

# **INSPECTION PROGRAM IMPLEMENTATION PLAN FOR THE REGULATORY OVERSIGHT OF THE RPP-WTP CONTRACTOR**



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## PREFACE

As directed by Congress in Section 3139 of the *Strom Thurmond National Defense Authorization Act for Fiscal Year 1999*, the U.S. Department of Energy (DOE) established the Office of River Protection (ORP) at the Hanford Site to manage the River Protection Project (RPP), formerly known as the Tank Waste Remediation System. ORP is responsible for the safe storage, retrieval, treatment, and disposal of the high level nuclear waste stored in the 177 underground tanks at Hanford.

The initial concept for treatment and disposal of the high level wastes at Hanford was to use private industry to design, construct, and operate a Waste Treatment Plant (WTP) to process the waste. The concept was for DOE to enter into a fixed-price contract for the Contractor to build and operate a facility to treat the waste according to DOE specifications. In 1996, DOE selected two contractors to begin design of a WTP to accomplish this mission. In 1998, one of the contractors was eliminated, and design of the WTP was continued. However, in May 2000, DOE chose to terminate the privatization contract and seek new bidders under a different contract strategy. In December 2000, a team led by Bechtel National, Inc. was selected to continue design of the WTP and to subsequently build and commission the WTP.

A key element of the River Protection Project Waste Treatment Plant (RPP-WTP) is DOE regulation of safety through a specifically chartered, dedicated Office of Safety Regulation (OSR). The OSR reports directly to the ORP Manager. The regulation by the OSR is authorized by the document entitled *Policy for Radiological, Nuclear, and Process Safety Regulation of the River Protection Project Waste Treatment Plant Contractor* (DOE/RL-96-25) (referred to as the Policy) and implemented through the document entitled *Memorandum of Agreement for the Execution of Radiological, Nuclear, Process Safety Regulation of the RPP-WTP Contractor* (DOE/RL-96-26) (referred to as the MOA). These two documents provide the basis for the safety regulation of the RPP-WTP at Hanford.

The foundation of both the Policy and the MOA is that the mission of removal and immobilization of the existing large quantities of tank waste by the RPP-WTP Contractor must be accomplished safely, effectively, and efficiently.

The Policy maintains the essential elements of the regulatory program established by DOE in 1996 for the privatization contracts. The MOA clarifies the DOE organizational relationships and responsibilities for safety regulation of the RPP-WTP. The MOA provides a basis for key DOE officials to commit to teamwork in implementing the policy and achieve adequate safety of RPP-WTP activities.

The Policy, the MOA, the RPP-WTP Contract, and the four documents incorporated in the Contract define the essential elements of the regulatory program being executed by the OSR. The four documents incorporated into the Contract (and also in the MOA) are as follows:

*Concept of the DOE Process for Radiological, Nuclear, and Process Safety Regulation of the RPP Waste Treatment Plant Contractor*, DOE-96-0005,

*DOE Process for Radiological, Nuclear, and Process Safety Regulation of the RPP Waste Treatment Plant Contractor*, DOE/RL-96-0003,

*Top-Level Radiological, Nuclear, and Process Safety Standards and Principles for the RPP Waste Treatment Plant Contractor*, DOE/RL-96-0006, and

*Process for Establishing a Set of Radiological, Nuclear, and Process Safety Standards and Requirements for the RPP Waste Treatment Plant Contractor*, DOE/RL-96-0004.

DOE patterned its safety regulation of the RPP-WTP Contractor to be consistent with the concepts and principles of good regulation (reliability, clarity, openness, efficiency, and independence) used by the Nuclear Regulatory Commission (NRC). In addition, the DOE principles of integrated safety management were built into the regulatory program for design, construction, operation, and deactivation of the facility. The regulatory program for nuclear safety permits waste treatment services to occur on a timely, predictable, and stable basis, with attention to safety consistent with that which would occur from safety regulation by an external agency. DOE established OSR as a dedicated regulatory organization to be a single point of DOE contact for nuclear safety oversight and approvals for the WTP Contractor. The OSR performs nuclear safety review, approval, inspection, and verification activities for ORP using the NRC principles of good regulation while defining how the Contractor shall implement the principles of standards-based integrated safety management.

A key feature of this regulatory process is its definition of how the standards-based integrated safety management principles are implemented to develop a necessary and sufficient set of standards and requirements for the design, construction, operation, and deactivation of the RPP-WTP facility. This process meets the expectations of the DOE necessary and sufficient closure process (subsequently renamed Work Smart Standards process) in DOE Policy 450.3, *Authorizing Use of the Necessary and Sufficient Process for Standards-based Environment, Safety and Health Management*, and is intended to be a DOE approved process under DOE Acquisition Regulations, DEAR 970.5204-2, *Laws, Regulations and DOE Directives*, Section (c). DOE approval of the contractor-derived standards is assigned to the OSR.

The RPP-WTP Contractor has direct responsibility for WTP safety. DOE requires the Contractor to integrate safety into work planning and execution. This integrated safety management process emphasizes that the Contractor's direct responsibility for ensuring that safety is an integral part of mission accomplishment. DOE, through its safety regulation and management program, verifies that the Contractor achieves adequate safety by complying with approved safety requirements.





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# INSPECTION PROGRAM IMPLEMENTATION PLAN FOR THE REGULATORY OVERSIGHT OF THE RPP-WTP CONTRACTOR

## 1.0 INTRODUCTION

A key element of the regulation of safety for the River Protection Project Waste Treatment Plant (RPP-WTP) is the performance of inspections. The inspection function is administered by the Office of Safety Regulation (OSR) of the RPP-WTP Contractor, an organizational element of the U.S. Department of Energy (DOE), Office of River Protection (ORP).

The OSR's Inspection Program is described in RL/REG-98-05, *Inspection Program Description for the Regulatory Oversight of the RPP-WTP Contractor*. RL/REG-98-05 addresses how the Inspection Program is defined, implemented, and executed according to the mandates for an inspection function. These mandates are stipulated in the RL/REG-96-25, *Policy for Radiological, Nuclear, and Process Safety Regulation and Management of the River Protection Project Waste Treatment Plant Contractor*; DOE/RL-96-26, *Memorandum of Agreement for the Execution of Radiological, Nuclear, and Process Safety Regulation of the River Protection Project Waste Treatment Plant Contractor*; and the RPP-WTP Contract.<sup>1</sup> DOE/RL-96-26 describes the purpose, general nature, objectives, and scope of the OSR Inspection Program as well as documents the program's authority.

The OSR Inspection Program is implemented according to this Inspection Program Implementation Plan (IPIP). The IPIP provides inspection-related administrative requirements, describes Inspection Program activities that are common to all phases of the RPP-WTP Inspection Program, and identifies specific administrative and technical procedures used to implement the Inspection Program.

## 2.0 COMMON INSPECTION ELEMENTS

This section describes elements of the OSR Inspection Program that are common to performing all inspections. These elements ensure that inspections are performed efficiently and effectively, while accomplishing the stated inspection objectives. The elements consist of planning and scheduling, gathering information, and preparing and performing inspections. Additional elements include evaluating documentation, docketing and storing information, and tracking and dispositioning of inspection-related items. For each element, objectives are described and detailed implementation instructions are provided in specific administrative procedures. In addition, this section discusses OSR inspector qualification.

Due to these common elements being used throughout the duration of the OSR Inspection Program and encompass activities requiring detailed instructions, these elements are expressed as A-100 series inspection administrative procedures in RL/REG-98-25, *Inspection Administrative Procedures* (IAPs). Specific area inspections will be designated as I-100 series inspection

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<sup>1</sup> Contract DE-AC27-01RV14136 between DOE and Bechtel National, Inc.(BNI) dated December 11, 2000.

technical procedures in RL/REG-98-26, *Inspection Technical Procedures* (ITPs). These procedures ensure consistency with applicable OSR Management Directives.

## **2.1 Inspection Planning and Scheduling**

Inspection planning and scheduling is conducted according to IAP A-101, "Inspection Planning and Scheduling." Planning and scheduling are performed to ensure that the overall set of planned inspections are adequate and compatible with the Contractor's ongoing schedule for developing and implementing its administrative and technical programs associated with the design, construction, testing, operation, and deactivation of the facility. Inspections will be sufficient in scope and depth to adequately assess the Contractor's implementation of the various administrative and technical programs established to meet the requirements set forth in the authorization basis and applicable regulations. Planning and scheduling for inspection is performed in a way that ensures the following:

- Resources (both qualifications and man-hours) are available to perform inspections with sufficient depth to carry out the inspection plan.
- Planning and scheduling consider trends and special conditions that might necessitate special assessments.
- The Contractor's work activities are considered in order to minimize disruption.

These planning and scheduling activities ensure that an inspection schedule is in place that maintains the timing and coordination of specific inspections relative to the Contractor's work. The OSR's inspection schedule is adjusted for the above considerations, while continuing to meet the objective of RL/REG-98-05, Section 5.0.

As the Inspection Program transitions from design to construction and later phases, the inspection planning and scheduling process accommodates this transition, which may involve one or more resident inspectors, who are normally assigned at the facility. The Inspection Program has defined inspections that may blend several areas described in different approved inspection procedures, coordinated by the resident inspector, and conducted under the authority of the Verification and Confirmation Officer.

## **2.2 Inspection Protocols**

The OSR Inspection Program is implemented in a planned, disciplined, and predictable manner. This implementation is accomplished by planning, preparing, and performing inspections and by using established protocols. These protocols provide a known process for conducting the inspection-related interactions between the OSR and the Contractor. During conduct of the Inspection Program, some or all of the protocols, which are described in this section, will be implemented. In some cases, inspection administrative procedures are referenced for specific protocols.

### **2.2.1 Announced and Unannounced Inspections and Information Requests**

IAP A-102, "Announced and Unannounced Inspections and Related Information Requests," provides guidance on the decision to perform announced or unannounced inspections and the need to request information before inspectors arrive on location. While preparing for an inspection, inspectors first determine if the inspection will be announced or unannounced. If the inspection will be announced, the inspectors may determine that obtaining key information from the Contractor related to a specific inspection area, before or when they arrive on location, may be necessary or advantageous to accomplish the inspection efficiently and effectively. In deciding if an information request is needed, the inspectors consider the impact that a request will have on the Contractor and avoid requests that could significantly disrupt Contractor activities.

If a request for information is deemed necessary or advantageous, the protocol listed below is used. For all formal information requests (where requests for documents or briefings are made before an inspection), the request for information is provided to the Contractor in writing according to RL/REG-97-05, *Office of Safety Regulation Management Directives*, Management Directive (MD) 2.1, "Information Management." The letter includes the following requests as a minimum:

**For documents:**

- The reason for the request
- A clear description of the information needed
- The date when the information is needed.

**For briefings:**

- The names of the person contacted and the OSR staff member who made the contact
- The reason for the briefing
- Key OSR and Contractor attendees
- A clear description of the information to be addressed in the briefing
- The date and location where the briefing should be conducted
- A discussion of the need to place any handouts on the docket.

### **2.2.2 Entrance and Exit Meetings**

Entrance and exit meetings associated with each specific inspection are arranged and conducted according to IAP A-103, "Entrance and Exit Meetings." Entrance meetings are conducted to ensure that the Contractor's managers and key personnel are informed of the details of inspections. The scope of the entrance meeting protocol includes, as a minimum, describing the purpose and intent of the inspection and discussing schedule considerations. Such protocol ensures that the interactions between the OSR inspection team and the Contractor's managers (and other key personnel) are facilitated before they occur.

Exit meetings are conducted to ensure that the Contractor's managers and key personnel are informed of the preliminary results of inspections and the degree of cooperation experienced during the inspections. The scope of the exit meeting protocol includes, as a minimum, discussing the results of the inspection including discussing Findings or observations that were identified as a result of the inspection. This protocol ensures that the post-inspection interactions between the OSR inspection team and the Contractor's managers and other personnel are facilitated to provide efficient and effective closure.

### **2.2.3 Resident Inspection Protocol**

Resident inspectors may be assigned to the facility during limited construction and beyond to provide regular coverage of Contractor activities. Inspection protocol will be similar to the protocol used for OSR office-based inspections, with the following differences:

- The resident inspection reports may cover periods of one to two months. Entrances and regular update meetings on inspection focus will be presented to site management to keep them informed on inspector activities. Exit meetings will be conducted at the end of each inspection period, as described in Section 2.2.2, above.
- Inspection activities will be commensurate with Contractor activities during the inspection period. Inspection procedures, as described in later sections of this plan, will be used in part or in full to provide guidance during inspections. Multiple inspection procedures may be used during any given inspection period, with emphasis on direct observation of work in progress.
- Resident inspector(s) will be supplemented by office-based or OSR Contractor inspection staff to cover multiple activities of technical areas and/or when a specialist is needed.

IAP A-112, "Resident Inspection Responsibilities," provides detailed guidance for the resident program.

### **2.3 Inspection Preparation**

Inspection preparation is performed according to IAP A-104, "Inspection Preparation," and includes, as a minimum, the following requirements:

- Designate a qualified lead inspector (see Section 2.8) and supplement with sufficient staff to perform and document the inspection in the time allotted.
- Obtain approved inspection procedures for the inspection area and review for necessary changes.
- Obtain necessary information in order to write the inspection plan.

- Prepare a plan for approval that delineates the inspection procedures to be used and the items to be inspected or reviewed.
- Implement sufficient protocol requirements necessary to schedule the entrance, establish points-of-contact, and address logistical considerations.

Inspection preparation activities are applied to all inspections performed under this program. Inspection personnel must be knowledgeable of background information, relevant information previously submitted by the Contractor, detailed activity plans, applicable OSR inspection procedures and protocols, and specific assignments/expectations for each inspection.

This preparation activity ensures that the on-location portion of each inspection proceeds professionally, efficiently, and effectively and provides an inspection process that supports the Inspection Program objectives.

## **2.4 Inspection Performance**

IAP A-105, "Inspection Performance," describes the process for performing inspections. This procedure defines the administrative requirements for conducting inspections and includes general guidance for the following:

- Deviating from inspection plans or procedures
- Addressing significant areas of concern
- Conducting inspection staff debriefings
- Interfacing with Contractor personnel during inspections
- Providing periodic inspection feedback to the Contractor
- Addressing inappropriate behavior of either the OSR or Contractor personnel.

In addition to the general guidance provided above, IAP A-106, "Verification of Corrective Actions," describes the process for reviewing Contractor corrective actions to Findings or observations that the Contractor has documented in formal correspondence to the OSR. Examples of correspondence that often contain corrective actions include responses to Findings or event reports (Incident Notification Reports).

Inspections are conducted according to the inspection plan for each activity of interest. Inspection plans are flexible to allow the inspectors, with management's approval, to modify the approach to better accomplish the inspection objectives or to follow-up on significant areas of concern or situations that may involve imminent danger.

Inspection performance ensures consistent, efficient, and effective inspections and provides for corrective action follow-up. Issues are defined and brought to the attention of OSR and Contractor management in a timely manner. These activities are performed to the extent practical without producing negative impacts on the Contractor's work activities.

## 2.5 Inspection Documentation

IAP A-107, "Inspection Documentation," provides specific guidance on preparing inspection reports. Inspection reports include, as a minimum, the following:

- A cover letter transmitting the inspection report to the Contractor and describing any Findings or observations identified
- An "Executive Summary" highlighting conclusions drawn from each area inspected
- A report coversheet documenting the report number, inspection period, inspection location, and the names of the inspectors and the reviewing official
- A "Report Details" section that, for each area inspected, describes the area inspected, the documents reviewed, and inspector observations and conclusions
- A section that discusses any related management meetings conducted during the inspection period, including the exit meeting
- A "Report Background Information" section that lists a summary of key Contractor personnel contacted during the inspection, items opened, reviewed, and/or closed, and commonly used acronyms.

Inspection reports are a formal record of regulatory action; therefore, they must be accurate and complete. An inspection report is written for each OSR inspection and documents what was inspected and the results of the inspection.

In developing the conclusions for each inspection area, the inspector will characterize the results as observations or as Findings. In general, Findings describe significant issues that often are discussed in the inspection report cover letter and may require corrective action by the Contractor and subsequent follow-up by the OSR inspection staff. IAP A-105, "Inspection Performance," provides specific guidance on what constitutes Findings and how to incorporate Findings into inspection reports.

The documentation process described above results in complete, readable, and standardized records of the inspections.

## 2.6 Inspection Records

Inspection activities involve official regulatory interactions with the Contractor. As such, formal documentation of these activities is part of the regulatory record and is docketed. Inspection reports are written in a manner that ensures all necessary inspection-related information is captured in the report or attached to the report. Therefore, once approved and issued, the inspection report constitutes the necessary legal and historical information that is docketed and archived. Other documents such as inspection-related correspondence between the Contractor and OSR staff are also docketed and archived. The inspection report, including the cover letter

and all attachments, and any inspection-related official correspondence are assigned Information Management System control numbers, and associated contractor-specific docket numbers. This ensures that the documents are docketed and archived according to MD 2.1.

## **2.7 Follow-up System Tracking**

IAP A-108, "Inspection Follow-up System," provides specific instructions for using and maintaining the Inspection Follow-up System. During the OSR Inspection Program, observations, assessments, and Findings are identified and documented. In some cases, Contractor and/or OSR staff actions are necessary to resolve issues associated with inspection items. In addition, Contractor-identified occurrences that require subsequent inspection follow-up activities are reported. Eventual review and disposition of these items are documented in inspection reports. To ensure that all items are dispositioned, items requiring follow-up are provided a tracking number and entered into an inspection follow-up system database.

## **2.8 Inspector Qualification**

Inspectors who have been qualified according to IAP A-109, "Inspector Qualification Program," are authorized to perform inspections without direct supervision. Inspectors and OSR contractors who have not completed the qualification program are authorized to perform inspections only under the direct supervision of a qualified inspector. The qualification program ensures OSR management that inspectors are knowledgeable of the OSR Inspection Program, the authorization basis, regulations applicable to the Contractor, and the procedures used to address unusual incidents. Procedures addressing unusual incidents include responses to significant events or Findings associated with Contractor facilities.

## **3.0 INSPECTION DURING DESIGN**

This section describes the areas of the Inspection Program that are being implemented and executed during the design phase of the RPP-WTP Program. The Inspection Program objective in this phase is to assist the Safety Regulatory Official (SRO) with recommendations on the issuance of the Authorization for Limited Construction and, subsequently, the Authorization for Construction (with respect to adherence to design requirements). The specific set of inspection areas for the design phase of the Inspection Program was selected to satisfy the program objectives in RL/REG-98-05, Section 5.0.

The general design-phase inspection attributes, rationale, and basis for each of the individual areas are described below (this is not an all-inclusive list of attributes but represents the approach being considered) and form the justification for the rigor of the program. During this phase, Contractor performance is assessed against the authorization basis and applicable laws and regulations. The specific inspection areas are defined consistent with the expected flow of the Contractor's design-phase activities. Inspections are scheduled according to Section 2.1 above.

### 3.1 Verifying Contractor Quality Assurance (QA) Program and Implementation

The Contractor's QA program and its implementation in the design phase of the RPP-WTP Contract will be inspected periodically throughout the design and subsequent phases of the facility's lifetime. These inspections are conducted according to RL/REG-98-26 and ITP I-101, "Quality Assurance Assessment," and include the following activities:

- Assessing implementing procedures of the QA organization to verify compliance with the Contractor's approved Quality Assurance Program (QAP)
- Verifying that the QA organization's program is consistent with the requirements in the Safety Requirements Document (SRD), and Integrated Safety Management Plan (ISMP)
- Verifying that the QA organization's program is meeting the requirements of 10 CFR 830, "Nuclear Safety Management," Subpart A
- Assessing the adequacy of the QA organization's implementation of the QAP.

**Rationale** – The implementation of the QA organization's requirements provides documented assurance that important-to-safety activities are performed according to the authorization basis and are of a quality commensurate with the activities' safety significance. The Contractor's inability to provide documentation of the quality of important-to-safety work activities could jeopardize the OSR's timely recommendation that the ORP Manager grant an Authorization for Limited Construction and subsequently the Construction Authorization.

**Basis** – Implementation of an approved QA program and compliance with the DOE QA requirements in 10 CFR 830, Subpart A are required by Standard 7 in Section C.6 of the RPP-WTP Contract. The basis for the inspections in this area is the OSR-approved SRD Safety Criteria (SC), QAP, ISMP, and 10 CFR 830, Subpart A.

### 3.2 Verifying Configuration Management

The Contractor's configuration management program and its implementation will be inspected periodically throughout the design and subsequent phases of the facility's lifetime. These inspections are performed according to ITP I-102, "Configuration Management Assessment," and include the following activities:

- Assessing the Contractor's implementing procedures for configuration management to ensure that they satisfy the commitments in the authorization basis such as the SRD, ISMP, and QAP
- Assessing the adequacy of the Contractor's implementation of the configuration management procedures.

**Rationale** – The goal of a configuration management program as it relates to safety is as follows:

- Establish consistency among the safety requirements for the facility
- Maintain the physical configuration (structures, systems, and components [SSCs]) of the facility
- Maintain this physical configuration and design basis throughout the life of the facility.

For design safety to be achieved effectively and maintained adequately as a basis for authorizations (OSR actions), continued configuration management must be ensured. Failure to maintain adequate configuration management during the design phase could jeopardize the OSR's timely recommendation that the ORP Manager grant an Authorization for Limited Construction and subsequently the Construction Authorization. This could lead to performance and regulatory difficulties in subsequent phases of the Contractor's waste treatment program. Therefore, inspections are needed to ensure adequate performance in this area.

**Basis** – The basis for the inspections in this area are the OSR-approved QAP, SRD, and ISMP. As required by 10 CFR 830, Subpart A, configuration management functions are embedded in the Contractor's SRD and the QAP. Additional requirements are defined further in the Contractor's ISMP.

### **3.3 Verifying Self-Assessments and Corrective Actions**

The Contractor's self-assessment and corrective action program and its implementation will be inspected periodically throughout the design and subsequent phases of the facility's lifetime. These inspections are conducted according to ITP I-103, "Self-Assessment and Corrective Action Assessment," and include the following activities:

- Verifying that the Contractor's program for performing self-assessments and implementing corrective actions is consistent with the commitments in the SRD, ISMP, and QAP
- Verifying that the self-assessments and corrective actions will be performed according to the regulatory requirements in 10 CFR 830, Subpart A, and DOE/RL-96-0006, *Top-Level Radiological, Nuclear, and Process Safety Standards and Principles for the RPP-WTP Contractor*
- Assessing the adequacy and effectiveness of the Contractor's procedures for performing self-assessments and implementing corrective actions
- Assessing the adequacy of the frequency of the Contractor's performance of self-assessments and the timeliness of implementing corrective actions
- Assessing the adequacy of the Contractor's self-assessment and corrective action records
- Assessing the adequacy of the Contractor's disposition of issues identified during self-assessments.

**Rationale** – Section C.4(a) and Standard 7 in Section C.6, paragraph (e)(2)(ii), of the Contract requires that the Contractor comply with the 10 CFR 800 series of regulations. The DOE requires management self-assessment and corrective actions to achieve quality objectives [10 CFR 830, Subpart A(c)(3)]. The Contractor’s QAP and ISMP address self-assessment and corrective action. The self-assessment and corrective action inspection procedure is designed to evaluate the effectiveness of the Contractor's self-assessment and corrective action program. The OSR Inspection Program employs intermittent, focused inspections that are intended to sample the Contractor’s performance (over time and throughout the scope of its important-to-safety activities) in implementing and executing control of important-to-safety activities such that adequate safety is achieved efficiently and effectively.

The inspection approach has merit if the Contractor’s own self-assessment program is known to be effective in assessing adequate Contractor performance in important-to-safety areas. This area of inspection is needed to confirm an effective safety/quality culture within the Contractor’s team. Ineffective self-assessment during the design phase could undermine the OSR’s confidence in the Contractor’s regulatory submittals and thereby jeopardize the OSR’s timely recommendation that the ORP Manager grant an Authorization for Limited Construction and subsequently the Construction Authorization. In addition, it could lead to performance and regulatory difficulties in subsequent phases of the Contractor’s waste treatment program.

**Basis** – The basis for self-assessment functions are 10 CFR 830, Subpart A(c)(3), and the OSR-approved SRD, QAP, and ISMP.

### 3.4 Verifying Design Process

The Contractor's design process and its implementation will be inspected periodically throughout the design phase. These inspections are conducted according to ITP I-104, "Design Process Assessment," and include the following activities:

- Assessing the adequacy of the Contractor's design process program (procedures) to ensure that the program adequately implements the Contractor's commitments in the authorization basis
- Assessing implementation of the Contractor’s procedures on design process related to selection of SSCs, specified functions and requirements for each SSC, selection of design-basis events for SSCs, analysis approaches for design-basis events, specification of standby and accident operating environments, and application of design controls to ensure that the design basis is maintained from the original or developing design through design changes and modifications
- Assessing implementation of the Contractor’s design review process.

**Rationale** – Inspections during the design effort will allow the OSR to assess the consideration and/or incorporation of safety issues into the Contractor's design. The Contractor's performance in designing the systems and facilities to process the tank waste is essential to achieving

adequate safety during production operations, which is when the hazards exist. The DOE has a vested interest in the success of the design standards implementation through a design process that ensures that important-to-safety aspects of the design are finalized, detailed, and issued as procurement packages for fabrication and construction. Ineffective implementation of SRD design standards during the design phase could jeopardize the OSR timely recommendation that the ORP Manager grant an Authorization for Limited Construction and subsequently the Construction Authorization. This, in turn, could lead to performance and regulatory difficulties in subsequent phases of the Contractor's waste treatment program.

**Basis** – The OSR-approved design standards are contained in the Contractor's SRD Safety Criteria (SC) in Chapter 4, "Engineering and Design." The design process commitment is made in the SRD, Vol. I, Section 3.0, "SRD Development Process." Design commitments are located in SRD Vol. II, Section 3.0, "Nuclear and Process Safety." The technical basis for the standard (in terms of the hazards/events and hazards control strategies to which the standard applies) is contained in the Contractor-designated supporting technical documents. The Contractor also makes commitments relative to the implementation of the design process in Section 6 of the QAP. Therefore, the basis for the inspections in this area is the OSR-approved SRD and QAP and the Contractor's supporting technical documents.

### 3.5 Verifying Standards Selection Process

The Contractor's standards selection process and its implementation will be inspected periodically throughout the design phase. These inspections are conducted according to ITP I-105, "Standards Selection Process Assessment," and include the following activities:

- Verifying that the Contractor is using the DOE/RL-96-0004, *Process for Establishing a set of Radiological, Nuclear, and Process Safety Standards and Requirements for the RPP-WTP Contract*, standards selection process in developing and refining subordinate standards as well as new standards
- Verifying that the Contractor is making modifications to existing standards when substantial changes occur to the facility or to elements of the facility process
- Verifying that the Contractor is applying the tailoring process described in RL/REG-98-17, *Office of Safety Regulation Position on Tailoring for Safety*, Section 5.1, in identifying standards
- Verifying that the Contractor is adequately maintaining records of linkages in the steps in the standards selection process
- Verifying that the Contractor is adequately documenting and maintaining justifications for changes to the OSR-approved standards.

**Rationale** – The standards selection process specified in DOE/RL-96-0004 is expected to be a continuing process. Once the OSR approves the initial set of Contractor-proposed standards in the SRD, additional standards, subordinate standards, and modifications to existing standards are

expected to occur over time as new information is developed. The inspection procedure for the standards selection process will provide the instructions for OSR inspections that are designed to ensure that the process specified in DOE/RL-96-0004 is being followed in selecting future standards.

**Basis** – The basis for the standards selection process inspections is the RPP-WTP Contract, which specifies that DOE/RL-96-0004 must be followed. The standards selection process is a continuing element of the integrated standards-based safety management program, which is required by the Contract to ensure that safety requirements are defined, implemented, and maintained. This has been captured in the Contractor's SRD, Vol. I, Section 3.0, and the ISMP Sections 4.1.4 and 4.2. The SC in the SRD, Vol. II, Section 4.0, "Engineering and Design" shows the implementation of the design standards into the design.

### 3.6 Verifying Training and Qualification of Personnel

The Contractor's personnel training and qualification program and its implementation will be inspected periodically throughout the design and subsequent phases of the facility's lifetime. These inspections are conducted according to ITP I-106, "Personnel Training and Qualification Assessment," and include the following activities:

- Assessing the adequacy of the Contractor's program to incorporate commitments to personnel training and qualification, including the commitments in the SRD and ISMP
- Verifying that the program is effective in providing staff who are qualified and trained to perform important-to-safety functions.

**Rationale** – Adequate safety during the operation and deactivation of the Contractor's waste processing facility will be influenced by integrating adequate safety into the design. Because design is a human activity, its characteristics (e.g., quality, effectiveness, reliability, adequacy, and robustness) from a safety standpoint, will be influenced by personnel training and qualifications. Inadequately qualified or trained personnel will negatively influence the characteristics in the important-to-safety aspects of the design and jeopardize the OSR's timely recommendation that the ORP Manager grant an Authorization for Limited Construction and subsequently the Construction Authorization. This, in turn, could lead to performance and regulatory difficulties in subsequent phases of the Contractor's waste treatment program. Therefore, inspections are needed to observe adequate performance in this area.

**Basis** – The basis for inspections in this area is the OSR-approved QAP, Section 2.0, "Personnel Training and Qualification," which is particularly pertinent to training and qualification of personnel in the design phase. The SC for training and qualification of personnel during the design phase are also defined in the SRD in Volume II, Section 7.3, "Quality Assurance Program." Sections of the ISMP also are pertinent to this area.

### 3.7 Verifying Authorization Basis Management

The Contractor's authorization basis management program and its implementation will be inspected periodically during the design and subsequent phases of the facility's lifetime. These inspections are conducted according to ITP I-107, "Authorization Basis Management Assessment," and include the following activities:

- Assessing the adequacy of the Contractor's procedures related to maintaining the authorization basis documents such as the ISMP and standards in the SRD
- Assessing the adequacy of the Contractor's procedures to implement safety evaluations as described in RL/REG 97-13, *Office of Safety Regulation Position on Contractor Initiated Changes to the Authorization Basis*, and the Contractor's ISMP
- Assessing the adequacy of the Contractor's integration of the safety evaluation process with the approval process for relevant design, procedure, and program documents
- Verifying that the safety evaluation process is being conducted consistent with the Contractor's QAP
- Assessing the adequacy of the Contractor's implementation of the safety evaluation process by reviewing Contractor records of design, procedure, and program document approvals:
  - Determine the adequacy of records related to document approvals and changes
  - Determine the adequacy of Contractor assessments regarding the regulatory and safety significance of proposed changes
  - Verify that persons performing and reviewing unreviewed safety questions are qualified.

**Rationale** – The authorization basis<sup>2</sup> describes the complete record of the safety performance characteristics of the waste processing facility. This record includes the safe operating domain, the associated programs to preserve these characteristics, the associated programs to control and ensure safe operations, and the contingency measures to respond to emergency situations. This record must be managed to ensure that it includes all relevant and adequate information. It must be internally consistent, current, and controlled with Contractor (and subsequent OSR) approval. Failure to adequately manage the authorization basis could result in sufficient uncertainty of the safety status of the waste processing endeavor and jeopardize the OSR's timely recommendation that the ORP Manager grant an Authorization for Limited Construction and subsequently the Construction Authorization. This, in turn, could lead to performance and regulatory difficulties in subsequent phases of the Contractor's waste treatment program.

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<sup>2</sup> Authorization basis is defined as "The composite of information provided by a Contractor in response to radiological, nuclear, and process safety requirements that is the basis on which the DOE grants the Contractor permission to perform regulated activities." (DOE/RL-96-0006, p. 21).

**Basis** – The basis for inspections in this area are RL/REG-97-13 (which is incorporated by reference in the Contract) and ISMP, Section 3. RL/REG-97-13 also describes the OSR’s position on an acceptable process for maintaining the integrity of the authorization basis. The ISMP describes (1) the specific documents that comprise the Contractor’s authorization basis, and (2) the commitments associated with the process for ensuring that changes the Contractor makes to the facility and the Contractor’s administrative controls are consistent with the authorization basis.

### **3.8 Verifying Contractor's Employee Concerns Program (ECP)**

The Contractor's ECP and its implementation will be inspected periodically during the design and subsequent phases of the facility’s lifetime. These inspections are conducted according to ITP I-108, "Employee Concerns Program Assessment," and include the following activities:

- Verifying that the Contractor’s ECP is in place and functional
- Verifying that the safety issues raised by the employees are documented, assessed, and addressed (if required) in a timely manner
- Assessing the adequacy and timeliness of feedback to employees on the review and resolution of their concerns
- Assessing the adequacy of employee protection from reprisal according to 29 CFR 24.2, "Procedures for the Handling of Discrimination Complaints under Federal Employee Protection Statutes."

**Rationale** – The OSR-approved ECP is an important means by which employees participating in the Contractor's important-to-safety activities can communicate safety issues to responsible managers. Employees may be in an advantageous position to identify and articulate potentially important safety issues but, due to various circumstances, are unable to attract attention to the issues through normal channels. Therefore, the communication channels prescribed by the ECP are important in achieving adequate safety. To ensure that the OSR-approved ECP is implemented and being executed effectively during the design phase, inspections in this area are needed.

**Basis** – The purpose of the ECP, which is a requirement of the RPP-WTP Contract, Section C.6, Standard 7, Table S7-1, is to promote prompt identification and resolution of employee concerns without the need for sanctions to the Contractor or the employee. The basis for inspections in this area is the OSR-approved ECP.

### **3.9 Verifying the Integrated Safety Management (ISM) Program**

The Contractor's ISM Program and its implementation will be inspected periodically throughout the design and subsequent phases of the facility’s lifetime. These inspections are conducted according to ITP I-109, "Safety Integration Assessment," and include the following activities:

- Assessing the adequacy of the Contractor's program to manage the integration of safety throughout the organization
- Assessing the adequacy and effectiveness of the Safety Committee Program to address safety issues at all levels of the Contractor's operation
- Assessing the adequacy and effectiveness of the Contractor's Safety Improvement Program
- Assessing the adequacy of safety integration into the design process
- Assessing the effectiveness of the Contractor's program for developing and maintaining a safety culture
- Verifying that the program is consistent with the Contractor's commitments in the ISMP.

**Rationale** – The objective of ISM is to systematically integrate safety into management and work practices at all levels such that missions are accomplished while protecting the Tribal Nations, the public, the worker, and the environment.<sup>3</sup> This is the DOE approach for achieving adequate safety and is considered guidance for ITP I-109. The Contractor's approach to ISM is defined in the Contractor's ISMP. Because hazards are to be identified, analyzed, and minimized in the design phase, when feasible (which is the basic tenet of ISM), inspections are required in this area to observe the Contractor's effectiveness in minimizing risk in the design and subsequent phases. This, in turn, allows for later risk mitigation through administrative means in the operations phase.

**Basis** – ISM is required by the RPP-WTP Contract Section C.6, Standard 7, and its characteristics are further defined in the regulatory process document, DOE/RL-96-0003, *DOE Regulatory Process for Radiological, Nuclear, and Process Safety for the RPP-WTP Contractor*, Section 3.3.1. The basis for inspections in this area is the OSR-approved ISMP.

### 3.10 Verifying SRD Design Standards

The Contractor's program and implementing procedures for SRD design standards will be inspected periodically during the design and subsequent phases of the facility's lifetime. These inspections are conducted according to ITP I-110, "SRD Design Standards Implementation Program Assessment," and include the following activities:

- Assessing whether the complete set of SRD design standards is being implemented
- Assessing whether any deviations from implementing the complete set of design standards are justifiable and are addressed according to RPP-WTP Contract requirements.

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<sup>3</sup> DOE Policy 450.4, *Safety Management System Policy*, Vol. 1, Section. 3.0.9.

**Rationale** – The Contractor's design standards are contained in the SRD, Vol. II, Section 4.0. DOE/RL-96-0003, Section 3.3.1, provides that one condition of approval of the Contractor's recommended set of radiological, nuclear, and process safety standards, is that the set will provide adequate safety, if properly implemented. The design standards in the SRD relate directly to implementing previously selected hazard control strategies. If these features are to be physical elements of the facility (or processing systems within the facility), these elements must be identified so that the SRD design standards can be assigned, applied, and tailored to their design. The implementation of the SRD design standards to specific SSCs must involve an understanding of intended functions; operational requirements; environments; and reliability, availability, maintainability, and inspectability requirements; etc. All of these aspects need to be clearly defined and integrated to achieve adequate implementation.

The inspection procedure for implementing SRD design standards is designed to assess the Contractor's implementation of the design standards in Vol. II, Section 4.0 of the SRD. Inspections in this area are necessary to verify that the Contractor's activities reflect a domain of properly implemented SRD design standards as the important-to-safety aspects of the design are finalized, detailed, and issued as procurement packages for fabrication and construction. If the SRD design standards are ineffectively implemented during the design phase, the OSR's timely recommendation that the ORP Manager grant an Authorization for Limited Construction and subsequently the Construction Authorization could be jeopardized and could lead to performance and regulatory difficulties in subsequent phases of the Contractor's waste treatment program.

**Basis** – The OSR-approved design standards are contained in the Contractor's SRD, Vol. II, Section 4.0, with some subordinate ad hoc standards in the ISMP that are referenced in the SRD. The Contractor-designated supporting technical documents contain the technical basis for the standards in terms of the hazards/events and hazards control strategies to which the standards apply. The Contractor's general approach to implementation may be described in its OSR-approved ISMP. Therefore, the bases for the inspections in this area are the OSR-approved SRD and ISMP, and the Contractor's supporting technical documents.

### **3.11 Verifying Radiological As Low As is Reasonably Achievable (ALARA) Design Program**

The Contractor's radiological ALARA design program and its implementation will be inspected periodically throughout the design and subsequent phases of the facility's lifetime. These inspections are conducted according to ITP I-111, "Radiological ALARA Design Program Assessment," and include the following:

- Verifying that radiological design criteria are applied to the facility design to ensure that radiation exposures are maintained ALARA
- Assessing the adequacy of design features and administrative controls for maintaining both occupational and public exposures within the criteria specified in the SRD and ALARA.

**Rationale** – The goal of ALARA design inspections is to ensure the OSR that ALARA design considerations are incorporated into the RPP-WTP facility design early in the design phase. These design features will result in radiation exposures to workers and the public being maintained ALARA. Inspecting the Contractor’s ALARA design program and its implementation at an early design stage is intended to preclude potential costly design modifications or retrofits.

**Basis** – Section C.6, Standard 7, paragraph (e)(2)(ii), of the RPP-WTP Contract requires the Contractor to meet the DOE nuclear safety management requirements in the 10 CFR 800 series of regulations. In this case, the applicable federal law is 10 CFR 835, "Occupational Radiation Protection." Statements in 10 CFR 835.1001 require that design features and administrative controls be used for facilities and equipment to keep radiation exposures in controlled areas ALARA. In addition, 10 CFR 835.1003 states that during routine operations, the combination of design features and administrative control procedures provide that the anticipated magnitude of the total effective dose equivalent does not exceed 5.0 rem in a year and that exposure levels are ALARA.

#### **4.0 INSPECTION DURING CONSTRUCTION PHASE**

This section of the IPIP describes the areas of the Inspection Program that will be implemented and executed during the construction phase of the RPP-WTP Program, which includes the activities during limited construction, construction, and pre-operational testing. The Inspection Program objective in this phase is to assist the ORP Manager with recommendations on issuing the Authorization for Construction (with respect to adhering to limited construction requirements) and issuing the Authorization for Operations (with respect to adhering to construction and pre-operational testing requirements). These inspections will not be considered as acceptance inspections. The specific set of inspection areas for the different portions of the construction phase of the Inspection Program was selected to satisfy the program objectives of RL/REG-98-05, Section 5.0, and are listed in RL/REG-98-05, Sections 8.2.4 and 8.2.5, for limited construction and construction, respectively.

The inspection attributes, rationale, and basis for each procedure in an area, are described below (this is not an all-inclusive list of attributes but represents the approach being considered) and form the justification for the rigor of the program. During this phase, Contractor performance will be assessed against the authorization basis and applicable laws and regulations. The specific inspection areas are defined consistent with the expected flow of the Contractor’s construction-phase activities. Inspections are scheduled according to Section 2.1, above. This section is divided into three subsections covering the three parts of construction: (1) limited construction, (2) construction, and (3) pre-operational testing. Pre-operational testing will be developed and issued in a revised IPIP before the testing program is initiated, based on the Contractor's subordinate standard commitments in this area.

During performance of the construction phase inspection program, as described below, the inspections of the design-related activities describe in Section 3.0 above will continue. In addition to performing design-related inspection activities described in Section 3.0, inspections listed in Sections 3.1 through 3.10, as they relate to construction-related activities, will be

conducted on an as needed basis during limited construction, construction, and pre-operational testing phases.

#### **4.1 Inspection For Limited Construction**

##### **4.1.1 Verifying Readiness for Limited Construction Authorization (LCA)**

The Contractor's readiness for accomplishing important-to-safety LCA work activities will be inspected prior to granting the LCA. This inspection is conducted according to ITP I-127, "Readiness for Limited Construction." This inspection assesses the functions, programs, documents, and activities that support the early efforts associated with limited construction to the degree necessary to evaluate the Contractor's ability to enter the work activities.

The inspection will include the following:

- Assessing plans and schedule of necessary work activities to support limited construction
- Evaluating self-assessment activities to perform LCA activities
- Evaluating prioritization of issues and items necessary to commence LCA activities
- Assessing procedures prepared to accomplish important-to-safety LCA work activities
- Evaluating QA programs for subcontractors performing important-to-safety limited construction activities
- Reviewing aspects of the radiation protection program necessary to support LCA work activities
- Reviewing aspects of the quality control (QC) program necessary to support important-to-safety LCA activities
- Reviewing the provisions for a soil testing laboratory
- Assessing availability of adequate qualified resources to support important-to-safety LCA work activities
- Reviewing the implementation of the procurement program
- Assessing provisions for storage areas to store important-to-safety material
- Assessing the availability of material necessary to support important-to-safety LCA work activities
- Assessing provisions for storage and retention of records

- Assessing other LCA work activity efforts based on the LCA request workscope.

**Rationale** – Inspections in this area will allow the OSR to determine if the Contractor is ready to accomplish the activities in conformance to design and authorization basis requirements. The successful completion of important-to-safety LCA activities provides a level of assurance that systems will be assembled as intended by engineering design and system integrity will be maintained for all anticipated transient and normal operating situations. Failure to implement limited construction work activities could adversely affect the ability of important-to-safety systems to perform according to design requirements and could result in the uncontrolled exposure of personnel to radiation and hazardous chemicals.

**Basis** – The QAP, Section 5.0, "Work Processes," describes the mechanism for ensuring that the construction processes are controlled through procedures and management oversight. The SRD SC in Section 7, "Management and Operations," also addresses this issue. In addition, the SRD, SC 4.1-2, provides that "Structures, systems, and components designated as important-to-safety shall be designed, fabricated, erected, constructed, tested, inspected, and maintained to quality standards commensurate with the importance of the safety functions to be performed." The ISMP also includes requirements for ensuring that the facility is built according to the design specifications. The OSR-approved QAP, SRD, and ISMP form the basis for this inspection.

#### 4.1.2 Implementation of QA Activities For LCA

##### 4.1.2.1 Verifying the Procurement Program

During the construction phase, the Contractor's procedures and their implementation for ensuring that suppliers' items and services meet the requirements and expectations of the end-user will be inspected. The inspections will be conducted according to ITP I-130, "Procurement Program Inspection," and will include assessing the adequacy and effectiveness of the following:

- Procedures controlling the procurement process
- Procurement documents (e.g., statements of work)
- Supplier qualification and monitoring processes
- Process for identifying, dispositioning, and correcting nonconforming purchased items
- Process for inspecting procured items and services
- Acceptance, control, and maintenance of supplier-generated documents (e.g., certificates of conformance, test reports, and certificates of compliance).

**Rationale** – Inspections of this area during the construction phase will allow the OSR to assess the Contractor's performance for procuring materials, equipment, and services. Procuring adequate materials, equipment, and services is essential to ensure that design specifications are

met and that the plant is constructed as designed. Inadequate materials, equipment, or services could lead to degraded systems, and later, to operational problems.

**Basis** – The QAP, Section 7.0, "Procurement," describes the mechanism for ensuring that the procurement process during the construction phase is controlled through procedures and management oversight. The SRD, SC 7.3-11, states, "Procured items and services shall meet established requirements and perform as specified. Prospective suppliers shall be evaluated and selected on the basis of specified criteria. Processes to ensure that approved suppliers continue to provide acceptable items and services shall be established and implemented." ISMP, Section 1.3.10, "Classification of Structures, Systems, and Components," Table 1-3, item 7, discusses the requirements for procurement. The OSR-approved QAP, SRD, and ISMP form the basis for this inspection.

#### **4.1.2.2 Verifying the Document Control and Records Management Program**

During the construction phase, the Contractor's procedures, and their implementation, for controlling documents and storing records of safety-related activities will be inspected according to ITP I-131, "Document Control and Records Management Program Inspection." These inspections will include assessing the adequacy and effectiveness of the following:

- Procedures controlling document control and records management activities
- Document review and approval process
- Document revision process
- Document issuance and distribution processes
- Records management system.

**Rationale** – Inspections of this area during the construction phase will allow the OSR to assess the Contractor's control of documents and management of records. Revisions to documents must be controlled to ensure traceability of field changes to documents and drawings. Records generated within the construction phase must be accurately controlled and maintained to describe the plant's as-built condition for use during future operations or if facility modifications are needed. Control of documents and records is essential to ensure that design specifications are met and that the plant is constructed as designed.

**Basis** – The QAP, Section 4.0, "Documents and Records," describes the mechanism for ensuring that document control and records management processes during the construction phase are controlled through procedures and management oversight. The SRD, SC 7.3-4, and Section 8.0 of the ISMP also address this area. The OSR-approved QAP, SRD, and ISMP form the basis for this inspection.

#### **4.1.2.3 Verifying the Identification and Control of Items and Processes**

The Contractor's procedures, and their implementation, for ensuring that items and services provided by suppliers meet the requirements and expectations of the end-user will be inspected during the construction phase. The inspections will be conducted according to ITP I-132,

"Identification and Control of Items and Processes Program Inspection," and will include assessing the adequacy and effectiveness of the following:

- Identification, traceability, and control of items
- Handling, storage, and shipping processes
- Control of special processes
- Control of measuring and test equipment process
- Control of nonconforming items, services, and processes.

**Rationale** – Inspections of this area during the construction phase will allow the OSR to assess the Contractor's performance in identifying and controlling items and processes. Identification and control of items and processes is essential in verifying that the materials and equipment procured for use in the plant are maintained in a traceable and defensible manner. Inadequate identification and control of materials, equipment, or services could lead to using incorrect or defective materials and equipment, which could lead to degraded systems, and later, to operational problems.

**Basis** – The QAP, Sections 3.0, "Quality Improvement," and 5.0, "Work Processes," describe the mechanism for ensuring that items and processes are identified and controlled during the construction phase, through procedures and management oversight.

The SRD, SC 7.3-5 and 7.3-6, also address this area. Therefore, the OSR-approved QAP and SRD form the basis for this inspection.

#### 4.1.2.4 Verifying the QC Program

The Contractor's QC procedures and their implementation will be inspected throughout the construction phase. The inspections will be conducted according to ITP I-133, "Quality Control Program Inspection," and will include assessing the adequacy and effectiveness of the following:

- Qualification and certification for QC personnel
- Criteria for QC verification activities
- Performance of QC verification activities
- Identification and documentation of deficiencies
- Verification of completion of corrective action.

**Rationale** – Inspections of this area during the construction phase will allow the OSR to assess the Contractor's performance of QC verification activities, including qualifications and certifications of QC personnel, and the identification, documentation, verification, and resolution of deficiencies. QC verification is essential to provide the OSR with a defensible, documented history of the quality of specific Contractor activities. In addition, documenting the qualifications and certifications of personnel performing QC verification activities provides the OSR with knowledge that these personnel have the required education, training, and experience to assess the quality of specific aspects of the facility.

**Basis** – The following QAP sections describe the mechanism for ensuring that QC during the construction phase is controlled through procedures and management oversight: Section 1.0, "Quality Program;" Section 2.0, "Personnel Training and Qualification;" Section 3.0, "Quality Improvement;" Section 8.0, "Inspection and Acceptance Testing;" and Section 10.0, "Independent Assessment."

The SRD, SC 7.3-2, 7.3-3, 7.3-6, 7.3-7, and 7.3-9, also provide safety criteria input to this inspection.

### **4.1.3 Verifying Special Work Processes Utilized For Limited Construction**

#### **4.1.3.1 Verifying the Geotechnical/Foundations Program**

The Contractor's procedures for constructing the foundations of important-to-safety structures will be inspected during the construction phase. These inspections will be conducted according to ITP I-112, "Geotechnical/Foundations Inspection," and will include assessing the adequacy and effectiveness of the following:

- Construction implementing procedures
- Construction activities
- Training and qualification of personnel
- Records system.

**Rationale** – Inspections in this area during the foundation construction activities will allow the OSR to assess the Contractor's performance in installing foundations in conformance with design specifications. Installing engineered foundations for important-to-safety structures ensures that the structures will respond as intended by the engineering design during all anticipated transient and normal loading situations. Failure to implement the foundation design specifications could adversely affect the stability of structures that are important-to-safety. Therefore, inspections are needed to observe performance in this area.

**Basis** – The QAP, Section 5.0, "Work Processes," describes the mechanism for ensuring that construction processes are controlled through procedures and management oversight. Similarly, the ISMP describes the application of QA program requirements to various quality levels of SSCs. ISMP, Table 1-3, Item 5, states, "Work processes shall be performed to established technical standards and administrative controls using approved instructions, procedures and other appropriate means." The SRD SC in Vol. II, Section 7, "Management and Operations," also addresses this issue. Also, SC 4.1-2 provides that "Structures, systems, and components designated as Important-to-Safety shall be designed, fabricated, erected, constructed, tested, inspected, and maintained to quality standards commensurate with the importance of the safety functions to be performed." The OSR-approved QAP, ISMP, and SRD form the basis for this inspection.

#### 4.1.3.2 Verifying the Structural Concrete Installation Program

The Contractor's procedures and their implementation for installing structural concrete for important-to-safety structures will be inspected during the construction phase. The activities included in these inspections may include concrete mix design and qualification; concrete constituent storage and testing; batch plant qualification, operation, and testing; installation of forms; reinforcing steel installation; transportation and placement of the concrete; concrete testing; concrete consolidation; and concrete curing. These inspections will be conducted according to ITP I-113, "Structural Concrete Inspection," and will include assessing the adequacy and effectiveness of the following:

- Construction implementing procedures
- Construction activities
- Training and qualification of personnel
- Records system.

**Rationale** – Inspections in this area during the construction activities will allow the OSR to assess the Contractor's performance in constructing structures in conformance with design specifications. The structural concrete installation for important-to-safety structures ensures that the structures will respond as intended by the engineering design during all anticipated transient and normal loading situations. Failure to implement the activities related to structural concrete manufacture and installation could adversely affect the ability of important-to-safety structures to perform according to the design requirements. Therefore, inspections are needed to observe performance in this area.

**Basis** – See the basis statement for work processes in Section 4.1.3.1, "Verifying the Geotechnical/Foundations Program."

#### 4.1.4 Radiological Controls Program (RCP) Implementation

The RCP includes both the Radiological Protection Program required by 10 CFR 835.101 and the requirements of the SRD, SC 5.0-1, Sections 5.1.

The RCP inspection procedures are intended to be all inclusive of a comprehensive RCP, independent of the phase of the Contractor's activities (e.g., design, construction, operation, or deactivation). This implies that these procedures would not require substantive revision unless there is an amendment to 10 CFR 835, which, in turn, would require a revised Contractor Radiological Protection Program to be submitted.

The approved Radiological Protection Program for the specific phase of the Contractor's activities will be the source that helps the inspector identify which of the RCP inspection procedures will be used during inspections. The RCP inspection procedures and their associated attributes are described below. The approved Radiological Protection Program will also be the source document the inspector uses to determine which attributes within the individual inspection procedures will be implemented in the inspection plan. Thus, while the procedures listed below may be more comprehensive than is warranted by the Contractor's LCA, only

procedures and attributes relative to the approved Radiological Protection Program will be applicable.

The flexibility in the Inspection Program will reside in the preparation of the inspection plan before each inspection (see Section 2.3, above). The inspection plan will identify the RCP elements applicable to the phase of the Contractor's activities and the emphasis of the inspection being planned.

#### 4.1.4.1 Verifying the Contractor's RCP

The Contractor's RCP will be inspected throughout the facility's life according to ITP I-140, "RCP Programmatic Assessment." Additional inspection procedures described below will address inspection of detailed aspects of the RCP. This procedure will assess the adequacy and effectiveness of the following:

- RCP documentation
- RCP implementing procedures
- RCP organization and administration
- Integration of QAP requirements with the RCP
- Integration of ISMP requirements with the RCP
- Integration of RCP requirements into emergency management.

**Rationale** – A functional RCP consistent with the approved Radiological Protection Program and according to regulatory requirements must be in place before any possible identification of radioactive contamination or use of radioactive material during construction activities. Inspections of this area will continue throughout all phases of the facility. The scope of the inspections will change as the phases in the life cycle of the facility change and as the Radiological Protection Program is revised and approved. Inspections in this area ensure the OSR that ALARA was considered in the design and that radiation and radioactive materials are effectively controlled with due regard for worker, public, and environmental safety.

**Basis** – 10 CFR 835.101 requires that any DOE activity shall have a documented and approved Radiological Protection Program that addresses each requirement in Part 835 of the regulations, and such activity shall comply with Part 835. The SRD, SC 5.0-1, requires the Contractor to have an RCP that includes the Radiological Protection Program and the additional requirements of the SRD, Section 5.1. The SRD, Section 7.2, also provides applicable training requirements; and SRD, Sections 4.1, 4.2, 4.3, 4.4, 5.1, 5.3, and 5.4 contain requirements addressing ALARA considerations. The Radiological Protection Program is also subject to the QA requirements. The approved QAP, Section 5.0, states, "All activities affecting quality shall be prescribed by, and performed in accordance with, documented, management-approved procedures, instructions, and design documents." Radiation protection and control are part of an overall environment, safety, and health program. Therefore, the RCP is subject to requirements of ISM (ISMP, Section 6.1; and SRD, SC 7.1-1). Radiological hazards are one of the drivers of emergency management and planning. Therefore, the RCP must be integrated into emergency management (SRD, SC 7.8-1, 7.8-2, and 7.8-3; and ISMP, Sections 1.3.18 and 3.10). The OSR-approved

Radiological Protection Program, SRD, ISMP, and QAP form the basis for this inspection, and for the other inspections that address specific parts of the RCP.

#### 4.1.4.2 Verifying the Contractor's ALARA Program

The ALARA program and its implementation will be inspected according to ITP I-111, "Radiological ALARA Program Assessment," and will include assessing the adequacy and effectiveness of the following:

- ALARA program documentation
- ALARA program implementing procedures
- Consideration of nonradiological hazards
- Records system.

**Rationale** – Inspections in this area will allow the OSR to assess the Contractor's implementation and performance regarding the ALARA program. An ALARA program is essential to ensure that the facility is designed, constructed, and operated within the regulatory requirements and that radiation exposures to workers and the public and the impact on the environment will be ALARA.

**Basis** – See the basis statement for the RCP in Section 4.1.4.1, "Verifying the Contractor's RCP."

#### 4.1.4.3 Verifying the Contractor's External Dosimetry Program

The Contractor's external dosimetry program and its implementation will be inspected according to ITP I-141, "External Dosimetry Assessment," and will include assessing the adequacy and effectiveness of the following:

- External dosimetry technical basis
- External dosimetry implementing procedures
- Area monitoring program
- Individual monitoring program
- External dose evaluation program
- Records system.

**Rationale** – Inspections in this area will allow the OSR to assess the Contractor's performance regarding the programs for monitoring and recording occupational radiation exposures to external sources of radiation. External dosimetry is essential to determine that radiation exposures to external sources of radiation and radioactive material are within regulatory and administrative limits and that there will be adequate documentation to demonstrate compliance with the regulations.

**Basis** – See the basis statement for the RCP in Section 4.1.4.1, "Verifying the Contractor's RCP."

#### 4.1.4.4 Verifying the Contractor's Internal Dosimetry Program

The Contractor's internal dosimetry program and its implementation will be inspected according to ITP I-142, "Internal Dosimetry Assessment," and will include assessing the adequacy and effectiveness of the following:

- Internal dosimetry technical basis
- Internal dosimetry implementing procedures
- Air monitoring and contamination control
- Individual monitoring program
- Internal dose evaluation program
- Respiratory protection program
- Records system.

**Rationale** – Inspections in this area will allow the OSR to assess the Contractor's performance in monitoring and recording occupational radiation exposures to internal sources of radioactive material. Internal dosimetry is essential to determine that occupational radiation exposures to internal sources of radioactive material are within regulatory and administrative limits and ALARA, and that there will be adequate documentation to demonstrate compliance with the regulations.

**Basis** – See the general basis statement for the RCP in Section 4.1.4.1, "Verifying the Contractor's RCP."

#### 4.1.4.5 Verifying the Contractor's Radiation Monitoring and Control Program

The Contractor's radiation monitoring and control program and its implementation will be inspected according to ITP I-143, "Radiation Monitoring and Control Assessment," and will address the adequacy and effectiveness of the following:

- Radiation monitoring technical basis
- Radiation monitoring and control implementing procedures
- Air and area monitoring program
- Contamination monitoring and control
- Release of materials and equipment
- Radioactive material storage
- Shipping and receiving
- Criticality monitoring program
- Records system.

**Rationale** – Inspections in this area will allow the OSR to assess the Contractor's performance in monitoring and controlling radiation and radioactive material. Monitoring and controlling radiation and radioactive material are essential to determine that occupational exposures are within regulatory limits and ALARA, that there are adequate controls to prevent the loss of control of radioactive material, and that there is adequate documentation to demonstrate compliance with the regulations.

**Basis** – See the basis statement for the RCP in Section 4.1.4.1, "Verifying the Contractor's RCP."

#### **4.1.4.6 Verifying the Air Monitoring Program**

The Contractor's air monitoring program and its implementation will be inspected according to ITP I-144, "Air Monitoring Program Assessment," and will address the adequacy and effectiveness of the following:

- Air monitoring implementing procedures
- Adequacy of air sampling equipment to be used
- Placement of air sampling and real-time air monitoring equipment
- Air sample evaluation program
- Records system.

**Rationale** – Inspections in this area will allow the OSR to assess the Contractor's performance regarding air monitoring. Adequate air monitoring is essential for determining the need for personnel dosimetry and adequate work controls. Information from the air-monitoring program is also necessary to demonstrate compliance with the regulations.

**Basis** – See the basis statement for the RCP in Section 4.1.4.1, "Verifying the Contractor's RCP."

#### **4.1.4.7 Verifying Contamination Monitoring and Control**

The Contractor's contamination monitoring program and its implementation will be inspected according to ITP I-145, "Contamination Monitoring and Control Assessment," and will address the adequacy and effectiveness of the following:

- Contamination monitoring and control implementing procedures
- Physical design features for contamination control
- Administrative controls
- Records system.

**Rationale** – Inspections in this area will allow the OSR to assess the Contractor's performance regarding monitoring and control of contamination. Control over contamination is essential for ensuring that radioactive contamination is adequately identified and controlled.

**Basis** – See the basis statement for the RCP in Section 4.1.4.1, "Verifying the Contractor's RCP."

#### **4.1.4.8 Verifying the Posting and Labeling Program**

The Contractor's posting and labeling program and its implementation will be inspected according to ITP I-146, "Posting and Labeling Program Assessment," and will address the adequacy and effectiveness of the following:

- Posting and labeling implementing procedures
- Controlled areas
- Radiological areas and radioactive material areas
- Labeling of items and containers.

**Rationale** – Inspections in this area will allow the OSR to assess the Contractor’s performance in posting and labeling items, areas, and materials. Posting and labeling are essential for ensuring that radiation hazards are identified so their impact on personnel can be minimized and material can be controlled.

**Basis** – See the basis statement for the RCP in Section 4.1.4.1, "Verifying the Contractor's RCP."

#### **4.1.4.9 Verifying the Sealed Source Accountability and Control Program**

The Contractor’s sealed source accountability and control program and its implementation will be inspected according to ITP I-147, "Sealed Source Accountability and Control Assessment," and will include assessing the adequacy and effectiveness of the following:

- Sealed source accountability implementing procedures
- Receipt, labeling, and storage program
- Inventory and control of sealed sources
- Leak testing of sealed sources
- Handling and disposal program for sealed sources
- Records system.

**Rationale** – Inspections in this area will allow the OSR to assess the Contractor's performance in controlling sealed sources. This program is essential to ensure that sealed sources are safely used, adequately stored and accounted for, and leak tested to ensure that any leakage is detected and controlled in a timely manner.

**Basis** – See the basis statement for the RCP in Section 4.1.4.1, "Verifying the Contractor's RCP."

#### **4.1.4.10 Verifying the RCP Instrument Calibration and Maintenance Program**

The Contractor’s RCP instrumentation calibration and maintenance program and its implementation will be inspected according to ITP I-148, "RCP Instrumentation Calibration and Maintenance Assessment," and will include assessing the adequacy and effectiveness of the following:

- RCP instrument calibration and maintenance implementing procedures
- RCP instrument calibration and testing activities
- RCP instrument maintenance activities
- RCP instrument operability testing activities
- Records system.

**Rationale** – Inspections in this area will allow the OSR to assess the Contractor’s performance in calibrating and maintaining radiation safety instruments. This program is essential to ensure that calibrated instruments are used to measure levels of radiation and radioactive materials in work areas. This information is essential for ensuring worker and public safety.

**Basis** – See the basis statement for the RCP in Section 4.1.4.1, "Verifying the Contractor's RCP."

#### **4.1.4.11 Verifying the Contractor’s Radiological Work Control Program**

The Contractor’s radiological work control program and its implementation will be inspected according to ITP I-149, "Radiological Work Controls Assessment," and will include assessing the adequacy and effectiveness of the following:

- Radiological work implementing procedures
- Work planning and preparation program
- Entry and exit controls
- Work controls
- Evaluation of performance of radiological work
- Records system.

**Rationale** – Inspections in this area will allow the OSR to assess the Contractor’s performance in controlling work in a radiological environment. Controlling radiological work is essential to ensure that occupational exposures will be within regulatory and administrative limits and ALARA, that there will be adequate controls to prevent the loss of control of radioactive material, and that there will be adequate documentation to demonstrate compliance with the regulations.

**Basis** – See the basis statement for the RCP in Section 4.1.4.1, "Verifying the Contractor's RCP."

#### **4.1.4.12 Verifying the Contractor’s RCP Personnel Training and Qualification Program**

The Contractor’s RCP personnel training and qualification program and its implementation will be inspected according to ITP I-150, "RCP Training and Qualification Assessment," and will include assessing the adequacy and effectiveness of the following:

- RCP training program content
- RCP training program implementation
- RCP qualification program
- RCP training of manager, supervisors, workers, and support personnel
- Records system.

**Rationale** – Inspections in this area will allow the OSR to assess the Contractor’s implementation and performance regarding RCP personnel training and qualifications. Having a functional RCP training and qualification program is essential to ensure that the RCP will be

managed and implemented by qualified individuals who are aware of and respect radiological hazards in the workplace.

**Basis** – See the general basis statement for the RCP in Section 4.1.4.1, "Verifying the Contractor's RCP."

#### **4.1.4.13 Verifying the Contractor's RCP Documents, Records, and Reports Management Program**

The records and reports program implementation will be inspected according to ITP I-151, "RCP Documents, Records, and Reports Assessment," and will include assessing the adequacy and effectiveness of the following:

- RCP records management implementing procedures
- Individual monitoring and dose records
- Monitoring and workplace records
- RCP administrative records
- RCP reports
- Conformance with the Privacy Act.

**Rationale** – Inspections in this area will allow the OSR to assess the Contractor's implementation and performance regarding RCP documents, records, and reports. Having a functional RCP documents, records, and reports management program is essential to show that the evaluation of radiation hazards and exposures to individuals is complete and to demonstrate compliance with regulations.

**Basis** – See the basis statement for the RCP in Section 4.1.4.1, "Verifying the Contractor's RCP."

## **4.2 Inspection for Construction**

### **4.2.1 Verifying Readiness for Construction Authorization**

Inspections of the Contractor's readiness for accomplishing important-to-safety construction work activities will be conducted before Construction Authorization is granted. These inspection activities may include assessing the thoroughness and completeness of the Contractor's plans and schedule for accomplishing all necessary work activities to support construction; evaluating the thoroughness and completeness of the Contractor's self-assessment activities to ensure readiness to perform construction activities; and evaluating the Contractor's prioritization and listing of issues and items necessary to be completed before construction activities commence. This inspection is conducted according to ITP I-135, "Readiness for Construction." This inspection will assess the adequacy of the following:

- Design documents and drawings covering the major construction areas that are released for construction upon granting the Construction Authorization

- Approved procedures to accomplish important-to-safety construction work activities
- Contractor assessment of QA programs for subcontractors
- The RCP program necessary to support construction work activities
- The QC program necessary to support important-to-safety construction work activities
- The adequacy of qualified resources to support important-to-safety construction activities
- Identification and scheduling of procedures necessary to support continued important-to-safety construction activities.

**Rationale** – Inspections in this area will allow the OSR to assess the Contractor’s readiness to accomplish the activities in conformance to design and authorization basis requirements. The successful completion of important-to-safety construction activities provides a level of assurance that systems will be assembled as intended by engineering design and that system integrity will be maintained for all anticipated transient and normal operating situations. Failure to adequately implement construction work activities could adversely affect the ability of important-to-safety systems to perform according to design requirements and could result in the uncontrolled exposure of personnel to radiation and hazardous materials.

**Basis** – The QAP, Section 5.0, "Work Processes," describes the mechanism for ensuring that construction processes are controlled through procedures and management oversight. Similarly, the ISMP describes the application of QA program requirements to various quality levels of SSCs. ISMP, Table 1-3, item 5, states, "Work processes shall be performed to established technical standards and administrative controls using approved instructions, procedures, and other appropriate means." The SRD SC in Vol. II, Section 7, "Management and Operations," also addresses this issue. In addition, SC 4.1-2 provides that "Structures, systems, and components designated as important-to-safety shall be designed, fabricated, erected, constructed, tested, inspected, and maintained to quality standards commensurate with the importance of the safety functions to be performed." The OSR-approved QAP, ISMP, and SRD form the basis for this inspection.

## **4.2.2 Implementation of QA Activities Associated with Construction**

### **4.2.2.1 Verifying the Procurement Program**

See Section 4.1.2.1, "Verifying the Procurement Program."

### **4.2.2.2 Verifying the Document Control and Records Management Program**

See Section 4.1.2.2, "Verifying the Document Control and Records Management Program."

#### **4.2.2.3 Verifying the Identification and Control of Items and Processes**

See Section 4.1.2.3, "Verifying the Identification and Control of Items and Processes."

#### **4.2.2.4 Verifying the QC Program**

See Section 4.1.2.4, "Verifying the QC Program."

### **4.2.3 Construction and Special Work Processes**

#### **4.2.3.1 Verifying the Geotechnical/Foundations Program**

See Section 4.1.3.1, "Verifying the Geotechnical/Foundations Program."

#### **4.2.3.2 Verifying the Structural Concrete Installation Program**

See Section 4.1.3.2, Verifying the Structural Concrete Installation Program."

#### **4.2.3.3 Verifying Structural Steel Construction**

The Contractor's structural steel construction will be inspected periodically during construction according to ITP I-114, "Structural Steel Inspection." Each inspection will include assessing the adequacy and effectiveness of the following:

- Construction implementing procedures
- Contractor's construction activities
- Training and qualification of personnel
- Records system.

**Rationale** – Structural steel work processes need to be controlled to ensure that construction is performed in a quality and safe manner and according to design requirements. Control must address the materials used, procedures, qualification of personnel, and adequate records. Inspections in this area provide the OSR with assurance that work processes are conducted safely and according to the requirements.

**Basis** – See the general basis statement for the work process in Section 4.1.3.1, "Verifying the Geotechnical/Foundations Program."

#### 4.2.3.4 Verifying Welding for Structural Steel Construction

Welding inspections of the structural steel will be conducted periodically during construction according to ITP I-115, "Structural Steel Welding Inspection." These inspections will include assessing the adequacy and effectiveness of the following:

- Construction implementing procedures
- Construction activities
- Training and qualification of personnel
- Records system.

**Rationale** – Structural steel welding work processes need to be controlled to ensure that construction is performed in a quality and safe manner and according to design requirements. Control must address the materials used, prequalification of welding procedures, qualification of welding procedures, qualification of personnel, and maintenance of adequate records. Inspections in this area provide the OSR with assurance that work processes are conducted safely and according to the requirements. Failure to adequately implement structural steel welding activities could adversely affect the ability of important-to-safety SSCs to perform according to design requirements and could result in the uncontrolled exposure of personnel to radiation.

**Basis** – See the general basis statement for the work process in Section 4.1.3.1, "Verifying the Geotechnical/Foundations Program."

#### 4.2.3.5 Verifying Equipment Lay-up and Maintenance

The Contractor's procedures and their implementation for the lay-up and maintenance of important-to-safety equipment will be inspected periodically during the construction phase. The inspections are conducted according to ITP I-116, "Equipment Lay-up and Maintenance." Each of these inspections will include assessing the adequacy and effectiveness of the following:

- Construction implementing procedures
- Construction activities
- Training and qualification of personnel
- Records system.

**Rationale** – Important-to-safety equipment lay-up and maintenance processes need to be controlled to ensure that large equipment components which have been purchased according to specifications continue to meet those specifications when they are installed so that they will operate in a safe and reliable manner and according to design requirements. Control must address the procedures, training, and qualification of personnel, and adequate records. Inspections in this area provide the OSR with assurance that lay-up and maintenance of equipment is conducted safely and according to the requirements.

**Basis** – See the general basis statement for the work process in Section 4.1.3.1, "Verifying the Geotechnical/Foundations Program."

#### 4.2.3.6 Verifying the Electrical Raceway Installation Program

The Contractor's procedures and their implementation for accomplishing the activities for installing electrical raceways for important-to-safety SSCs will be inspected during the construction phase. These inspections will be conducted according to ITP I-117, "Electrical Raceway Inspection," and will include assessing the adequacy and effectiveness of the following:

- Construction implementing procedures
- Construction activities
- Training and qualification of personnel
- Records system.

**Rationale** – Inspections during the construction activities for important-to-safety electrical raceways will allow the OSR to assess the Contractor's performance in accomplishing the construction of these raceways in conformance with design specifications. The adequate installation of important-to-safety electrical raceways ensures that they will respond as intended by the engineering design during all anticipated transient and normal loading situations. Failure to adequately install these electrical raceways could adversely affect the ability of the electrical system to support the functioning of important to safety electrically powered SSCs. Therefore, inspections are needed to observe performance in this area.

**Basis** – See the general basis statement for the work process in Section 4.1.3.1, "Verifying the Geotechnical/Foundations Program."

#### 4.2.3.7 Verifying the Electrical Terminations Installation Program

The Contractor's procedures and their implementation for accomplishing the activities for installing important-to-safety electrical terminations will be inspected during the construction phase. These inspections will be conducted according to ITP I-118, "Electrical Terminations Inspection," and will include assessing the adequacy and effectiveness of the following:

- Construction implementing procedures
- Construction activities
- Training and qualification of personnel
- Records system.

**Rationale** – Inspections during the construction activities for important-to-safety electrical terminations associated with SSCs will allow the OSR to assess the Contractor's performance in accomplishing these terminations in conformance with design specifications. The adequate installation of important-to-safety electrical terminations ensures that the electrical systems will respond as intended by the engineering design during all anticipated transient and normal loading situations. Failure to adequately terminate electrical cables could adversely affect the ability of the electrical systems to support the functioning of important-to-safety electrically powered SSCs. Therefore, inspections are needed to observe performance in this area.

**Basis** – See the general basis statement for the work process in Section 4.1.3.1, "Verifying the Geotechnical/Foundations Program."

#### **4.2.3.8 Verifying the Heating, Ventilation, and Air Conditioning (HVAC) Installation Program**

The Contractor's procedures and their implementation for accomplishing the activities for installing the important-to-safety HVAC systems will be inspected during the construction phase. These inspection activities may include welding, mechanical joint installation, access doors and hinges, ductwork installation, damper and fan installation; and duct and equipment supports. These inspections will be conducted according to ITP I-119, "Heating, Ventilation, and Air Conditioning System Installation Inspection." Each of these inspections will include assessing the adequacy and effectiveness of the following:

- Construction implementing procedures
- Construction activities
- Training and qualification of personnel
- Records system.

**Rationale** – Inspections during the construction activities for important-to-safety HVAC systems will allow the OSR to assess the Contractor's performance in accomplishing the construction activities in conformance to design specifications and manufacturer's recommendations. The installations for important-to-safety HVAC systems ensure that the work areas will be adequately ventilated and filtered as intended by engineering design for all anticipated transient and normal operating situations. Failure to adequately implement the activities related to HVAC system installation could adversely affect the ability of important-to-safety SSCs to perform according to design requirements and could result in the uncontrolled exposure of personnel to radiation.

**Basis** – See the general basis statement for the work process in Section 4.1.3.1, "Verifying the Geotechnical/Foundations Program."

#### **4.2.3.9 Verifying Nondestructive Testing**

Contractor nondestructive testing will be inspected periodically during construction according to ITP I-120, "Structural Steel Welding Inspection." These inspections will include assessing the adequacy and effectiveness of the following:

- Construction implementing procedures
- Construction activities
- Training and qualification of personnel
- Records system.

**Rationale** – Nondestructive test work processes need to be effectively implemented to confirm that construction is performed in a quality and safe manner and according to design requirements. Implementation must address the areas of visual inspection, and radiographic,

ultrasonic, liquid penetrant, and magnetic particle testing. In each area, the Contractor must address implementing codes or standards, procedures, qualification of personnel, and adequate records. Inspections in this area provide the OSR with assurance that work processes are conducted safely and according to the requirements. Failure to adequately implement nondestructive test activities could result in the failure to detect flaws in SSCs whose failure could adversely affect the ability of important-to-safety SSCs to perform according to design requirements and could result in the uncontrolled exposure of personnel to radiation and hazardous material.

**Basis** – See the general basis statement for the work process in Section 4.1.3.1, "Verifying the Geotechnical/Foundations Program."

#### 4.2.3.10 Verifying Pipe System Installation Program

The Contractor's procedures and their implementation for accomplishing the pipe and pipe support installation activities related to important-to-safety piping systems will be inspected during the construction phase. These inspection activities may include, but are not limited to, the following: pipe and pipe support material verification; welding procedure qualification; welder qualification; welder identification; weld filler metal storage and issue; weld joint edge material preparation, fit-up, alignment, and preheat; visual and nondestructive inspection of completed welds; flange material, finish, and configuration verification; mechanical joint fit-up, alignment, gaskets, and bolting; and pipe support spacing, tolerances, and configuration. These inspections will be conducted according to ITP I-121, "Piping System Installation Inspection," and will include assessing the adequacy and effectiveness of the following:

- Construction implementing procedures
- Construction activities
- Training and qualification of personnel
- Records system.

**Rationale** – Inspections during the installation activities for important-to-safety piping systems will allow the OSR to assess the Contractor's performance in accomplishing the construction activities in conformance to design specifications. The installations for important-to-safety piping systems ensure that the piping systems will be assembled and tested as intended by engineering design to provide assurance that system integrity will be maintained for all anticipated transient and normal operating situations. Failure to adequately implement the activities related to piping system installation could adversely affect the ability of important-to-safety systems to perform according to design requirements and could result in the uncontrolled exposure of personnel to radiation and hazardous materials.

**Basis** – See the general basis statement for the work process in Section 4.1.3.1, "Verifying the Geotechnical/Foundations Program."

#### 4.2.3.11 Verifying the Electrical Equipment Installation Program

The Contractor's procedures and their implementation for accomplishing the installation activities on major important-to-safety electrical equipment installations, such as electrical control cabinets, circuit breakers, motor control cabinets, and transformers, will be inspected during the construction phase. These inspection activities may include elevation and azimuth conformance and tolerances; foundation and support installation; equipment cleanliness; and implementation of space heating requirements. These inspections will be conducted according to ITP I-122, "Electrical Equipment Installation Inspection," and will include assessing the adequacy and effectiveness of the following:

- Construction implementing procedures
- Construction activities
- Training and qualification of personnel
- Records system.

**Rationale** – Inspections during the installation activities for major important-to-safety electrical equipment will allow the OSR to assess the Contractor's performance in accomplishing the activities in conformance to design specifications and manufacturer's recommendations. The installations of major electrical equipment for important-to-safety systems ensure that these systems will be assembled and installed as intended by engineering design and that system integrity will be maintained for all anticipated transient and normal operating situations. Failure to adequately implement major electrical equipment installation activities could adversely affect the ability of important-to-safety systems to perform according to design requirements and could result in the uncontrolled exposure of personnel to radiation and hazardous material.

**Basis** – See the general basis statement for the work process in Section 4.1.3.1, "Verifying the Geotechnical/Foundations Program."

#### 4.2.3.12 Verifying the Electrical Cable Pulling Program

The Contractor's procedures and their implementation for accomplishing the activities related to the installation (pulling) of important-to-safety electrical cables will be inspected during the construction phase. These inspections will be conducted according to ITP I-124, "Electrical Cable Pulling Inspection," and will include assessing the adequacy and effectiveness of the following:

- Construction implementing procedures
- Construction activities
- Training and qualification of personnel
- Records system.

**Rationale** – Inspections during the construction activities for important-to-safety electrical cable installations will allow the OSR to assess the Contractor's performance in accomplishing these installations in conformance with design specifications. The adequate installation of important-to-safety electrical cables ensures that the related safety SSCs will function as intended by the

engineering design during all anticipated transient and normal loading situations. Failure to adequately install electrical cables could adversely affect the ability of the related important-to-safety SSCs to perform according to the design requirements and could result in the uncontrolled exposure of personnel to radiation or hazardous materials.

**Basis** – See the general basis statement for the work process in Section 4.1.3.1, "Verifying the Geotechnical/Foundations Program."

#### **4.2.3.13 Verifying Fire Protection Administrative Controls**

The Contractor's procedures administratively controlling and specifying the fire protection program, fire prevention plan, fire protection system impairment identification and correction program, fire emergency plan, fire emergency organization, fire brigade, emergency lighting, housekeeping, and hot work program for important-to-safety structures, systems, and components will be inspected during the construction phase. These inspections will be conducted according to ITP I-136, "Inspection of Fire Protection Administrative Controls," and will include assessing the adequacy and effectiveness of the following:

- The fire prevention program; fire emergency plan; fire emergency organization administrative controls; and administrative controls governing hot work, fire protection impairments, and flammable and combustible liquids and gases
- Implementation activities for those administrative controls
- Training and qualification of personnel
- System of records.

**Rationale** – Inspections in this area during the fire protection program specification and construction activities will allow the OSR to assess the Contractor's performance in providing for the above fire protection requirements in conformance with National Fire Protection Association (NFPA) standards. Providing for these fire protection activities and controls for important-to-safety structures, systems and components (SSCs) ensures that they will respond as intended by the engineering design, in the event of fire, and during all anticipated transient and normal operating situations. Failure to adequately implement the fire protection program requirements, above, could adversely affect the continued operability of important-to-safety systems and structures following a fire. Therefore, inspections are needed to observe and verify performance in this area.

**Basis** – The SRD, Section 4.5, "Fire Protection," describes the requirements for ensuring that fire protection programs and processes are controlled through procedures and management oversight. The OSR-approved SRD forms the basis for this inspection.

#### 4.2.3.14 Verifying the Construction of Fire Protection Systems

The Contractor's procedures for constructing the fire protection systems for important-to-safety structures, systems, and components will be inspected during the construction phase. These inspections will be conducted according to ITP I-137, "Inspection of Fire Protection System Construction," and will include assessing the adequacy and effectiveness of the following:

- Construction implementing procedures
- Construction activities
- Training and qualification of personnel
- Records system.

**Rationale** – Inspections in this area during the fire protection system construction activities will allow the OSR to assess the Contractor's performance in installing fire protection systems in conformance with design specifications and NFPA requirements. Installing fire protection alarm and mitigation systems for important-to-safety SSCs ensures that the required SSCs will respond as intended by the engineering design, in the event of fire, and during all anticipated transient and normal operating situations. Failure to implement the NFPA requirements and fire protection design specifications could adversely affect the continued operability of important-to-safety systems and structures following a fire. Therefore, inspections are needed to observe and verify performance in this area.

**Basis** – The SRD, Section 4.5, "Fire Protection," describes the requirements for ensuring that fire protection programs and processes are controlled through procedures and management oversight. The OSR-approved SRD forms the basis for this inspection.

#### 4.2.3.15 Verifying Fire Protection System Testing

The Contractor's procedures administratively controlling and specifying the testing of fire protection systems for important-to-safety structures, systems, and components will be inspected during the construction phase. These inspections will be conducted according to ITP I-138, "Inspection of Fire Protection System Testing," and will include assessing the adequacy and effectiveness of the following:

- The program and procedures governing the periodic testing, and testing following maintenance, of fire protection systems for important-to-safety structures, systems, and components
- Implementation of the fire protection system testing activities
- Training and qualification of personnel conducting and verifying the testing activities
- System of records.

**Rationale** – Inspections in this area during the fire protection system construction and operation activities will allow the OSR to assess the Contractor's performance in providing for the fire

protection system testing requirements in conformance with NFPA standards. Providing adequate fire protection system testing activities and controls for fire protection systems for important-to-safety SSCs ensures that the required SSCs will respond as intended by the engineering design, in the event of fire, and during all anticipated transient and normal operating situations. Failure to adequately implement the fire protection testing requirements could adversely affect the continued operability of important-to-safety systems and structures following a fire. Therefore, inspections are needed to observe and verify performance in this area.

**Basis** – The SRD, Section 4.5, "Fire Protection," describes the requirements for ensuring that fire protection programs and processes are controlled through procedures and management oversight. The OSR-approved SRD forms the basis for this inspection.

#### **4.2.3.16 Verifying the Electrical Circuit Testing Program**

The Contractor's procedures and their implementation for accomplishing the activities related to electrical circuit testing for important-to-safety SSCs will be inspected during the construction phase. The activities include continuity and insulation testing. These inspections will be conducted according to ITP I-126, "Electrical Circuit Testing Inspection," and will include assessing the adequacy and effectiveness of the following:

- Construction implementing procedures
- Construction activities
- Training and qualification of personnel
- Records system.

**Rationale** – Inspections during the construction activities for important-to safety electrical circuits will allow the OSR to assess the Contractor's performance in accomplishing the testing of electrical circuits in conformance with design specifications. The adequate installation of important-to-safety electrical circuits ensures that the related important-to-safety SSCs will function as intended by the engineering design during all anticipated transient and normal loading situations. Failure to adequately install electrical circuits could adversely affect the ability of the related important-to-safety SSCs to perform according to the design requirements and could result in the uncontrolled exposure of personnel to radiation and hazardous chemicals.

**Basis** – See the general basis statement for the work process in Section 4.1.3.1, "Verifying the Geotechnical/Foundations Program."

#### **4.2.3.17 Verifying the Mechanical Equipment Installation Program**

The Contractor's installation procedures for major important-to-safety mechanical equipment installations, such as pumps, large valves, and emergency diesel motors and generators, will be inspected during the construction phase. These inspection activities may include elevation and azimuth conformance and tolerances, foundation and support installation, shaft alignment and fit up, equipment cleanliness, rotating part lubrication and periodic rotation, and implementation of

space heating requirements. These inspections will be conducted according to ITP I-129, "Mechanical Equipment Installation Inspection," and will include assessing the adequacy and effectiveness of the following:

- Construction implementing procedures
- Construction activities
- Training and qualification of personnel
- Records system.

**Rationale** – Inspections during the installation activities for major important-to-safety mechanical equipment will allow the OSR to assess the Contractor's performance in accomplishing the activities in conformance to design specifications and manufacturer's recommendations. The installation inspections of major mechanical equipment for important-to-safety systems verify that these systems are assembled as intended by engineering design and that system integrity is maintained for all anticipated transient and normal operating situations. Inadequate mechanical equipment installation activities could adversely affect the ability of important-to-safety SSCs to perform according to design requirements and could result in the uncontrolled exposure of personnel to radiation and hazardous materials.

**Basis** – See the general basis statement for the work process in Section 4.1.3.1, "Verifying the Geotechnical/Foundations Program."

#### 4.2.4 RCP Implementation

The RCP includes both the Radiological Protection Program, as required by 10 CFR 835.101, and the requirements of the SRD, SC 5.0-1, Vol. II, Section 5.1.

As described in Section 4.1.4, the RCP inspection procedures were intended to be all inclusive of a comprehensive RCP and independent of the phase of the Contractor's activities (e.g., design, construction, operation, or deactivation). This implies that these procedures would not require substantive revision, unless there is an amendment to 10 CFR 835, which in turn would require a revised Contractor Radiological Protection Program to be submitted.

Also, as described in Section 4.1.4, the approved Radiological Protection Program for the specific phase of the Contractor's activities will be the source that helps the inspector identify which of the RCP Inspection Procedures will be used during inspections. The RCP Inspection Procedures and their associated attributes are described in Section 4.1.4 above. The approved Radiological Protection Program will also be the source document the inspector uses to determine which of the attributes within the individual inspection procedures will be implemented in the inspection plan. Thus, while the procedures listed in Section 4.1.4 may be more comprehensive than is warranted by the Contractor's construction-phase activities, only procedures and attributes supported by the approved Radiological Protection Program will be applicable.

The flexibility in the Inspection Program will reside in the preparation of the inspection plan before each inspection (see Section 2.3, above). The inspection plan will identify the RCP

elements applicable to the phase of the Contractor's activities and the emphasis of the inspection being planned.

### **4.3 Inspection for Pre-Operational Testing**

With the exception of the fire protection system testing that is expected to be performed early in construction (see Section 4.2.3.15 above), the specific OSR Inspection Program inspection procedures for the pre-operational testing program (i.e., demonstration of system and facility performance according to the design), will be developed and issued in a revised IPIP, following the revision of the Inspection Program Description (RL/REG-98-05) for the Pre-Operational Test Program. The revised IPD, IPIP, and the procedures will be developed and issued before the start of the pre-operational test program and based upon the subordinate standard selected by the Contractor for controlling the pre-operational test program. These inspection procedures will focus on ensuring that Contractor's performance is consistent with the approved authorization basis.

## **5.0 INSPECTION DURING PRODUCTION OPERATION**

The specific elements of the OSR Inspection Program applicable to the production operations phase will be developed and issued in a revised RL/REG-98-05 prior to the initiation of the production operation phase. These elements will be tailored to the activities associated with this phase and the safety significance of these activities. These procedures will focus on verifying that Contractor's performance is consistent with the (1) approved operating authorization basis, (2) the conditions of the Operating Authorization Agreement, and (3) any other Contractor commitments to the OSR, including any agreements between the Contractor and the OSR that are relevant to the Contractor's important-to-safety performance during this phase.

## **6.0 INSPECTION DURING DEACTIVATION**

The specific elements of the OSR Inspection Program applicable to the deactivation phase will be developed and issued in a revised RL/REG-98-05 before the deactivation phase is initiated. These elements will be tailored to the activities associated with this phase and the safety significance of these activities. The elements will focus on verifying that the Contractor's performance is consistent with the approved deactivation authorization basis, the conditions of the deactivation authorization agreement, and any other Contractor commitments to the OSR including any agreements between the Contractor and the OSR that are relevant to the Contractor's important-to-safety performance during this phase.

## **7.0 DEFINITIONS**

**Conclusion:** A conclusion is the result of an evaluation that relates one or more inspection observations to the broader context of a Contractor's program or an inspection area.

**Contractor:** The Contractor is the company selected to contract with DOE for construction and operation of the technologies and facilities necessary to retrieve and process tank waste, and deliver treated waste products to DOE for storage or disposal.

**Contractor Team Members:** Those organizations that are designated by the Contractor as primary performers of major elements of the Contractor's program are considered the Contractor Team Members.

**Finding.** A Finding is the determination that the Contractors (or supplier to the Contractor) performance is not consistent with the commitments in the authorization basis, or the Contractor is not in compliance with the requirements in the Contract, authorization basis, or applicable regulations.

**Important to Safety.** Structures, systems, and components (SSCs) that serve to provide reasonable assurance that the facility can be operated without undue risk to the health and safety of the workers and the public. It encompasses the broad class of facility features addressed (not necessarily explicitly) in the top-level radiological, nuclear, and process safety standards and principles that contribute to the safe operation and protection of workers and the public during all phases and aspects of facility operations (i.e., normal operation as well as accident mitigation).

This definition includes not only those SSCs that perform safety functions and traditionally have been classified as safety-class, safety-related, or safety-grade, but also those that place frequent demands on or can adversely affect the performance of safety functions if they fail or malfunction, i.e., support SSCs. Thus, these latter SSCs would be subject to applicable top-level radiological, nuclear, and process safety standards and principles to a degree commensurate with their contribution to risk. In applying this definition, it is recognized that during the early stages of the design effort all significant systems interactions may not be identified and only the traditional interpretation of important to safety, i.e., safety-related, may be practical. However, as the design matures and results from risk assessments identify vulnerabilities resulting from non-safety-related equipment, additional SSCs should be considered for inclusion within this definition.

**Inspection:** The examination and evaluation of any Contractor activity to determine its effectiveness, to ensure safety, and/or to determine compliance is an inspection.

**Inspection Plan:** The inspection plan is a set of specific, pre-defined, inspection activities for which resources have been allocated to perform an inspection according to the stated objectives.

**Inspection Program:** The inspection program is the set of defined inspection activities that lead to the fulfillment of the stated inspection objectives when accomplished in a time frame and through an approach specified.

**Objective Evidence:** Any direct observation or documented statement of fact, information, or record, either quantitative or qualitative, pertaining to safety performance based on observations, measurements, or tests that can be verified.

**Observations:** A fact; any detail noted during an inspection.

**On-location:** Within the Contractor's controlled area at the waste-processing site within the Hanford Reservation or within facilities at which inspectable Contractor activities are being performed.

**Regulatory Commitment:** An explicit statement to take a specific action agreed to or volunteered by the Contractor, where the statement has been submitted in writing to the OSR and has been included in the docket.

**Safety Significance:** The degree to which safety is affected.

**Safety Triad:** Adequate safety, conformance to DOE-stipulated top-level safety standards and principles, and compliance to applicable laws and regulations.

## 8.0 REFERENCES

10 CFR 835, "Occupational Radiation Protection," *Code of Federal Regulations*, as amended.

10 CFR 830. "Nuclear Safety Management," *Code of Federal Regulations*, as amended.

29 CFR 24.2, "Procedures for the Handling of Discrimination Complaints under Federal Employee Protection Statutes," *Code of Federal Regulations*, as amended.

DOE/RL-96-0003, *DOE Process for Radiological, Nuclear, and Process Safety Regulation of the RPP Waste Treatment Plant Contractor*, Rev. 2, U.S. Department of Energy, Office of River Protection, 2001.

DOE/RL-96-0004, *Process for Establishing a set of Radiological, Nuclear, and Process Safety Standards and Requirements for the RPP Waste Treatment Plant Contractor*, Rev. 2, U.S. Department of Energy, Office of River Protection, 2001.

DOE/RL-96-0006, *Top-Level Radiological, Nuclear, and Process Safety Standards and Principles for the RPP Waste Treatment Plant Contractor*, Rev. 2, U.S. Department of Energy, Office of River Protection, 2001.

DOE/RL-96-25, *Policy for Radiological, Nuclear, and Process Safety Regulation of the River Protection Project Waste Treatment Plant Contractor*, Rev. 1, U.S. Department of Energy, Office of River Protection, 2001.

DOE/RL-96-26, *Memorandum of Agreement for the Execution of Radiological, Nuclear, and Process Safety Regulation of the River Protection Project Waste Treatment Plant Contractor*, Rev. 1, U.S. Department of Energy, Office of River Protection, 2001.

*Integrated Safety Management Plan (ISMP)*, BNFL-5193-ISP-01, Rev. 4, Bechtel National, Inc., Richland, Washington, 2001.

*Quality Assurance Program*, BNFL-5193-QAP-01, Rev. 7a, Bechtel National, Inc., Richland, Washington, 2001.

RL/REG-97-05, *Office of Safety Regulation Management Directives*, U.S. Department of Energy, Office of River Protection, 2001.

MD 1.8, "Employee Concerns Investigations"

MD 2.1, "Information Management"

RL/REG 97-13, *Office of Safety Regulation Position on Contractor Initiated Changes to the Authorization Basis*, Rev. 7, U.S. Department of Energy, Richland Operations Office, 1999.

RL/REG-98-05, *Inspection Program Description for the Regulatory Oversight of the RPP-WTP Contractor*, Rev. 4, U.S. Department of Energy, Office of River Protection, 2001.

RL/REG-98-17, *Office of Safety Regulation Position on Tailoring for Safety*, U.S. Department of Energy, Richland Operations Office, Rev. 1, 1998

RL/REG-98-25, *Inspection Administrative Procedures*, U.S. Department of Energy, Office of River Protection, 2001.

A-101, Rev. 1, "Inspection Planning and Scheduling"

A-102, Rev. 1, "Announced and Unannounced Inspections and Related Information Requests"

A-103, Rev. 1, "Entrance and Exit Meetings"

A-104, Rev. 1, "Inspection Preparation"

A-105, Rev. 1, "Inspection Performance"

A-106, Rev. 1, "Verification of Corrective Actions"

A-107, Rev. 1, "Inspection Documentation"

A-108, Rev. 2, "Inspection Follow-up System"

A-109, Rev. 1, "Inspector Qualification Program"

A-112, TBD, "Resident Inspection Responsibilities"

RL/REG-98-26, *Inspection Technical Procedures*, U.S. Department of Energy, Office of River Protection, 2001.

I-101, Rev. 1, "Quality Assurance Assessment"

I-102, Rev. 1, "Configuration Management Assessment"

I-103, Rev. 1, "Self-Assessment and Corrective Action Assessment"

I-104, Rev. 1, "Design Process Assessment"

I-105, Rev. 1, "Standards Selection Process"

I-106, Rev. 1, "Personnel Training and Qualification Assessment"

I-107, Rev. 1, "Authorization Basis Management Assessment"

I-108, Rev. 2, "Employee Concerns Program Assessment"

I-109, Rev. 0, "Safety Integration Assessment"

I-110, Rev. 2, "SRD Design Standards Implementation Program"

I-111, Rev. 1, "ALARA Program Assessment"

I-112, Rev. 0, "Geotechnical Foundations Inspection"

I-113, Rev. 0, "Structural Concrete Inspection"

I-114, Rev. 0, "Structural Steel Inspection"

I-115, Rev. 0, "Structural Steel Welding Inspection"

- I-116, Rev. 0, "Equipment Lay-up and Maintenance"
- I-117, Rev. 0, "Electrical Raceway Inspection"
- I-118, Rev. 0, "Electrical Terminations Inspection"
- I-119, Rev. 0, "Heating, Ventilation, and Air Conditioning System Installation Inspection"
- I-120, Rev. 0, "Structural Steel Welding Inspection"
- I-121, Rev. 0, "Piping System Installation Inspection"
- I-122, Rev. 0, "Electrical Equipment Installation Inspection"
- I-124, Rev. 0, "Electrical Cable Pulling Inspection"
- I-126, Rev. 0 "Electrical Circuit Testing Inspection"
- I-127, Rev. 0, "Readiness for Limited Construction"
- I-129, Rev. 0, "Mechanical Equipment Installation Inspection"
- I-130, Rev. 0, "Procurement Program Inspection"
- I-131, Rev. 0, "Document Control and Records Management Program Inspection"
- I-132, Rev. 0, "Identification and Control of Items and Processes Program Inspection"
- I-133, Rev. 0, "Quality Control Program Inspection"
- I-135, Rev. 0, "Readiness for Construction"
- I-136, Rev. 0, "Inspection of Fire Protection Administrative Controls"
- I-137, Rev. 0, "Inspection of Fire Protection System Construction"
- I-138, Rev. 0, "Inspection of Fire protection System Testing"
- I-140, Rev. 0, "RCP Programmatic Assessment"
- I-141, Rev. 0, "External Dosimetry Assessment"
- I-142, Rev. 0, "Internal Dosimetry Assessment"
- I-143, Rev. 0, "Radiation Monitoring and Control Assessment"
- I-144, Rev. 0, "Air Monitoring Program Assessment"
- I-145, Rev. 0, "Contamination Monitoring and Control Assessment"
- I-146, Rev. 0, "Posting and Labeling Program Assessment"
- I-147, Rev. 0, "Sealed Source Accountability and Control Assessment"
- I-148, Rev. 0, "RCP Instrumentation Calibration and Maintenance Assessment"
- I-149, Rev. 0, "Radiological Work Controls Assessment"
- I-150, Rev. 0, "RCP Training and Qualification Assessment"
- I-151, Rev. 0, "RCP Documents, Records, and Reports Assessment"

*Safety Management System Policy 450.4*, U.S. Department of Energy, 1996.

*Safety Requirements Document (SRD)*, BNFL-5193-SRD-01, Volumes I and II, Rev. 2, Bechtel National, Inc., Richland, Washington, 2001.

## 9.0 LIST OF TERMS

ALARA	as low as is reasonably achievable
CFR	Code of Federal Regulations
DOE	U.S. Department of Energy
ECP	Employee Concerns Program
HVAC	heating, ventilation, and air conditioning
IAP	Inspection Administrative Procedure
IPD	Inspection Program Description

IPIP	Inspection Program Implementation Plan
ISM	Integrated Safety Management
ISMP	Integrated Safety Management Plan
ITP	Inspection Technical Procedure
LCA	Limited Construction Authorization
MD	Management Directive
NFPA	National Fire Protection Association
OSR	Office of Safety Regulation
ORP	Office of River Protection
QA	quality assurance
QAP	Quality Assurance Program
QC	quality control
RCP	Radiological Controls Program
RPP	Radiological Protection Program
RPP-WTP	River Protection Program Waste Treatment Plant
SC	safety criteria
SCCs	structures, systems, and components
SRD	Safety Requirements Document
SRO	Safety Regulation Official

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