note: This WesTIP review is the same method to be described under Weakness No. 92-04-07.)*

To ensure that Regulatory Affairs procedures are properly reviewed, these procedures will be placed on the Electronic Procedure System. This is scheduled for implementation as the procedures come up for revision, beginning January, 1993.

Actions to provide adequate technical reviews of change control authorizations and to establish the criteria to be satisfied by all nuclear criticality safety controls as specified by ANSI/ANS-8.1, Section 4.1.1, are addressed in the response to Weakness No. 92-04-14 (Appendix A).

Weakness 92-04-03 -- Lack of Formal Plant Procedures.

Specific procedures for chemical safety are incorporated in the Regulatory Affairs Procedure Manual and the Columbia Plant Safety Manual. Administrative procedures for chemical safety are being incorporated into the Columbia Plant Safe Working Practices Handbook. This is scheduled for completion by December 31, 1993.

A formal procedure for incident investigations will be developed following completion of the activities identified in Weakness 92-04-04 (root cause analysis training), by July 31, 1993. In the iterim, the Regulatory Engineering policy referenced in the Inspection report, "Establishing Protocol for Nuclear Criticality Safety Events", will be followed.

The following actions address the three Regulatory Affairs procedures referenced in the Inspection report:

RA-300, "Nuclear Criticality Safety Design and Review Criteria"

Accident analyses are currently being documented for all Facility Change Authorizations conducted in accordance with revised Procedure RA-104 (see response to Weakness No. 92-04-14). In addition, RA-300 is being revised to provide more guidance for the completion of these accident scenario evaluations. The revised procedure is in the review process and will be implemented by February 28, 1993.

RA-301, "Nuclear Criticality Control Procedure"

This procedure authorizes the use of non-favorable geometry (NFG) containers for filling with slightly contaminated scrap (materials with residual surface contamination and free of inaccessible areas that might contain uranium accumulations) without conducting physical measurements for fissile material content. The approval for such placement of scrap materials in NFG containers was based on required visual inspections to confirm that the fissile content was limited only to residual surface contamination. This program proved successful in controlling low-level waste. However, the procedure is being revised to delete a general authorization for such use of NFG containers. Regulatory Affairs Procedure RA-306 has been written to specify those movable NFG containers that have been approved for continued use. All other movable NFG containers, not approved in accordance with this procedure, have been removed from manufacturing areas (see response to 92-04-20).

RA-303, "Control of Moderating Materials for Nuclear Criticality Safety"

This procedure identifies the requirements for use of moderation control criteria in manufacturing operations. The procedure states that management must approve the use of moderating materials for fire fighting purposes, but does not address the fire fighting techniques. This procedure will be revised by February 28, 1993, to indicate that the only approved technique for fire fighting is a fog spray, and under no circumstances shall a directed concentrated spray, jet, or beam be used.

Weakness 92-04-04 -- Formal Root Cause Analysis Training.

Four individuals participated in a root cause analysis training program in December, 1992. Additional personnel attended a root cause analysis program at a nearby fuel fabrication facility to determine its applicability to Columbia Facility needs. A pilot evaluation program was initiated (using one of the trained individuals as a facilitator) in December, 1992, to test the applicability of the methodology and the training. Additional training for approximately 20 individuals is scheduled for February, 1993. The effectiveness of this new methodology and the schedule for additional training will be determined by June 30, 1993.

Weakness 92-04-05 -- System to Track and Trend Incidents.

The PRONET Commitment Tracking System managed by Regulatory Affairs is being used by the Criticality Safety Assessment (CSA) Team for recording of all recommended corrective actions. An action plan is also being developed for implementing the CSA recommendations for safety enhancement.

A procedure is under development to formalize the process for tracking and trending corrective actions in areas such as incident investigations, Criticality Safety Assessments, Safety Action Group surveillance items, and facility change control authorizations. The procedure will include a process for assuring that items are tracked to closure. The schedule for this procedure will be determined as part of the Safety Margin Improvement Program (Appendix C).

Weakness 92-04-06 -- Human Factors Associated with the Electronic Procedure System.

Efforts are underway to review the Electronic Procedure System with operators and other "users" to determine where human factors improvements can be made. Evaluations will also be made of system software to determine where enhancement modifications can be made. This review is scheduled for completion by June 30, 1993.

Weakness 92-04-07 -- Control and Implementation of Supplemental Operating Instructions.

A procedure system improvement plan has been identified in the Safety Margin Improvement Program to provide adequate control and implementation of operating procedures, including Supplemental Operating Instructions (SOI's). The plan will utilize WesTIP methodology to analyze the existing procedure system, and to design, develop and implement an improved process to address concerns in the Inspection report. This will cover inconsistencies in use of the SOI acknowledgement sheets, maintenance of SOI's for operator review, and control and implementation of SOI's. The improvements will be focused on the areas described below:

- Develop a structured procedure system and clarify the functions of Operating Procedures, Supplemental Operating Instructions, and Process Information Forms.

- Ensure all procedures contain the necessary information (regulatory and operational criteria/limits); and that the information is accurate and clearly provided.

- Improve procedure control systems to ensure that procedures are understood and consistently followed by functional area personnel.

- Develop a cross-reference documentation index for procedures and other configuration documentation (drawings, parameter sheets, Operating Procedures, Supplemental Operating Instructions, and Process Information Forms).

- Develop an audit process to evaluate overall system effectiveness.

The WesTIP review will be completed by June 30, 1993; the remainder of the schedule will be developed following the WesTIP review. *(Note: This is the same WesTIP methodology described under Weakness No. 92-04-02.)*

Weakness 92-04-11 -- Descriptions of Accident Scenarios for Criticality Safety Assessments.

A new procedure (RA-307, "Nuclear Criticality Safety Assessments") is being developed to require accident scenario evaluations for each Criticality Safety Assessment being performed. Accident scenario descriptions are to be identified during the initial Nuclear Safety Analysis and documented within the Criticality Safety Assessment report. Scenarios identified in the Criticality Safety Assessment report will have appropriate controls identified in a table format that shows the relationship of each control to the specific barrier and contingency. This procedure is scheduled for implementation by February 28, 1993.

In addition, the Integrated Dry Route (IDR) Conversion Criticality Safety Assessments were revised to include accident scenario evaluations as a model test case. The resulting reports were critiqued by both NRC and independent Westinghouse personnel; and, a more formalized accident scenario evaluation technique was recommended. Westinghouse is currently investigating formal evaluation techniques for implementation and benchmark testing. This review should be completed by May 31, 1993.

Weakness 92-04-16 -- Transfers from Favorable to Non-Favorable Geometry Containers.

At the time of the NRC Operational Safety Assessment, Uranyl Nitrate analytical sample results were logged in the lab and then verbally transmitted by telephone to Manufacturing. The Manufacturing Area personnel then recorded these results in their log.

This practice will be replaced with a network-based computer application for reporting sample results. The lab will input results to a computer terminal which will be immediately available to Manufacturing for disposition.

The application code for this system is complete and is currently being tested and qualified. Additional hardware will also be purchased to support the system. Installation of the hardware and code qualification is scheduled for completion by the end of March, 1993.

In the interim, the lab and Manufacturing areas have implemented an administrative verification of result reporting, consisting of: 1) manufacturing personnel calling the lab once per shift to verify results, and (2) a second lab technician verifying that the conversion of raw data to final concentration was performed correctly. This interim practice will continue until the computerized sample request reporting system is installed and functional.

Weakness 92-04-18 -- Postings Regarding Criticality Controls.

Enhanced controls (Phase 1) and programs (Phase 2) have been initiated to address the Weaknesses concerning nuclear criticality safety postings (92-04-18), the application and use of exclusion zones (92-04-19), and engineering controls for the storage of Special Nuclear Material (92-04-21).

Phase 1 controls will characterize every material type stored on the floor at any time, and define every type of container used to store each material type. Teams will be formed by February 26, 1993, to perform the following: 1) enumerate how many containers of each type are needed for storage of each particular material type, 2) describe how each container will be labeled, 3) identify how and where each container may be stored, 4) define how each storage area will be posted, and 5) control the interaction of storage areas with exclusion zones.

The Phase 2 program involves the formation of a second team to address strict minimization of routine floor storage of nuclear material in the Columbia Facility. Areas to be addressed by this team include: 1) minimizing container types, 2) creating physical storage areas (racks, fenced areas, etc.) for each container type, 3) labeling each container as to what it can be used for and where it can be stored, 4) posting each physical storage area as to how containers are to be stored, and 5) providing for emergency floor storage on a case-by-case basis.

The team activities will be completed by June 30, 1993. Their recommendations will be reviewed and implemented as appropriate.

Weakness 92-04-19 -- Application and Use of Exclusion Zones.

The actions described for Weakness 92-04-18 will address this concern.

Weakness 92-04-21 -- Engineered Controls for Storage of Special Nuclear Material.

The actions described for Weakness 92-04-18 will address this concern.

Weakness 92-04-22 -- Improved Sample Analyses.

Sampling and analysis programs are being modified to transfer the "process control" aspects to Manufacturing by March 31, 1993. This transfer will reduce the number of samples required to be submitted to Regulatory Operations, while still maintaining proper responsibility in releasing final product from favorable to non-favorable geometry containers. New instrumentation for automated final release of product is currently being qualified. Additionally, samples will be received into the laboratory in unbreakable screw-top containers, and nondestructive assay measurements will be conducted without breaching the containers.

Weakness 92-04-29 -- Document Radiation Work Permit ALARA Checklists.

To ensure that ALARA reviews are performed and documented in a consistent manner, Regulatory Affairs Procedure RA-207 "Radiation Work Permits" was revised to incorporate ALARA actions more directly into the Radiation Work Permit process. This action was completed September 2, 1992, and has been successful in completing and documenting such ALARA reviews.

Weakness 92-04-34 -- Document Control for Regulatory Operations Procedures.

To ensure that Regulatory Operations (RO) procedures are properly controlled, they will be placed on the Electronic Procedure System. This will be completed as procedures come up for revision, beginning in February, 1993. In the interim, administrative constraints have been implemented to enhance procedural control,

including reduction of the number of controlled copies of the RO Procedures Manual and application of additional administrative attention to procedure revisions.

Weakness 92-04-36 -- Radiation Levels at the Central Security Station.

A survey instrument has been provided for use by the Security Watchmen at the Central Security Station so that they can determine whether this area can be manned during an emergency. Security Watchmen have also been trained to use the instrument. This was completed in January, 1993.

Weakness 92-04-37 -- Inadequate Training of Emergency Directors and Emergency Coordinators.

A performance-based training program is under development for emergency planning responders. A "needs analysis" evaluation performed for Emergency Directors and Emergency Coordinators indicated that these individuals required hands-on experience in order to properly fulfill their role in accordance with the Site Emergency Plan. Preparation for this hands-on training is nearing completion. The first phase of training (table top exercises) for all Emergency Directors and Emergency Coordinators should be completed by the end of February, 1993. Hands-on mock drills will then be performed to provide practice, by using various scenarios and walk-throughs. This will be completed by June 30, 1993.

Weakness 92-04-38 -- Inadequate Procedure RA-107.

Procedure RA-107, "Internal Reporting, and NRC Notification, of Unusual Occurrences", has been revised to correct deficiencies identified in the report. Changes include: 1) clarification of "equivalent compensatory controls"; 2) defining when an Alert should be declared, and 3) cross-referencing the Site Emergency Plan in the procedure. Implementation of this procedure is scheduled for February 28, 1993.

APPENDIX C

SAFETY MARGIN IMPROVEMENT PROGRAM

Introduction

The Columbia Fuel Fabrication Facility has long prided itself on its safety record. Furthermore, it remains fully committed to the policy that the safety of its employees and the general public is its number one priority. This policy is implemented through a cooperative working arrangement between manufacturing organizations (Manufacturing, Technical Services, and Product Assurance) and the Regulatory Affairs organization. This arrangement requires that the Plant's manufacturing organizations bear the primary responsibility for safety; and that Regulatory Affairs provides oversight and overall policy direction, regarding regulatory requirements, for plant operations.

The above strategy has served the Columbia Facility very well during its two-decades-long history. Now, however, a period is being entered where there are significantly heightened expectations on the part of both federal (NRC, EPA, OSHA) and state (SCDHEC) agencies. Areas where there are such heightened expectations include nuclear criticality safety; radiation exposure limits (including ALARA); uranium discharge limits for plant effluents; air and water quality standards; definition and disposal of hazardous wastes; fire protection; and industrial safety. This new regulatory environment requires that the Columbia Facility adopt a new approach to implementing safety programs, while simultaneously maintaining the fundamental strategy that manufacturing organizations bear the primary responsibility for safety. The new approach, therefore, is to combine all regulatory-related and process improvement projects into one highly structured umbrella program that builds on existing strengths. Creation of this umbrella program assures that Plant management will be aware of, and able to proactively meet, new regulatory requirements. This program will also allow safety-related and process improvement initiatives to be managed in a manner that assures coordination of all project priorities, resources, schedules, and external commitment dates. This program will be called the Safety Margin Improvement Program (SMIP).

Safety Margin Improvement Program

There are four major sub-programs that make up the Safety Margin Improvement Program. They are: 1) the Criticality Safety Improvement Program, 2) the Environmental Protection Improvement Program, 3) the Industrial Safety Improvement Program, and 4) the Columbia Plant Process Improvement Program. An overview of each sub-program is provided in Figure C-1; however, the Criticality Safety Improvement Program is the only sub-program that will be described in detail (Appendix D). Table C-1 cross references specific SMIP projects with the regulatory requirements and issues identified in NUREG-1324 as well as the Columbia Facility Operational Safety Assessment.

Criticality Safety Improvement Program

The facility has been aggressively implementing manufacturing system configuration control (CC) in the chemical area since 1990. A parallel effort to perform an in-depth criticality safety assessment (CSA) for each wet uranium-bearing process has also been implemented. The Criticality Safety Improvement Program is built on the strengths and experiences derived from both the CC and CSA efforts. In addition, four new major projects have been developed to address the weaknesses and concerns identified by the August, 1992, Operational Safety Assessment. Specific improvements have been planned in the areas of criticality safety measurement control, plant procedure upgrades, the change control and review process, and criticality safety training for plant personnel. Particular emphasis will be placed on implementation of a performance-based nuclear criticality safety training package, and the application of root cause analysis techniques to incident investigations. Further details of the Criticality Safety Improvement Program are provided in Appendix D.

Environmental Protection Improvement Program

The second component of SMIP consists of projects required to improve environmental safety in the areas of monitoring and control of plant effluents, and the reduction of both chemical and radiological discharge and waste disposal levels consistent with the ALARA principle. Periodic clean technology audits will also be part of ongoing efforts to ensure that plant practices are environmentally safe and comply with the criteria and limits specified by Federal and State agencies.

Industrial Safety Improvement Program

A series of programs have been identified to enhance industrial safety at the Columbia Facility. One of these initiatives is to implement the systems, procedures, and methodologies necessary to comply with revised 10CFR20 criteria. This initiative will require extensive modification of personnel exposure data acquisition computer hardware and software, in order to conform to internal plus external dose summation and other requirements. Additional industrial safety-related projects included in this program are fire protection, material handling and storage, implementation of a hazardous substance safety analysis project, and improved radiation protection.

Columbia Plant Process Improvement Program

The fourth component of SMIP consists of programs required to improve the manufacturing operations of the Columbia Facility so that it is able to meet both the challenges of an ever-changing business environment and the new generation of regulatory requirements. Key tasks encompassed by this program include: 1) enhancement of the Maintenance Planning Control System (MAPCON), 2) new capital investments for facility upgrades and implementation of new products, and 3) a major process improvement initiative (Vision 94) which will significantly improve the the plant's operating efficiency.

SMIP Project

Columbia Facility Management has created a specific project organization to plan, control, and coordinate all program activities integrated into SMIP. This project will be led by Dr. C. K. Wu, an Advisory Engineer in the Technical Services Department, and will be supported by project engineers and technicians from Plant Systems Engineering, Chemical Process Engineering, and Regulatory Affairs. Several of these engineers will report to Dr. Wu on a matrix basis, while many others will be involved on an ad-hoc basis. This approach will allow management to direct and control the regulatory workload on a project basis, thereby allowing adequate coordination of project activities, priorities, resource requirements, schedules, and external commitments. This approach will utilize the organization's existing strengths and talents to satisfy all business and regulatory requirements. Furthermore, it represents a commitment on the part of the plant to manage

safety improvement in a structured and comprehensive manner. Periodic internal management reviews of the entire program are planned.

APPENDIX D

CRITICALITY SAFETY IMPROVEMENT PROGRAM

Introduction

There are six major projects that constitute the Criticality Safety Improvement Program (CSIP). These are: 1) Configuration Control Management; 2) Criticality Safety Assessment Review Improvement; 3) Change Control Management; 4) Measurement Control; 5) Personnel Training; and 6) Procedure Upgrades. An overview of the CSIP is provided in Figure D-1, while the corresponding task definitions are described below.

Configuration Management

The configuration control project is a continuation of an ongoing effort to upgrade the top level configuration documentation for the balance of the chemical process area. Major activities will be focused on the revision and verification of engineering flow diagrams and instrumentation loop sheets related to safety controls. Work in 1993 will be extended to the portions of the uranium oxide powder processing facility that under primary moderation control, in order to produce the documentation necessary to support the corresponding criticality safety assessment project.

An equally important subtask is to improve the plant maintenance process. This sub-task will ensure: 1) plant preventive and corrective maintenance activities are managed, planned, and performed in a timely manner; 2) information provided for performing maintenance is correct, complete and documented; and, 3) equipment and instrumentation spare parts are properly set up in accordance with specification requirements.

Criticality Safety Assessment Review Improvement

A reference manual of methodology will be developed for the Criticality Safety Assessment process in accordance with Operational Safety Assessment recommendations. The manual will then be used as a guide for engineers to control normal operations; and, to determine and predict the consequences of nuclear material manufacturing system and/or equipment

failures under process upsets and other abnormal operating conditions. The manual will provide necessary instructions in a structured format so that the application of the "Double Contingency Principle" can effectively be utilized to establish criticality safety controls and limits. It will contain all necessary data (criteria and limits) to perform a high quality criticality safety assessment. Efforts in 1993 will continue to focus on criticality safety assessment in both the Ammonium Diuranate and Integrated Dry Route uranium oxide powder processing areas, as well as evaluation and implementation of recommendations from Assessment reports previously prepared for wet uranium-bearing chemical processes.

Change Control Management

This program will establish a change control system for evaluating any proposed additions to or modifications of, plant systems or equipment that may affect nuclear criticality safety. Procedures and methods will be developed to ensure that any changes in safety control limits and/or equipment configuration are made in accordance with approved design configuration and SNM-1107 License conditions. The program will also verify that each change evaluation is reviewed independently by a multi-disciplinary safety committee and/or cognizant technical expert. An independent audit program will be established to monitor performance of the change control system and procedures. A system will also be established to assure that datapacks generated from incident investigations are properly analyzed, and that corrective actions are traced to completion.

Measurement Control

A special effort will be devoted to developing an effective and reliable measurement control system applicable to criticality safety parameter measurements. Work planned includes: 1) identification of all criticality safety control points which are subject to measurement control; 2) evaluation of sampling plans to verify that they are adequate and represent required criticality safety control parameters; 3) evaluation and selection of the best available measurement techniques/methodologies; 4) evaluation of measurement system biases, and development of control methods to ensure measurement results are reliable and reproducible; and 5) implementation of appropriate system qualifications. Work in 1993 will focus on items 1 through 3 above.

Personnel Training

The primary objective of this program is to develop a performance-based criticality safety training package for all appropriate professionals and all non-exempt personnel working directly with Special Nuclear Materials. The principal efforts in 1993 will include completion of a "needs analysis" for all trainees (integrated within the ongoing interim training program), and creation of a Nuclear Safety Engineering Handbook that incorporates the information necessary to train Criticality Safety Specialists to perform nuclear criticality safety analyses and verify safety design calculations. Another important sub-task in 1993 will be to conduct formal root cause training classes for professionals and managers who are responsible for incident investigations.

These long-term improvement efforts will include revision and overhaul of the Nuclear Safety Training Package to ensure that the lesson plans, material contents, examinations, and evaluation methods are consistent with ANS-8.20 recommendations.

Procedure Upgrades

One of the most important improvement programs is the upgrade of written procedures so that they are commensurate with both criticality safety control and manufacturing process requirements. A multi-departmental task team will be organized to utilize a WesTIP Workshop to analyze, design and implement an improved process to ensure that: 1) clear written procedures are prepared, authorized, and followed; 2) procedure changes are properly reviewed, approved, revised, and distributed; and 3) the most recently authorized version is available for all users. In addition, the design of the Electronic Procedure System (EPS) will be reviewed, and improvements will be developed as necessary to resolve problems associated with human factors and user interfaces.

Work in 1993 will focus on conducting the WesTIP Plant Procedure Improvement Workshop, and performing the nuclear criticality safety procedure upgrades identified by the Operational Safety Assessment report. These procedures are: RA-104: Change Request Review; RA-108 and RA-109, which are related to Criticality Safety Interlocks Testing and Functional Verification, and RA-300, Nuclear Criticality Safety Design and Review Criteria.

Program Schedule

The CSIP is a comprehensive and complex program which will require substantial resources, multiple disciplines, multi-year implementation efforts, and long-term commitments.
Detailed program schedules will be developed according to the following priorities:

Priority I	Program schedules driven by regulatory directives that contribute most to the improvement of safety margins within a one- to two-year period.
Priority II	On-going improvement programs which have well defined workscopes and schedules, and require more than two years for completion.
Priority III	New improvement initiatives which require detailed study prior to establishment of a program schedule.

Periodic internal management reviews of the entire program, including priorities, resource utilization, schedules, and accomplishments, are planned. The program priority and schedule will be modified in accordance with the overall work load of the facility, as well as external influences such as new regulatory directives and or new business requirements.

Figure C-1

Safety Margin Improvement Program Overview

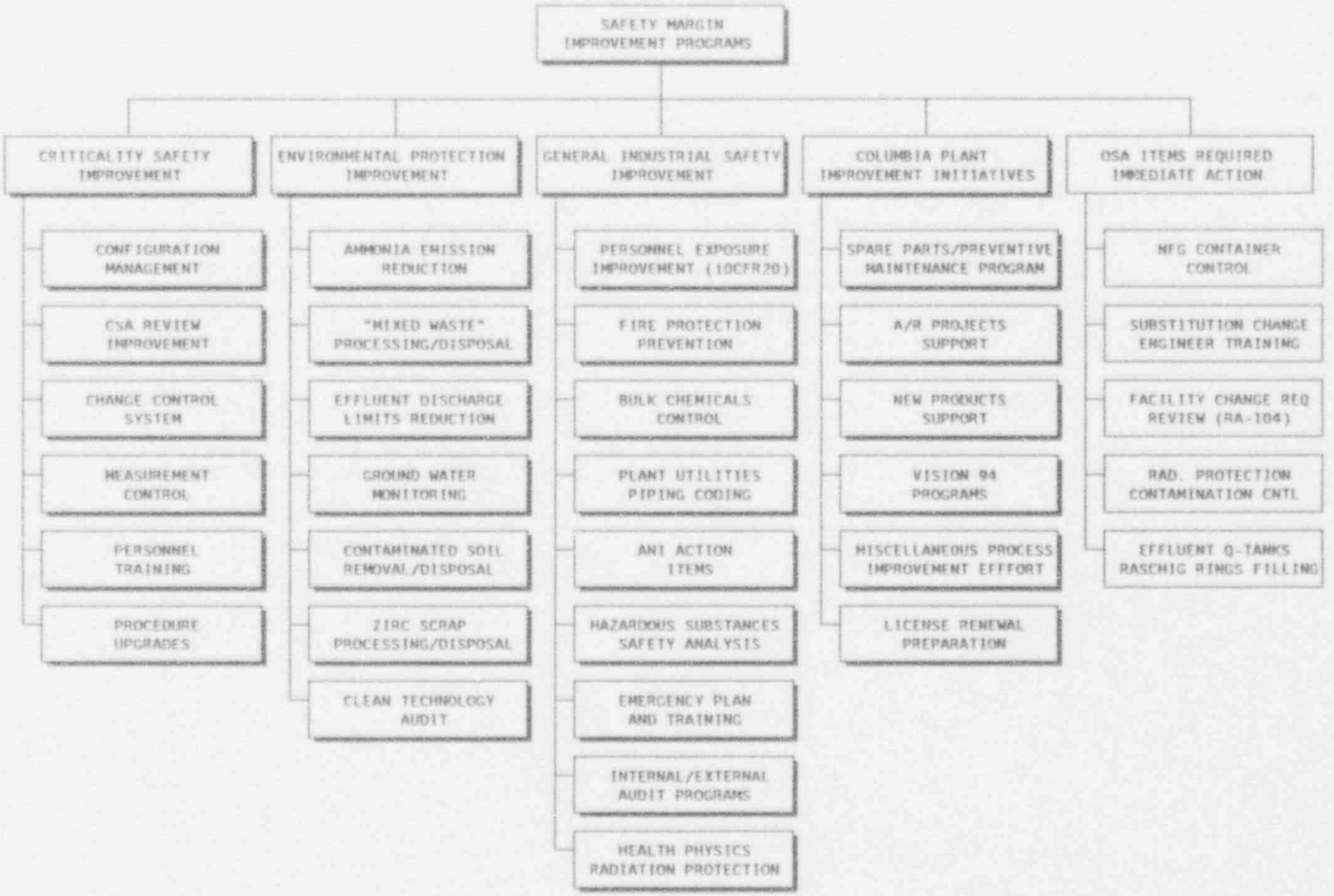

Figure D-1

Criticality Safety Improvement Program Overview

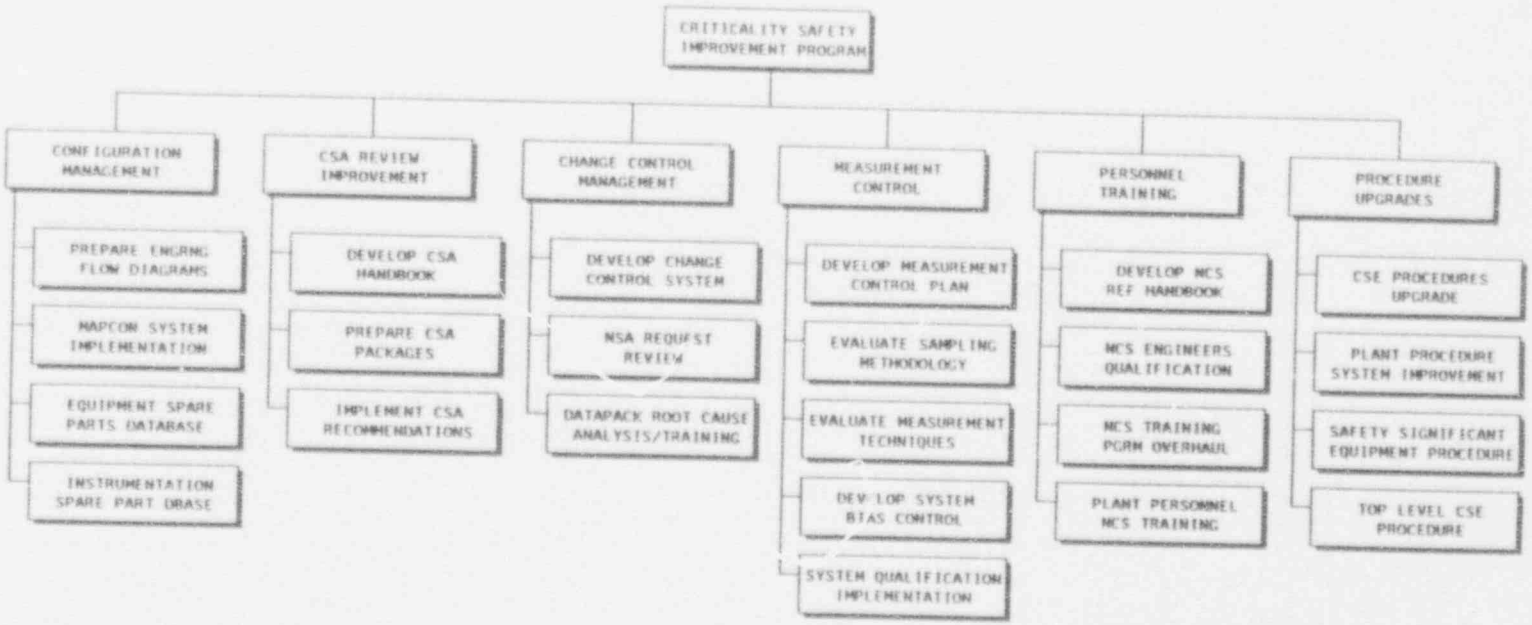

TABLE C-1
SMIP/OSA/NUREG -1324
Cross-Reference

Description	Program Priority	OSA Report References				NUREG-1324 References
		Weakness	Renewal	IFI's	Improvements	
I. Criticality Safety Improvement Programs						
1. Configuration Management			920409			3.26, 3.25
1.1 Prepare Engineering Flow Diagrams	High					3.2.7
1.2 MAPCON System Implementation	High		920424, 920425			3.7
1.3 Equipment Spare Parts Database	High					3.2.7
1.4 Instrumentation Spare Parts Database	Medium					3.2.1
2. Criticality Safety Assessment			920409			3.6
2.1 Develop CSA Handbook	High	920411	920409			3.17.1, 3.22, 3.3, 3.3.1, 3.3.2
2.2 Prepare CSA Packages	High	920411	920409			3.17.1, 3.22, 3.3, 3.3.1, 3.3.2
2.3 Implement CSA Recommendations	Medium	920405				3.2.8
3. Change Control Management			920409			3.2.2, 3.4, 3.2
3.1 Implement Change Control System	High		920409			3.2.2, 3.4, 3.2
3.2 NSA Request Review	High	920402, 920414				3.4
3.3 Datapack Root Cause Analysis	Medium	920405		920412		3.28
4. Measurement Control						
4.1 Develop Measurement Control Plan	High	920422, 920416		920423	Imp #4	3.15
4.2 Evaluate Sampling Methodology	High	920422, 920416		920423	Imp #4	3.15
4.3 Evaluate Measurement Technique	High	920422, 920416		920423	Imp #4	3.15
4.4 Develop Control Bias Control	High	920422, 920416		920423	Imp #4	3.15
4.5 System Qualification/Implementation	High	920422, 920416		920423	Imp #4	3.15
5. Personnel Training						3.5
5.1 Develop NCS Training Reference Handbook	High	920410				3.5
5.2 NCS Engineers Qualification	High	920410				3.5
5.3 Root Cause Analysis Training	High	920404				3.5
5.4 NCS Training Program Overhaul	Medium		920408, 920413		Imp #1, #7	3.5
5.5 Plant Personnel NCS Training	Medium	920410,920421, 920437,920438	920413		Imp # 2	3.5
6. Procedure Upgrades			920409			3.2
6.1 CSE Procedure Upgrade	High	920405, 920411				3.9
6.2 Plant Procedure System Improvement	High	920402, 920406, 920407, 920434			Imp #6	3.2.1
6.3 Safety Significant Equipment Procedure	Medium	920438	920427		Imp #3	3.9
6.4 Top Level Criticality Safety Procedure	Low	920403		920426	Imp #6	3.9

TABLE C-1
SMIP/OSA/NUREG -1324
Cross-Reference

Description	Program Priority	OSA Report References				NUREG-1324 References
		Weakness	Renewal	IFI's	Improvements	
II. Environmental Protection Improvement Programs			920409			3.11
7.1 Ammonia Emission Reduction	High					3.11
7.2 "Mixed Waste" Processing/Disposal	High					3.11, 3.16
7.3 Effluent Discharge Limit Reduction	High					3.11
7.4 Ground Water Monitoring	Medium					3.11
7.5 Contaminated Soil Removal/Disposal	Medium					3.11, 3.16
7.6 Zirc Scrap Processing/Disposal	Low					3.11, 3.16
7.7 Clean Technology Audit	Medium					3.11, 3.16
III. General Industrial Safety Improvement Programs			920409			
8.1 Personnel Exposure Improvement	High	920429, 920430, 920433		920428, 920431, 920432	Imp#7,#8,#9,#10,#12, #13,#14,#15,#16,#17	3.8
8.2 Fire Protection Prevention	Medium		920409	920441	Imp #22	3.10
8.3 Bulk Chemical Control	Medium			920439	Imp #21	3.10
8.4 Plant Utilities Piping Coding	Medium					3.10
8.5 ANI Action Items	Medium					3.10
8.6 Hazardous Substance Safety Analysis	Medium	920403		920439 920440	Imp #18	3.17.1, 3.17.2
8.7 Emergency Planning	Medium	920436, 920437, 920438	920435		Imp #19, #20	
8.8 Internal/External Audit Programs	Medium		920408, 920409			
8.9 H. P. Radiation Protection Contamination Control	Medium		920408, 920409			
IV. Columbia Plant Improvement Initiatives			920409			
9.1 Preventive Maintenance Program	High		920425, 920427			3.7
9.2 A/R Projects Support	High					
9.3 New Product Support	High					
9.4 Vision 94 Programs	Medium					
9.5 Process Improvement Initiatives	Medium					
9.6 License Renewal	Low		920409			3.2.7
V. Operational Safety Assessment Action Items						
10.1 NFG Container Control	High	920420				3.14
10.2 Substitution Change Engineer Training	High	920410				3.8
10.3 Facility Change Request Review (RA ;04)	High	920414				
10.4 Radiation Protection Contamination Control	High	920430				
10.5 Effluent Q-Tanks Raschig Rings Filling	High	920417				
10.6 Shop Floor SNM Control & Posting	High	920418, 920419, 920421			Imp #5	

File No. 70-1151/2.2
Copies To:

NRC93-002

Westinghouse Electric Corporation
Commercial Nuclear Fuel Division
Drawer R
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January 29, 1993

Mr. J. Philip Stohr, Director
Division of Radiation Safety and Safeguards
U.S. Nuclear Regulatory Commission
Region II
101 Marietta Street, N.W.
Atlanta, Georgia 30323

SUBJECT: NRC INSPECTION REPORT NO. 70-1151/9204

Gentlemen:

Westinghouse Electric Corporation hereby submits a response to the above-referenced Inspection Report pertaining to the NRC Operational Safety Assessment of our Columbia Fuel Fabrication Facility conducted August 17-28, 1992.

While this response is directed at the Weaknesses identified in the Inspection Report, we were pleased that your inspection report identified the many program Strengths at our facility. We believe that these Strengths are a direct result of proactive management and safety-first initiatives that assure compliance with regulatory requirements.

Our response describes initiatives taken, or planned, to address our mutual concerns regarding the following:

Appendix A contains our responses to the four Weaknesses addressed in your letter, specifically: (1) control of non-favorable geometry containers, (2) authority of process engineers to make substitution changes without proper training, (3) evaluation of facility changes, and (4) radiation protection practices concerning the contamination control and survey program. The Unresolved Item dealing with consideration of an overflow section of in a Raschig ring-filled tank is also addressed in Appendix A.

Appendix B contains our responses to the remaining eighteen Weaknesses listed in the Assessment Summary of your inspection report.

Appendix C contains an overview of our Safety Margin Improvement Program, which integrates many planned improvements to our environmental protection, radiation protection, nuclear criticality safety, industrial safety, fire protection, and emergency planning programs.

Appendix D contains details regarding the integrated improvements in our nuclear criticality safety program.

If you have any questions, please contact me at the above address or telephone me at (803) 776-2610 Ext. 3301.

Sincerely,

WESTINGHOUSE ELECTRIC CORPORATION

Ronald H. Koga
General Manager
Commercial Nuclear Fuel Division

APPENDIX A

RESPONSE TO ITEMS OF PARTICULAR CONCERN

The following is a description of actions taken or planned in response to the four Weaknesses of particular concern, specifically: 1) control of non-favorable geometry containers, 2) authority of process engineers to make substitution changes without proper training, 3) evaluation of facility changes, and 4) radiation protection practices concerning the contamination control and survey program. Actions taken with regard to the Unresolved Item dealing with consideration of an overflow section of a Raschig ring-filled tank are also described.

1. Weakness 92-04-20 -- Control of Non-Favorable Geometry Containers.

   Following the NRC Operational Safety Assessment, a comprehensive plan was initiated to minimize non-favorable geometry (NFG) containers and to provide nuclear criticality safety controls on those remaining. This plan included: 1) the formation of a multi-disciplinary task team to review and make recommendations to management regarding the control and use of movable NFG containers; 2) conducting an inventory of NFG containers; 3) removing unnecessary containers; 4) performing additional personnel training on the use of and controls for NFG containers; and, 5) implementing a new procedure to establish plant policy and criteria for NFG containers (RA-306, "Movable Non-Favorable Geometry (NFG) Containers" in the Chemical Area). These actions were summarized in a series of five letters to NRC Region II from September 4 to October 16, 1992. Two routine, unannounced inspections conducted by NRC Region II in September and October, 1992, resulted in no identified violations involving NFG containers.

   The plant policy (as stated in RA-306) is to minimize the use of movable NFG containers throughout the Chemical Area, and where continued use is necessary, to perform a Nuclear Safety Analysis (NSA) of, and establish adequate controls for, continued use. If it is necessary to use an NFG container in the main process areas

of the plant, it may only be used after the completion and approval of an NSA, including a double contingency evaluation, and the establishment of specific, proceduralized controls.

Currently, NSA's and procedure revisions are ongoing to analyze, justify, document, and control movable NFG containers that are necessary for operations. After procedure revisions are approved, training will be conducted as the revisions are issued to Manufacturing for use. The task team meets weekly to evaluate continuing items and make recommendations to management as appropriate. Surveillance for compliance with NFG container policy is performed weekly by task team members and by Safety Observers during their regular inspections. On an interim basis, joint Regulatory and Management tours were also conducted to audit for NFG container control compliance.

Many NSA's have been completed for "high priority" NFG operations. The remainder of the NSA's are scheduled for completion by March 31, 1993. Each affected procedure will be completed within one month of approval of the applicable NSA.

Procedure changes for which no NSA is required are in process and are expected to be completed by February 26, 1993.

2. Weakness 92-04-10 -- Training for Process Engineers.

Regarding the authority of process engineers to make substitution changes, the Configuration Control program has been modified to delete such authorization. If there is a future change in this policy, appropriate documented training and qualification by the Nuclear Criticality Safety Function will be provided to specific process engineers.

3. Weakness 92-04-14 -- Evaluation of Facility Changes.

Specific problems with the two Regulatory Affairs Review Requests noted in the report have been resolved. One of the Review Requests, waste sorting, w[illegible] never

approved or implemented. The other one, a low level waste treatment operation, was suspended and will not be restarted until a new Change Authorization is approved by Regulatory Affairs. Both of these were initiated before the plant Configuration Control procedure (TA-500) was implemented. This new procedure and the revised Regulatory Affairs procedures described below will correct facility change concerns.

Procedure RA-104, "Regulatory Affairs Review Request" is being revised and re-titled. The revised RA-104, entitled "Change Authorizations" requires Regulatory Affairs review of all steps in a facility change, up to and including implementation. This new Change Authorization process requires Regulatory Affairs review of changes during design conceptualization; installation and construction; preoperational testing; and operation. The change authorization process also requires a more detailed up-front review of system documentation, indicating revisions as a result of proposed changes to the process. (The old version of the procedure required review and approval of a facility change, but did not address details for the implementation phase of the change.) The new Change Authorization Request form requires information regarding reference drawings, assessment of accident scenarios, independent reviews, and limits and controls. This new document will contain the evaluations being performed or indicate where the information can be found, and will clarify the purpose of the documentation signatures. This procedure will be fully implemented by February 28, 1993.

The nuclear criticality safety evaluations that accompany Change Authorizations governed by revised RA-104 will be performed in accordance with a revised Procedure RA-300, "Nuclear Criticality Safety Design and Review Criteria". This procedure identifies the parameters for normal conditions of operation that may be applied to the system being reviewed. The procedure also requires that accident scenarios and appropriate controls be documented, and that (as a minimum) double contingency protection to preclude an accidental criticality be demonstrated and documented. This procedure identifies the terminology and methodology for nuclear criticality safety evaluations; and, identifies the requirements for personnel performing, reviewing, and approving the evaluations.

4. Weakness 92-04-30 -- Contamination Control and Survey Program.

Regulatory Operations procedures have been revised and administrative controls have been implemented to improve contamination control and survey practices identified as deficient in the report. In addition, a review is being performed of the overall contamination control and survey program to determine whether there are additional improvements that could further increase the margin of safety. Items under consideration include: 1) enhanced program audits; 2) Health Physics Technician training; 3) development of a plant-wide program on contamination control and survey practices to assure that the program fully meets site needs; and 4) an evaluation of employee contamination control practices. This review will be completed by April 30, 1993.

5. Unresolved Item 92-04-17 -- Raschig Ring-Filled Tanks.

The on-line Q-tanks have automatic level controllers set to maintain the liquid level between 20% and 80% full (the Raschig ring level is approximately 99% full). A high level alarm is set at 80% full, and operators are trained to discontinue feed to the tanks if the high-level alarm point is reached. This and other administrative controls have been in place to support double-contingency protection for the Q-tanks. In order to improve the margin of safety for this operation, however, Westinghouse will add Raschig rings to completely fill the tanks and manholes to a level such that the remaining void is less than a safe slab dimension. The additional Raschig rings needed to fill all six tanks were promptly placed on order. Half of the order was received in December, 1992, and three of the six tanks were filled at that time. The other half of the order was received January 26, 1993, and the remaining Raschig rings are scheduled to be placed in the last three tanks by January 30, 1993.

APPENDIX B

RESPONSES TO SPECIFIC PROGRAM WEAKNESSES

Weakness 92-04-01 -- Adequacy of Staffing.

Regulatory staffing at the Columbia Facility is based on the philosophy that Regulatory Affairs provides oversight and overall policy direction for plant operations regarding regulatory requirements -- including environmental protection, radiation protection, nuclear criticality safety, and industrial safety. The successful implementation of this philosophy is the safe and compliant performance to requirements by manufacturing personnel.

To further amplify staff resources, the following actions have been taken: 1) functions within the Regulatory Affairs organization have been reassigned; 2) a technician has been added to assist the Nuclear Criticality Safety Function; and, 3) a Safety Margin Improvement Project (SMIP) organization is being established to plan and direct all improvement projects in an integrated fashion (Appendix C). The SMIP organization will consist of a Project Manager/Leader, two professionals (one plant systems engineer and one regulatory engineer), and a Configuration Control technician. This organization will serve to further augment resources in the Regulatory Affairs organization.

Requests for these additional personnel have been approved, and the recruiting effort to hire is ongoing. Resource requirements will continue to be evaluated to assure that they are consistent with high quality safety and regulatory performance.

Weakness 92-04-02 -- Adequate Reviews of Technical Documents.

A Westinghouse evaluation method called WesTIP (a structured process by which appropriate management and other employees are assembled to examine a process using total quality tools that lead to process redesign) has been initiated to provide an

evaluation of this concern; and, will develop a mechanism to apply appropriate technical disciplines to procedure and other document reviews to assure that all technical concerns are addressed. Areas to be reviewed include identifying specific procedural changes to assist reviewers, and providing improved distribution of procedures to cognizant individuals. The WesTIP review will be completed by June 30, 1993. *(Note: This WesTIP review is the same method to be described under Weakness No. 92-04-07.)*

To ensure that Regulatory Affairs procedures are properly reviewed, these procedures will be placed on the Electronic Procedure System. This is scheduled for implementation as the procedures come up for revision, beginning January, 1993.

Actions to provide adequate technical reviews of change control authorizations and to establish the criteria to be satisfied by all nuclear criticality safety controls as specified by ANSI/ANS-8.1, Section 4.1.1, are addressed in the response to Weakness No. 92-04-14 (Appendix A).

Weakness 92-04-03 -- Lack of Formal Plant Procedures.

Specific procedures for chemical safety are incorporated in the Regulatory Affairs Procedure Manual and the Columbia Plant Safety Manual. Administrative procedures for chemical safety are being incorporated into the Columbia Plant Safe Working Practices Handbook. This is scheduled for completion by December 31, 1993.

A formal procedure for incident investigations will be developed following completion of the activities identified in Weakness 92-04-04 (root cause analysis training), by July 31, 1993. In the iterim, the Regulatory Engineering policy referenced in the Inspection report, "Establishing Protocol for Nuclear Criticality Safety Events", will be followed.

The following actions address the three Regulatory Affairs procedures referenced in the Inspection report:

RA-300, "Nuclear Criticality Safety Design and Review Criteria"

Accident analyses are currently being documented for all Facility Change Authorizations conducted in accordance with revised Procedure RA-104 (see response to Weakness No. 92-04-14). In addition, RA-300 is being revised to provide more guidance for the completion of these accident scenario evaluations. The revised procedure is in the review process and will be implemented by February 28, 1993.

RA-301, "Nuclear Criticality Control Procedure"

This procedure authorizes the use of non-favorable geometry (NFG) containers for filling with slightly contaminated scrap (materials with residual surface contamination and free of inaccessible areas that might contain uranium accumulations) without conducting physical measurements for fissile material content. The approval for such placement of scrap materials in NFG containers was based on required visual inspections to confirm that the fissile content was limited only to residual surface contamination. This program proved successful in controlling low-level waste. However, the procedure is being revised to delete a general authorization for such use of NFG containers. Regulatory Affairs Procedure RA-306 has been written to specify those movable NFG containers that have been approved for continued use. All other movable NFG containers, not approved in accordance with this procedure, have been removed from manufacturing areas (see response to 92-04-20).

RA-303, "Control of Moderating Materials for Nuclear Criticality Safety"

This procedure identifies the requirements for use of moderation control criteria in manufacturing operations. The procedure states that management must approve the use of moderating materials for fire fighting purposes, but does not address the fire fighting techniques. This procedure will be revised by February 28, 1993, to indicate that the only approved technique for fire fighting is a fog spray, and under no circumstances shall a directed concentrated spray, jet, or beam be used.

Weakness 92-04-04 -- Formal Root Cause Analysis Training.

Four individuals participated in a root cause analysis training program in December, 1992. Additional personnel attended a root cause analysis program at a nearby fuel fabrication facility to determine its applicability to Columbia Facility needs. A pilot evaluation program was initiated (using one of the trained individuals as a facilitator) in December, 1992, to test the applicability of the methodology and the training. Additional training for approximately 20 individuals is scheduled for February, 1993. The effectiveness of this new methodology and the schedule for additional training will be determined by June 30, 1993.

Weakness 92-04-05 -- System to Track and Trend Incidents.

The PRONET Commitment Tracking System managed by Regulatory Affairs is being used by the Criticality Safety Assessment (CSA) Team for recording of all recommended corrective actions. An action plan is also being developed for implementing the CSA recommendations for safety enhancement.

A procedure is under development to formalize the process for tracking and trending corrective actions in areas such as incident investigations, Criticality Safety Assessments, Safety Action Group surveillance items, and facility change control authorizations. The procedure will include a process for assuring that items are tracked to closure. The schedule for this procedure will be determined as part of the Safety Margin Improvement Program (Appendix C).

Weakness 92-04-06 -- Human Factors Associated with the Electronic Procedure System.

Efforts are underway to review the Electronic Procedure System with operators and other "users" to determine where human factors improvements can be made. Evaluations will also be made of system software to determine where enhancement modifications can be made. This review is scheduled for completion by June 30, 1993.

Weakness 92-04-07 -- Control and Implementation of Supplemental Operating Instructions.

A procedure system improvement plan has been identified in the Safety Margin Improvement Program to provide adequate control and implementation of operating procedures, including Supplemental Operating Instructions (SOI's). The plan will utilize WesTIP methodology to analyze the existing procedure system, and to design, develop and implement an improved process to address concerns in the Inspection report. This will cover inconsistencies in use of the SOI acknowledgement sheets, maintenance of SOI's for operator review, and control and implementation of SOI's. The improvements will be focused on the areas described below:

- Develop a structured procedure system and clarify the functions of Operating Procedures, Supplemental Operating Instructions, and Process Information Forms.

- Ensure all procedures contain the necessary information (regulatory and operational criteria/limits); and that the information is accurate and clearly provided.

- Improve procedure control systems to ensure that procedures are understood and consistently followed by functional area personnel.

- Develop a cross-reference documentation index for procedures and other configuration documentation (drawings, parameter sheets, Operating Procedures, Supplemental Operating Instructions, and Process Information Forms).

- Develop an audit process to evaluate overall system effectiveness.

The WesTIP review will be completed by June 30, 1993; the remainder of the schedule will be developed following the WesTIP review. *(Note: This is the same WesTIP methodology described under Weakness No. 92-04-02.)*

Weakness 92-04-11 -- Descriptions of Accident Scenarios for Criticality Safety Assessments.

A new procedure (RA-307, "Nuclear Criticality Safety Assessments") is being developed to require accident scenario evaluations for each Criticality Safety Assessment being performed. Accident scenario descriptions are to be identified during the initial Nuclear Safety Analysis and documented within the Criticality Safety Assessment report. Scenarios identified in the Criticality Safety Assessment report will have appropriate controls identified in a table format that shows the relationship of each control to the specific barrier and contingency. This procedure is scheduled for implementation by February 28, 1993.

In addition, the Integrated Dry Route (IDR) Conversion Criticality Safety Assessments were revised to include accident scenario evaluations as a model test case. The resulting reports were critiqued by both NRC and independent Westinghouse personnel; and, a more formalized accident scenario evaluation technique was recommended. Westinghouse is currently investigating formal evaluation techniques for implementation and benchmark testing. This review should be completed by May 31, 1993.

Weakness 92-04-16 -- Transfers from Favorable to Non-Favorable Geometry Containers.

At the time of the NRC Operational Safety Assessment, Uranyl Nitrate analytical sample results were logged in the lab and then verbally transmitted by telephone to Manufacturing. The Manufacturing Area personnel then recorded these results in their log.

This practice will be replaced with a network-based computer application for reporting sample results. The lab will input results to a computer terminal which will be immediately available to Manufacturing for disposition.

The application code for this system is complete and is currently being tested and qualified. Additional hardware will also be purchased to support the system. Installation of the hardware and code qualification is scheduled for completion by the end of March, 1993.

In the interim, the lab and Manufacturing areas have implemented an administrative verification of result reporting, consisting of: 1) manufacturing personnel calling the lab once per shift to verify results, and (2) a second lab technician verifying that the conversion of raw data to final concentration was performed correctly. This interim practice will continue until the computerized sample request reporting system is installed and functional.

Weakness 92-04-18 -- Postings Regarding Criticality Controls.

Enhanced controls (Phase 1) and programs (Phase 2) have been initiated to address the Weaknesses concerning nuclear criticality safety postings (92-04-18), the application and use of exclusion zones (92-04-19), and engineering controls for the storage of Special Nuclear Material (92-04-21).

Phase 1 controls will characterize every material type stored on the floor at any time, and define every type of container used to store each material type. Teams will be formed by February 28, 1993, to perform the following: 1) enumerate how many containers of each type are needed for storage of each particular material type, 2) describe how each container will be labeled, 3) identify how and where each container may be stored, 4) define how each storage area will be posted, and 5) control the interaction of storage areas with exclusion zones.

The Phase 2 program involves the formation of a second team to address strict minimization of routine floor storage of nuclear material in the Columbia Facility. Areas to be addressed by this team include: 1) minimizing container types, 2) creating physical storage areas (racks, fenced areas, etc.) for each container type, 3) labeling each container as to what it can be used for and where it can be stored, 4) posting each physical storage area as to how containers are to be stored, and 5) providing for emergency floor storage on a case-by-case basis.

The team activities will be completed by June 30, 1993. Their recommendations will be reviewed and implemented as appropriate.

Weakness 92-04-19 -- Application and Use of Exclusion Zones.

The actions described for Weakness 92-04-18 will address this concern.

Weakness 92-04-21 -- Engineered Controls for Storage of Special Nuclear Material.

The actions described for Weakness 92-04-18 will address this concern.

Weakness 92-04-22 -- Improved Sample Analyses.

Sampling and analysis programs are being modified to transfer the "process control" aspects to Manufacturing by March 31, 1993. This transfer will reduce the number of samples required to be submitted to Regulatory Operations, while still maintaining proper responsibility in releasing final product from favorable to non-favorable geometry containers. New instrumentation for automated final release of product is currently being qualified. Additionally, samples will be received into the laboratory in unbreakable screw-top containers, and nondestructive assay measurements will be conducted without breaching the containers.

Weakness 92-04-29 -- Document Radiation Work Permit ALARA Checklists.

To ensure that ALARA reviews are performed and documented in a consistent manner, Regulatory Affairs Procedure RA-207 "Radiation Work Permits" was revised to incorporate ALARA actions more directly into the Radiation Work Permit process. This action was completed September 2, 1992, and has been successful in completing and documenting such ALARA reviews.

Weakness 92-04-34 -- Document Control for Regulatory Operations Procedures.

To ensure that Regulatory Operations (RO) procedures are properly controlled, they will be placed on the Electronic Procedure System. This will be completed as procedures come up for revision, beginning in February, 1993. In the interim, administrative constraints have been implemented to enhance procedural control,

including reduction of the number of controlled copies of the RO Procedures Manual and application of additional administrative attention to procedure revisions.

Weakness 92-04-36 -- Radiation Levels at the Central Security Station.

A survey instrument has been provided for use by the Security Watchmen at the Central Security Station so that they can determine whether this area can be manned during an emergency. Security Watchmen have also been trained to use the instrument. This was completed in January, 1993.

Weakness 92-04-37 -- Inadequate Training of Emergency Directors and Emergency Coordinators.

A performance-based training program is under development for emergency planning responders. A "needs analysis" evaluation performed for Emergency Directors and Emergency Coordinators indicated that these individuals required hands-on experience in order to properly fulfill their role in accordance with the Site Emergency Plan. Preparation for this hands-on training is nearing completion. The first phase of training (table top exercises) for all Emergency Directors and Emergency Coordinators should be completed by the end of February, 1993. Hands-on mock drills will then be performed to provide practice, by using various scenarios and walk-throughs. This will be completed by June 30, 1993.

Weakness 92-04-38 -- Inadequate Procedure RA-107.

Procedure RA-107, "Internal Reporting, and NRC Notification, of Unusual Occurrences", has been revised to correct deficiencies identified in the report. Changes include: 1) clarification of "equivalent compensatory controls"; 2) defining when an Alert should be declared, and 3) cross-referencing the Site Emergency Plan in the procedure. Implementation of this procedure is scheduled for February 28, 1993.

APPENDIX C

SAFETY MARGIN IMPROVEMENT PROGRAM

Introduction

The Columbia Fuel Fabrication Facility has long prided itself on its safety record. Furthermore, it remains fully committed to the policy that the safety of its employees and the general public is its number one priority. This policy is implemented through a cooperative working arrangement between manufacturing organizations (Manufacturing, Technical Services, and Product Assurance) and the Regulatory Affairs organization. This arrangement requires that the Plant's manufacturing organizations bear the primary responsibility for safety; and that Regulatory Affairs provides oversight and overall policy direction, regarding regulatory requirements, for plant operations.

The above strategy has served the Columbia Facility very well during its two-decades-long history. Now, however, a period is being entered where there are significantly heightened expectations on the part of both federal (NRC, EPA, OSHA) and state (SCDHEC) agencies. Areas where there are such heightened expectations include nuclear criticality safety; radiation exposure limits (including ALARA); uranium discharge limits for plant effluents; air and water quality standards; definition and disposal of hazardous wastes; fire protection; and industrial safety. This new regulatory environment requires that the Columbia Facility adopt a new approach to implementing safety programs, while simultaneously maintaining the fundamental strategy that manufacturing organizations bear the primary responsibility for safety. The new approach, therefore, is to combine all regulatory-related and process improvement projects into one highly structured umbrella program that builds on existing strengths. Creation of this umbrella program assures that Plant management will be aware of, and able to proactively meet, new regulatory requirements. This program will also allow safety-related and process improvement initiatives to be managed in a manner that assures coordination of all project priorities, resources, schedules, and external commitment dates. This program will be called the Safety Margin Improvement Program (SMIP).

Safety Margin Improvement Program

There are four major sub-programs that make up the Safety Margin Improvement Program. They are: 1) the Criticality Safety Improvement Program, 2) the Environmental Protection Improvement Program, 3) the Industrial Safety Improvement Program, and 4) the Columbia Plant Process Improvement Program. An overview of each sub-program is provided in Figure C-1; however, the Criticality Safety Improvement Program is the only sub-program that will be described in detail (Appendix D). Table C-1 cross references specific SMIP projects with the regulatory requirements and issues identified in NUREG-1324 as well as the Columbia Facility Operational Safety Assessment.

Criticality Safety Improvement Program

The facility has been aggressively implementing manufacturing system configuration control (CC) in the chemical area since 1990. A parallel effort to perform an in-depth criticality safety assessment (CSA) for each wet uranium-bearing process has also been implemented. The Criticality Safety Improvement Program is built on the strengths and experiences derived from both the CC and CSA efforts. In addition, four new major projects have been developed to address the weaknesses and concerns identified by the August, 1992, Operational Safety Assessment. Specific improvements have been planned in the areas of criticality safety measurement control, plant procedure upgrades, the change control and review process, and criticality safety training for plant personnel. Particular emphasis will be placed on implementation of a performance-based nuclear criticality safety training package, and the application of root cause analysis techniques to incident investigations. Further details of the Criticality Safety Improvement Program are provided in Appendix D.

Environmental Protection Improvement Program

The second component of SMIP consists of projects required to improve environmental safety in the areas of monitoring and control of plant effluents, and the reduction of both chemical and radiological discharge and waste disposal levels consistent with the ALARA principle. Periodic clean technology audits will also be part of ongoing efforts to ensure that plant practices are environmentally safe and comply with the criteria and limits specified by Federal and State agencies.

Industrial Safety Improvement Program

A series of programs have been identified to enhance industrial safety at the Columbia Facility. One of these initiatives is to implement the systems, procedures, and methodologies necessary to comply with revised 10CFR20 criteria. This initiative will require extensive modification of personnel exposure data acquisition computer hardware and software, in order to conform to internal plus external dose summation and other requirements. Additional industrial safety-related projects included in this program are fire protection, material handling and storage, implementation of a hazardous substance safety analysis project, and improved radiation protection.

Columbia Plant Process Improvement Program

The fourth component of SMIP consists of programs required to improve the manufacturing operations of the Columbia Facility so that it is able to meet both the challenges of an ever-changing business environment and the new generation of regulatory requirements. Key tasks encompassed by this program include: 1) enhancement of the Maintenance Planning Control System (MAPCON), 2) new capital investments for facility upgrades and implementation of new products, and 3) a major process improvement initiative (Vision 94) which will significantly improve the the plant's operating efficiency.

SMIP Project

Columbia Facility Management has created a specific project organization to plan, control, and coordinate all program activities integrated into SMIP. This project will be led by Dr. C. K. Wu, an Advisory Engineer in the Technical Services Department, and will be supported by project engineers and technicians from Plant Systems Engineering, Chemical Process Engineering, and Regulatory Affairs. Several of these engineers will report to Dr. Wu on a matrix basis, while many others will be involved on an ad-hoc basis. This approach will allow management to direct and control the regulatory workload on a project basis, thereby allowing adequate coordination of project activities, priorities, resource requirements, schedules, and external commitments. This approach will utilize the organization's existing strengths and talents to satisfy all business and regulatory requirements. Furthermore, it represents a commitment on the part of the plant to manage

safety improvement in a structured and comprehensive manner. Periodic internal management reviews of the entire program are planned.

APPENDIX D

CRITICALITY SAFETY IMPROVEMENT PROGRAM

Introduction

There are six major projects that constitute the Criticality Safety Improvement Program (CSIP). These are: 1) Configuration Control Management; 2) Criticality Safety Assessment Review Improvement; 3) Change Control Management; 4) Measurement Control; 5) Personnel Training; and 6) Procedure Upgrades. An overview of the CSIP is provided in Figure D-1, while the corresponding task definitions are described below.

Configuration Management

The configuration control project is a continuation of an ongoing effort to upgrade the top level configuration documentation for the balance of the chemical process area. Major activities will be focused on the revision and verification of engineering flow diagrams and instrumentation loop sheets related to safety controls. Work in 1993 will be extended to the portions of the uranium oxide powder processing facility that under primary moderation control, in order to produce the documentation necessary to support the corresponding criticality safety assessment project.

An equally important subtask is to improve the plant maintenance process. This sub-task will ensure: 1) plant preventive and corrective maintenance activities are managed, planned, and performed in a timely manner; 2) information provided for performing maintenance is correct, complete and documented; and, 3) equipment and instrumentation spare parts are properly set up in accordance with specification requirements.

Criticality Safety Assessment Review Improvement

A reference manual of methodology will be developed for the Criticality Safety Assessment process in accordance with Operational Safety Assessment recommendations. The manual will then be used as a guide for engineers to control normal operations; and, to determine and predict the consequences of nuclear material manufacturing system and/or equipment

failures under process upsets and other abnormal operating conditions. The manual will provide necessary instructions in a structured format so that the application of the "Double Contingency Principle" can effectively be utilized to establish criticality safety controls and limits. It will contain all necessary data (criteria and limits) to perform a high quality criticality safety assessment. Efforts in 1993 will continue to focus on criticality safety assessment in both the Ammonium Diuranate and Integrated Dry Route uranium oxide powder processing areas, as well as evaluation and implementation of recommendations from Assessment reports previously prepared for wet uranium-bearing chemical processes.

Change Control Management

This program will establish a change control system for evaluating any proposed additions to, or modifications of, plant systems or equipment that may affect nuclear criticality safety. Procedures and methods will be developed to ensure that any changes in safety control limits and/or equipment configuration are made in accordance with approved design configuration and SNM-1107 License conditions. The program will also verify that each change evaluation is reviewed independently by a multi-disciplinary safety committee and/or cognizant technical expert. An independent audit program will be established to monitor performance of the change control system and procedures. A system will also be established to assure that datapacks generated from incident investigations are properly analyzed, and that corrective actions are traced to completion.

Measurement Control

A special effort will be devoted to developing an effective and reliable measurement control system applicable to criticality safety parameter measurements. Work planned includes: 1) identification of all criticality safety control points which are subject to measurement control; 2) evaluation of sampling plans to verify that they are adequate and represent required criticality safety control parameters; 3) evaluation and selection of the best available measurement techniques/methodologies; 4) evaluation of measurement system biases, and development of control methods to ensure measurement results are reliable and reproducible; and 5) implementation of appropriate system qualifications. Work in 1993 will focus on items 1 through 3 above.

Personnel Training

The primary objective of this program is to develop a performance-based criticality safety training package for all appropriate professionals and all non-exempt personnel working directly with Special Nuclear Materials. The principal efforts in 1993 will include completion of a "needs analysis" for all trainees (integrated within the ongoing interim training program), and creation of a Nuclear Safety Engineering Handbook that incorporates the information necessary to train Criticality Safety Specialists to perform nuclear criticality safety analyses and verify safety design calculations. Another important sub-task in 1993 will be to conduct formal root cause training classes for professionals and managers who are responsible for incident investigations.

These long-term improvement efforts will include revision and overhaul of the Nuclear Safety Training Package to ensure that the lesson plans, material contents, examinations, and evaluation methods are consistent with ANS-8.20 recommendations.

Procedure Upgrades

One of the most important improvement programs is the upgrade of written procedures so that they are commensurate with both criticality safety control and manufacturing process requirements. A multi-departmental task team will be organized to utilize a WesTIP Workshop to analyze, design and implement an improved process to ensure that: 1) clear written procedures are prepared, authorized, and followed; 2) procedure changes are properly reviewed, approved, revised, and distributed; and 3) the most recently authorized version is available for all users. In addition, the design of the Electronic Procedure System (EPS) will be reviewed, and improvements will be developed as necessary to resolve problems associated with human factors and user interfaces.

Work in 1993 will focus on conducting the WesTIP Plant Procedure Improvement Workshop, and performing the nuclear criticality safety procedure upgrades identified by the Operational Safety Assessment report. These procedures are: RA-104: Change Request Review; RA-108 and RA-109, which are related to Criticality Safety Interlocks Testing and Functional Verification, and RA-300, Nuclear Criticality Safety Design and Review Criteria.

Program Schedule

The CSIP is a comprehensive and complex program which will require substantial resources, multiple disciplines, multi-year implementation efforts, and long-term commitments.
Detailed program schedules will be developed according to the following priorities:

Priority I	Program schedules driven by regulatory directives that contribute most to the improvement of safety margins within a one- to two-year period.
Priority II	On-going improvement programs which have well defined workscopes and schedules, and require more than two years for completion.
Priority III	New improvement initiatives which require detailed study prior to establishment of a program schedule.

Periodic internal management reviews of the entire program, including priorities, resource utilization, schedules, and accomplishments, are planned. The program priority and schedule will be modified in accordance with the overall work load of the facility, as well as external influences such as new regulatory directives and or new business requirements.

Figure C-1

Safety Margin Improvement Program Overview

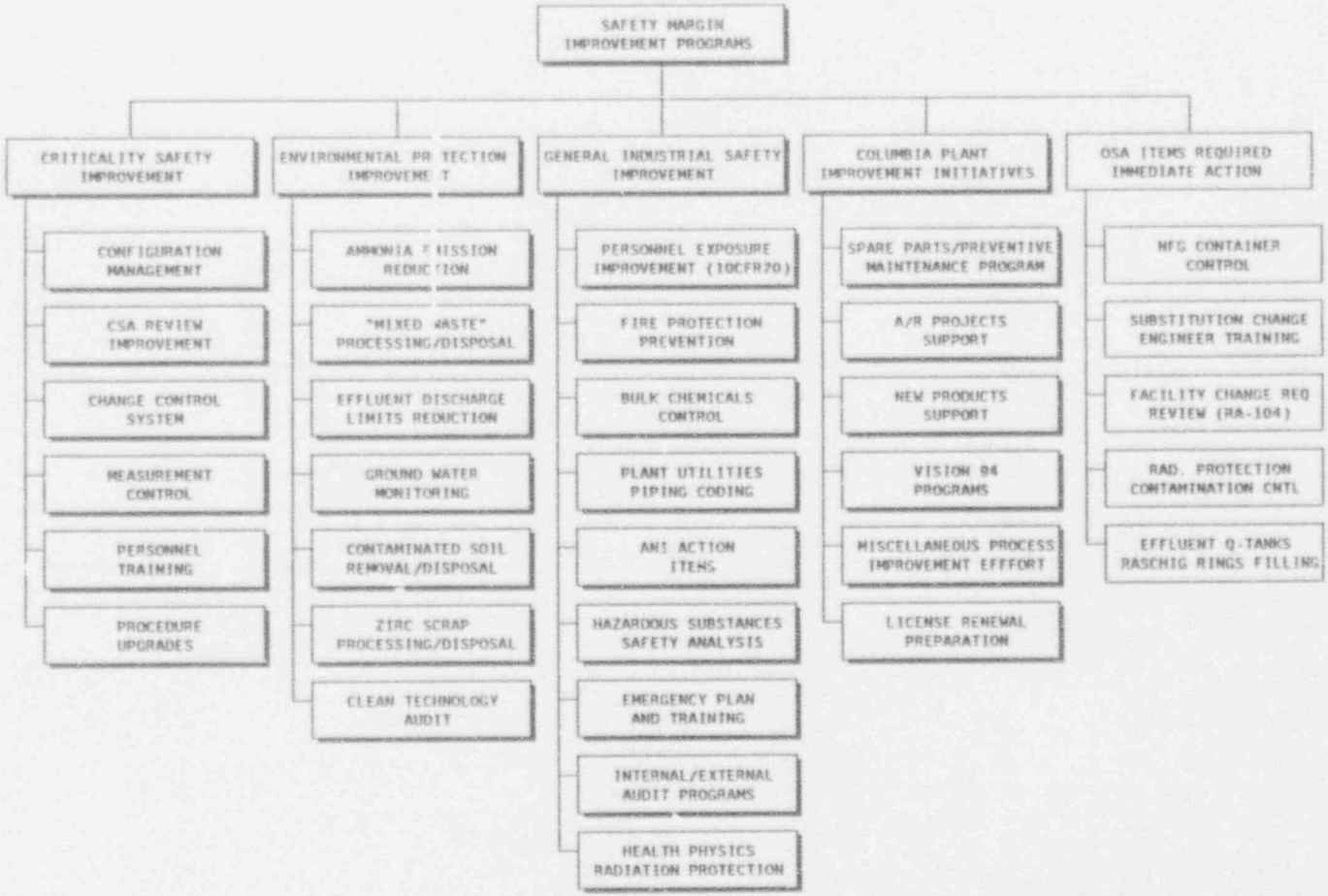

Figure D-1

Criticality Safety Improvement Program Overview

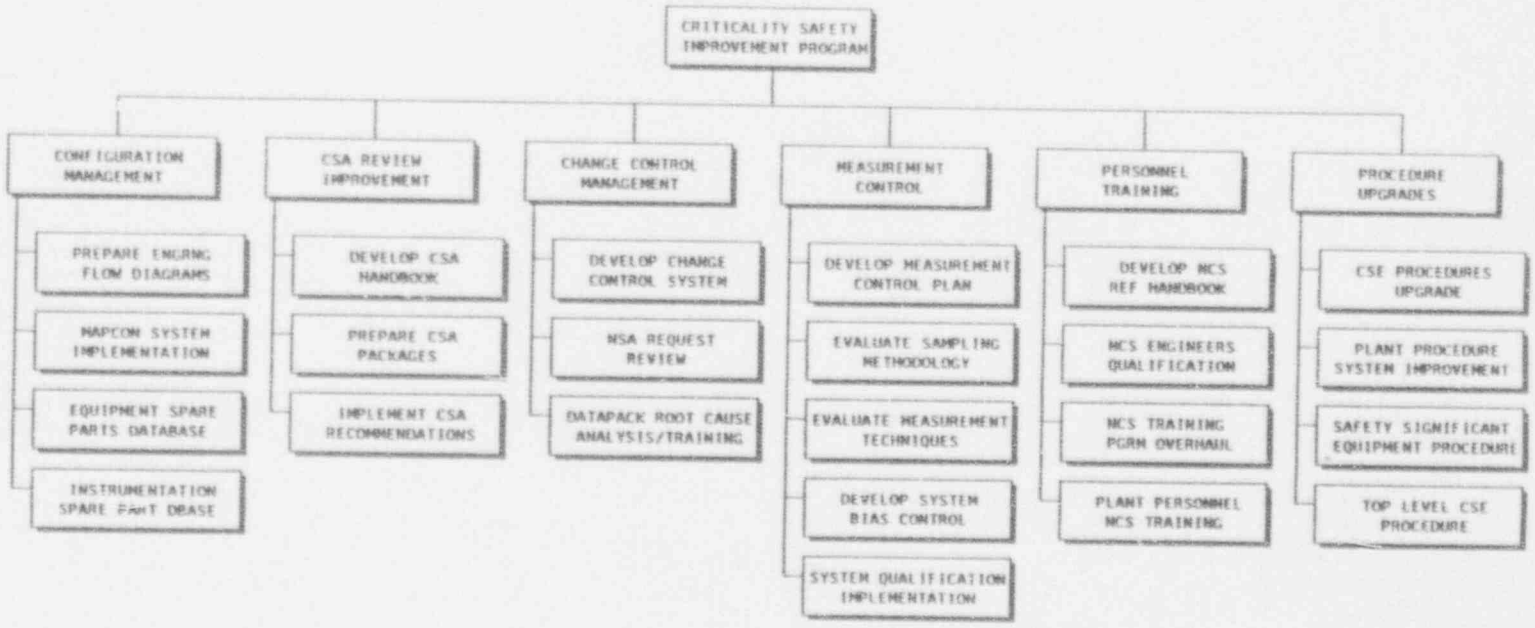

TABLE C-1
SMIP/OSA/NUREG -1324
Cross-Reference

Description	Program Priority	OSA Report References				NUREG-1324 References
		Weakness	Renewal	IFI's	Improvements	
I. Criticality Safety Improvement Programs						
1. Configuration Management			920409			3.26, 3.25
1.1 Prepare Engineering Flow Diagrams	High					3.2.7
1.2 MAPCON System Implementation	High		920424, 920425			3.7
1.3 Equipment Spare Parts Database	High					3.2.7
1.4 Instrumentation Spare Parts Database	Medium					3.2.1
2. Criticality Safety Assessment			920409			3.9
2.1 Develop CSA Handbook	High	920411	920409			3.17.1, 3.22, 3.3, 3.3.1, 3.3.2
2.2 Prepare CSA Packages	High	920411	920409			3.17.1, 3.22, 3.3, 3.3.1, 3.3.2
2.3 Implement CSA Recommendations	Medium	920405				3.2.8
3. Change Control Management			920409			3.2.2, 3.4, 3.2
3.1 Implement Change Control System	High		920409			3.2.2, 3.4, 3.2
3.2 NSA Request Review	High	920402, 920414				3.4
3.3 Datapack Root Cause Analysis	Medium	920405		920412		3.28
4. Measurement Control						
4.1 Develop Measurement Control Plan	High	920422, 920416		920423	Imp #4	3.15
4.2 Evaluate Sampling Methodology	High	920422, 920416		920423	Imp #4	3.15
4.3 Evaluate Measurement Technique	High	920422, 920416		920423	Imp #4	3.15
4.4 Develop Control Bias Control	High	920422, 920416		920423	Imp #4	3.15
4.5 System Qualification/Implementation	High	920422, 920416		920423	Imp #4	3.15
5. Personnel Training						3.5
5.1 Develop NCS Training Reference Handbook	High	920410				3.5
5.2 NCS Engineers Qualification	High	920410				3.5
5.3 Root Cause Analysis Training	High	920404				3.5
5.4 NCS Training Program Overhaul	Medium		920408, 920413		Imp #1, #7	3.5
5.5 Plant Personnel NCS Training	Medium	920410,920421, 920437,920438	920413		Imp # 2	3.5
6. Procedure Upgrades			920409			3.2
6.1 CSE Procedure Upgrade	High	920405, 920411				3.9
6.2 Plant Procedure System Improvement	High	920402, 920406, 920407, 920434			Imp #6	3.2.1
6.3 Safety Significant Equipment Procedure	Medium	920438	920427		Imp #3	3.9
6.4 Top Level Criticality Safety Procedure	Low	920403		920426	Imp #6	3.9

TABLE C-1
SMIP/OSA/NUREG -1324
Cross-Reference

Description	Program Priority	OSA Report References				NUREG-1324 References
		Weakness	Renewal	IFI's	Improvements	
II. Environmental Protection Improvement Programs			**920409**			**3.11**
7.1 Ammonia Emission Reduction	High					3.11
7.2 "Mixed Waste" Processing/Disposal	High					3.11, 3.16
7.3 Effluent Discharge Limit Reduction	High					3.11
7.4 Ground Water Monitoring	Medium					3.11
7.5 Contaminated Soil Removal/Disposal	Medium					3.11, 3.16
7.6 Zinc Scrap Processing/Disposal	Low					3.11, 3.16
7.7 Clean Technology Audit	Medium					3.11, 3.16
III. General Industrial Safety Improvement Programs			**920409**			
8.1 Personnel Exposure Improvement	High	920429, 920430, 920433		920428, 920431, 920432	Imp#7,#8,#9,#10,#12, #13,#14,#15,#16,#17	3.8
8.2 Fire Protection Prevention	Medium		920409	920441	Imp #22	3.10
8.3 Bulk Chemical Control	Medium			920439	Imp #21	3.10
8.4 Plant Utilities Piping Coding	Medium					3.10
8.5 ANI Action Items	Medium					3.10
8.6 Hazardous Substance Safety Analysis	Medium	920403		920439 920440	Imp #18	3.17.1, 3.17.2
8.7 Emergency Planning	Medium	920436, 920437, 920438	920435		Imp #19, #20	
8.8 Internal/External Audit Programs	Medium		920408, 920409			
8.9 H. P. Radiation Protection Contamination Control	Medium		920408, 920409			
IV. Columbia Plant Improvement Initiatives			**920409**			
9.1 Preventive Maintenance Program	High		920425, 920427			3.7
9.2 A/R Projects Support	High					
9.3 New Product Support	High					
9.4 Vision 94 Programs	Medium					
9.5 Process Improvement Initiatives	Medium					
9.6 License Renewal	Low		920409			3.2.7
V. Operational Safety Assessment Action Items						
10.1 NFG Container Control	High	920420				3.14
10.2 Substitution Change Engineer Training	High	920410				3.8
10.3 Facility Change Request Review (RA-104)	High	920414				
10.4 Radiation Protection Contamination Control	High	920430				
10.5 Effluent Q-Tanks Raschig Rings Filling	High	920417				
10.6 Shop Floor SNM Control & Posting	High	920418, 920419, 920421			Imp #5	