

INSPECTION TECHNICAL PROCEDURE

I-111

ALARA PROGRAM ASSESSMENT

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INSPECTION TECHNICAL PROCEDURE I-111, REV. 5

ALARA PROGRAM ASSESSMENT

1.0 PURPOSE

This procedure provides guidance for assessing the Contractor's As Low As is Reasonably Achievable (ALARA) program. This guidance is based on the requirements in 10 CFR 835, "Occupational Radiation Protection," the Safety Requirements Document (SRD), the Radiation Protection Program (RPP), the Draft Environmental Radiological Protection Program (ERPP), the Radiological Control Program (RCP), the Quality Assurance Manual (QAM), and the Integrated Safety Management Plan (ISMP).

This procedure assesses the adequacy and effectiveness of the following:

- ALARA program documentation
- ALARA program implementing procedures
- ALARA design
- Operational ALARA
- Consideration of non-radiological hazards
- System of records.

NOTE: This procedure references RPP sections as the basis of many of the requirements. At the time of writing, the RPP was approved for design and construction. When the revised RPP is approved for operations, this procedure will be reviewed to ensure the inspection attributes and references are appropriate. The same concept applies to the ERPP, which was submitted as a draft document at the time of Construction.

2.0 OBJECTIVES

This procedure verifies the Contractor has developed, implemented, and maintained an effective radiation exposure ALARA process during: (1) design, (2) construction, (3) operation, and (4) deactivation of the River Protection Project Waste Treatment and Immobilization Plant (WTP).

This procedure is a component of the RCP inspection program. This and other inspection procedures will be used, as needed, on an on-going basis to provide assurance that ALARA activities are being conducted as required by the RCP, authorization basis commitments, and Contractor procedures. This procedure will be used throughout the entire lifecycle of the WTP. However, the entire inspection procedure may not be completed during any one inspection and/or every time the inspection procedure is used.

3.0 INSPECTION REQUIREMENTS

3.1 Adequacy and Effectiveness of ALARA Program Documentation

- 3.1.1 The inspector should verify the Contractor has established formal plans and measures for applying the ALARA process consistent with the status of the project. (RPP, Requirements 13 and 106 through 113)
- 3.1.2 The inspector should verify the Contractor has established formal plans and measures for applying the ALARA process related to effluents and public dose. (WTP Contract No. DE-AC27-01RV14136, Section C.6, Standard 7, Table S7-1 and Section C.7; and SRD, Safety Criterion (SC) 5.0-1, 5.1-1, 5.1-2, and 5.1-3)

3.2 Adequacy and Effectiveness of ALARA Program Implementing Procedures

The inspector should verify the Contractor has established, maintained, and implemented ALARA program procedures. (RPP, Requirement 13; SRD SC 5.0-1 and 5.1-1; and QAM, Policy Q-05.1)

3.3 Adequacy and Effectiveness of ALARA Design

- 3.3.1 The inspector should verify the Contractor has established and implemented its process for ALARA design. (SRD, SC 5.0-1, 5.1-1, and 8.0-2; and RPP, Requirements 106 through 113)
- 3.3.2 The inspector should verify the Contractor has established and implemented its process for radiation protection design of the facility. (RPP, Requirements 106 through 113)
- 3.3.3 The inspector should verify the Contractor's ALARA program has successfully achieved the occupational and public dose objectives. (SRD, SC 2.0-1, 2.0-3, 5.0-1, 5.1-1, 5.1-2, and 5.1-3)

3.4 Adequacy and Effectiveness of Operational ALARA

3.4.1 Construction

The inspector should verify the Contractor has implemented and maintained an effective operational ALARA program during construction. (RPP, Requirements 112 and 113; and SRD, SC 5.0-1 and Section 5.1)

3.4.2 Hot Commissioning/Operations

The inspector should verify the Contractor has implemented and maintained an effective operational ALARA program during operations. (SRD, SC 5.0-1 and Section 5.1 and RPP, Requirements 112 and 113)

3.4.3 Deactivation

The inspector should verify the Contractor has implemented and maintained an effective operational ALARA program during deactivation. (SRD, SC 5.0-1 and 8.0-2; and RPP, Requirements 112 and 113)

3.5 Adequacy and Effectiveness of Consideration of Non-Radiological Hazards

The inspector should verify the Contractor has incorporated non-radiological hazards into the ALARA process during design, construction, operation, and deactivation of the facility. (*RPP-WTP Occupational ALARA Program*, Section 3.3; and SRD, SC 2.0-2, and Appendix I; ISMP, Section 1.0; and WTP Contract No. DE-AC27-01RV14136, Section C.6, Standard 7(c))

3.6 Adequacy and Effectiveness of the System of Records

The inspector should verify the Contractor has a system of records to document the actions taken to maintain radiation exposure ALARA. (SRD SC 5.0-1; RPP, Requirement 91; and *RPP-WTP Occupational ALARA Program*, Section 4.6)

4.0 INSPECTION GUIDANCE

Inspection guidance is provided to assist the inspector in addressing the inspection requirements in Section 3.0 of this procedure.

Exposure to ionizing radiation at the levels permitted in 10 CFR 835, Subpart C, "Standards For Internal and External Exposure," increases the probability of adverse stochastic effects according to the linear non-threshold model. 10 CFR 835.101(c) requires that the RPP include formal plans and measures to ensure occupational radiation exposures are maintained ALARA. This involves making reasonable efforts to maintain exposures, as far below the regulatory limits as is practical, taking into account the state of technology, cost, practicality, and public policy considerations. The focus of the ALARA requirement is to ensure a process is in place to reduce occupational exposures to well below the regulatory limits. However, the process must also ensure the design objective stated in 10 CFR 835.1002(b) of less than an average of 0.5 mrem per hour (i.e., 1 rem/yr) to workers from external sources of radiation in areas of continuous occupational occupancy (2000 hours per year) and as far below this average as is reasonably achievable is also satisfied. In addition, the dose contribution from intake of radioactive materials must also be maintained

ALARA by designing to prevent releases of radioactive material to the workplace atmosphere and using confinement and ventilation to limit exposure if releases occur. (10 CFR 835.1002(c))

Also, the WTP Contract No. DE-AC27-01RV14136,¹ Section C.6, Standard 7, Table S7-1 requires the Contractor to submit an ERPP to the ORP and the SRD SC 5.1-1 requires the ERPP to address an environmental radiological ALARA program. The purpose of this part of the ALARA program is to minimize the radiation dose to members of the public and the environment.² One objective of this inspection program is to determine if the Contractor's ALARA process will ensure that exposure to the public will be maintained less than dose standards presented in SRD Section 2.0-1 and Section 2.0-3.

Since efforts to implement ALARA may increase the risk from non-radiological hazards, an integrated approach that optimizes protection from all hazards must be a part of the overall management strategy to achieve an optimum level of safety.

For each of the inspection elements, the inspector must review the core requirements applicable to the stage of the project being inspected. For example, the RPP has been developed to incorporate requirements from 10 CFR 835, Subpart K-Design and Control, and approved by the ORP for the design and construction phases. The RPP commits to implementing several Articles from the *Waste Treatment Plant Radiological Control Manual (WTPRCM)*, and the *RPP-WTP Occupational ALARA Program*. The inspector must also use the SRD Safety Criterion and associated Implementing Codes and Standards for the specific technical guidance the Contractor is committed to use.

The focus of this inspection effort is on the ALARA process, not individual dose determinations. If the process is not being fully implemented, identify the most safety significant/exposure intensive observations to communicate your conclusions.

At the completion of the inspection effort, the ORP should be able to describe the adequacy of the Contractor's ALARA process and its effectiveness in achieving ALARA objectives in the context of regulatory requirements and authorization basis commitments.

4.1 Adequacy and Effectiveness of the ALARA Program Documentation

- 4.1.1 The inspector should review the *RPP-WTP Occupational ALARA Program* to verify it addresses the seven topical areas presented in the RPP, Requirement 13. (Policy and Management Commitment; ALARA Training; Plans, and Procedures; Internal Assessments/Audits; ALARA Design Review; Radiological Work/Experiment Administration and Planning; and Records)

Note: SRD, SC 8.0-2 and Appendix F reference DOE G 441.1-2, *Occupational ALARA Program Guide*, as an "Implementing Code and Standard" for the design related to

¹ Contract No. DE-AC27-01RV14136 between the U.S. Department of Energy and Bechtel National, Inc., dated December 11, 2000.

² DOE/RL-96-0006, *Top-Level Radiological, Nuclear, and Process Safety Standards and Principles for the RPP Waste Treatment Plant Contractor*, Rev. 2, Office of Safety Regulation, SRD definition, Page 27, dated February 2001.

deactivation and decommissioning and SC 2.0-3 addresses DOE G 441.1-2 for dose limits in unrestricted areas. Therefore, the ALARA program should also address all of this guidance.

If the *RPP-WTP Occupational ALARA Program* has been changed since last reviewed by ORP, determine if the change reduced the effectiveness of the RPP. If the change reduced the effectiveness of the RPP, verify that the RPP change was submitted to and approved by the ORP prior to implementation of the change. (RPP, Requirements 16 through 19)

- 4.1.2 The inspector should confirm the adequacy of the effluent/public dose ALARA program by verifying the ORP has approved the ERPP. The inspector should verify how the Contractor procedures implement the SRD Implementing Codes and Standards for effluents and public dose. (SRD, SC 5.1-1, 5.1-2, 5.1-3, 5.1-4, and 5.2-1)

4.2 Adequacy and Effectiveness of ALARA Program Implementing Procedures

The inspector should perform the following to verify the Contractor has established, maintained, and implemented ALARA Program procedures:

- 4.2.1 Review the ALARA program implementing procedures (some are referenced in the WTP ALARA Program) to determine if they provide sufficient direction to implement the seven ALARA topical areas and commitments to the WTPRCM. (RPP Requirements 13, 91, and 106 through 113)

If the ALARA Program or implementing procedures have been changed since the last review, the inspector should verify they have not reduced the effectiveness of the ALARA program and they have been maintained in accordance with the QAM. (RPP, Requirements 18 and 22; and QAM, Policy Q-05.1)

- 4.2.2 Verify, by review of records and discussions with individuals involved in implementing the ALARA Program and procedures (i.e., design engineers, radiological engineers, ALARA Sub-Committee members), that they have the education, training, and skills necessary to successfully implement their assigned responsibilities as defined in the BNI Training Program. (RPP, Requirement 21)
- 4.2.3 When possible, observe implementation of the ALARA procedures to assess the effectiveness. Look for indications the procedures are understood, followed, and produce the desired results. If procedure implementation cannot be observed during the course of the inspection, select records for at least three implementations of ALARA activities to assess the effectiveness of the procedures. This step may be conducted in conjunction with steps 4.3 or 4.4 that follow. (RPP, Requirements 13 and 22)
- 4.2.4 Review the results of Contractor audits and evaluations of its ALARA program performed since the last ORP inspection to determine if deficiencies involving the program or procedures have been identified and corrected. (RPP, Requirement 20; QAM, Policy Q-16.1)

4.2.5 Repeat steps 4.2.1 through 4.2.4 for the ERPP reference to the environmental ALARA program for the effluent/public dose ALARA procedures. (WTP Contract No. DE-AC27-01RV14136, Section C.6, Standard 7, Table S7-1 and Section C.7(a)(13))

4.3 Adequacy and Effectiveness of ALARA Design

4.3.1 The inspector should evaluate the ALARA design process by reviewing a sampling of specific design products to determine if the Contractor's process is being fully implemented. The following components from the *RPP-WTP Occupational ALARA Program* comprise the WTP ALARA design process: (RPP, Requirement 106)

- Completion of a baseline design proposal
- Identification and evaluation of alternatives impacting baseline case dose
- ALARA assessments
- Formal ALARA reviews
- Final decision process
- Incorporation of changes into design
- ALARA documentation.

The activities listed below should be performed to evaluate the adequacy of the ALARA design process.

4.3.1.1 The inspector should select about five completed specific design products that will impact dose, radiological effluents, or decommissioning, and verify the ALARA design considered the following: (RPP, Requirements 106 through 112; and SRD, SC 2.0-1, 2.0-3, 5.0-1, and 8.0-2)

- Primary methods to reduce dose were physical design features (e.g., confinement, ventilation, remote handling, and shielding).
- Administrative controls were only employed as supplemental methods to control exposure.
- Administrative controls were used to maintain dose ALARA for specific activities where use of physical design features have been demonstrated to be impractical.
- Optimization methods were used to assure that the dose was maintained ALARA in developing and justifying the facility design and physical controls.
- Design objective for controlling personnel exposure from external sources of radiation in areas of continuous occupational occupancy (2000 hr/yr) was as far below an average exposure rate of 0.5 mrem/hr as was reasonably achievable.
- Design objective for exposure rates, where the occupancy differs from 2000 hr/yr, were ALARA and did not exceed 20% of the applicable standards in 10 CFR 835.202.

- Design objective for control of airborne radioactivity, under normal conditions, was to avoid releases to the workplace atmosphere, and in any situation, to control the inhalation of such material to levels that were ALARA by use of confinement and ventilation control measures.
- Facility design and selection of materials included features that facilitate operations, maintenance, decontamination, and decommissioning.
- Design limited the dose to members of the public to less than 2 mrem in any one hour and less than 100 mrem in a year from all sources and was below the radiological and process dose standards expressed in SRD, SC 2.0-1, and was ALARA.

The inspector should discuss the preliminary observations with the design engineer and responsible radiological engineer to ensure the Contractor's position is understood. If it appears the process was not followed, the inspector should determine why. If the process was followed but it appears the final design is not adequate, the inspector should collect all pertinent information and discuss the matter within the ORP to achieve management consensus before any conclusion regarding the adequacy of a specific ALARA design is presented to Contractor representatives.

Note: Any inspector calculations, performed to support ORP conclusions, must be conducted and documented in accordance with ORP management direction. Normally these calculations would be included as an appendix to the inspection report.

4.3.1.2 The inspector should review a sample of at least three of the topical areas listed below to assess the broad effectiveness of the ALARA design. The topical areas selected should be coordinated with the assessments and reviews conducted pursuant to Section 4.3.1.1 above. In addition to reviewing documents and discussing topics with Contractor representatives, the inspector should observe the following:

- General configuration of the facility. Review traffic patterns, location of radiation areas, location and size of the control rooms, adequacy of personnel decontamination facilities, location of the fixed monitoring equipment, and adequacy of space for anticipated operations, maintenance, and decommissioning (DOE G 441.1-2, *Occupational ALARA Program Guide*, Section 4.6).
- Confinement and ventilation systems. Determine whether they provide the required level of protection from airborne contamination. Particularly, look at patterns of airflow and the location of the air inlets and exhaust ports, and other penetrations. The purpose is to minimize the release of radioactive material to the workplace under normal operating conditions so the inhalation of such material by the workers is ALARA (DOE G 441.1-2, *Occupational ALARA Program Guide*, Section 4.6).
- Control devices for reducing occupational exposures. This includes shielding, hoods, gloveboxes, containments, interlocks, barricades, shielded cells,

decontamination features, and remote operations (DOE G 441.1-2, *Occupational ALARA Program Guide*, Section 4.6).

- Personnel entry controls. Determine, for each radiological area, if controls are commensurate with existing or potential radiological hazards within the area (RPP, Requirement 56).
- Control of access to high and very high-radiation areas. Determine if these controls meet the special features specified in the RPP, Requirements 60 through 63.
- Radiation monitoring and nuclear criticality safety instrumentation. Assess whether such monitoring is appropriate for the expected types and intensities of radiation, and has sufficient redundancy and capability for operation during normal and emergency conditions (RPP, Requirements 43 and 44; DOE G 441.1-2, *Occupational ALARA Program Guide*, Section 4.6).

Note: This step should be conducted using ITP I-143, "*Radiation Monitoring and Control Assessment*."

- Facilities for handling, packaging, storage, and shipping of radioactive waste (SRD, SC 5.1-1 and 5.1-3).
- Features used to minimize the generation of radioactive waste (SRD, SC 5.1-3).
- Design features to control the release of liquid and gaseous effluents into the environment (SRD, SC 5.1-2).

4.3.1.3 The inspector should review any Contractor audits of the ALARA program performed since the last inspection. The inspector should follow-up selected identified deficiencies to determine if corrective actions were taken in a timely manner and if it is likely the actions will be effective in correcting the reported deficiencies. (RPP, Requirement 20)

4.3.1.4 The inspector should verify the Contractor has implemented its oversight of the ALARA program as delineated in the *RPP-WTP Occupational ALARA Program* document. The inspector should observe a meeting of the ALARA Subcommittee (ASC) to confirm that its activities are conducted consistent with the *Project Safety Committee* (PSC) implementing document. If it is not possible to observe a meeting during the course of the inspection, the inspector should review documentation of past meetings to confirm the implementing procedure is being followed.

4.3.2 The inspector should identify three structures, systems, or components from Chapter 3 of the most recent Preliminary Safety Analysis Report (PSAR), based on review of the facility design documentation and discussion with the WTP representatives, which contribute substantial exposure to workers or the public. The inspector should verify by review of design records that the criteria expressed in the procedure *Application of ALARA in the Design Process*, Section 3.0, related to material confinement, shielding, access control, and

monitoring have been implemented. The *Design Guide for ALARA* also contains criteria to consider during design.

- 4.3.3 The inspector should consider the ALARA design effectiveness if it achieves the dose criteria presented in SRD Table 2.0-1 for normal and anticipated events. In each of the areas described below, the inspector's review should focus on evaluating the veracity of input, acceptance of calculation models and computer codes used, implementation of those codes and models, the rigor of independent verifications, and completeness of records maintained.
- 4.3.3.1 The inspector should review the Contractor's documentation of ALARA design verifications conducted pursuant to the *RPP-WTP Occupational ALARA Program* and implementing procedures. This documentation might include the following: "Classification of Areas Report," "Shielding Assessment Report," and "Dose Assessment Report" for each project facility. Reviewing several of these design verifications will be the most efficient way to evaluate the Contractor's probable success in achieving the dose objectives.
- 4.3.3.2 The inspector should review the overall design effectiveness relative to occupational dose standards. The inspector should evaluate compliance with the Radiological and Process Standards presented in SRD Safety Criterion 2.0-1 by review of the Contractor's dose assessments. Also confirm the ALARA design objectives expressed in RPP, Requirements 109 through 112, and the ERPP were demonstrated. The inspector should verify that any specific commitments regarding use of dose models or codes incorporated into the authorization basis were implemented. (SRD, SC 2.0-1, 2.0-3, 5.0-1, 5.1-1, and Appendices A and D)
- 4.3.3.3 The inspector should evaluate the control rooms and other location designs used in abnormal and emergency conditions. Following an accident, the designs will not result in an excess of 5 rem total effective dose equivalent (TEDE) and 30 rem beta skin dose to the operator. (SRD, SC 4.3-7)
- 4.3.3.4 The inspector should discuss preliminary observations with the Contractor. The design engineer and responsible radiological engineer should understand the Contractor's position. If it appears the process was not followed, the inspector should determine why. If the process was followed but it appears the final design is not adequate, the inspector should collect all pertinent information and discuss the matter within the ORP to achieve management consensus before any conclusion regarding the adequacy of a specific ALARA design is presented to the Contractor.
- 4.3.3.5 The inspector should review the use of design effectiveness with the public dose objectives expressed in SRD, SC 2.0-1 and 2.0-3 for normal and anticipated events. (Refer to Section 4.3.3.1)

Note: Washington State requirements state, "Radionuclide emissions shall be determined and dose equivalents to members of the public shall be calculated using department of social and health services approved sampling procedures, department of social and health services approved modes, or other procedures, including those based on environmental

measurements that department of social services has determined to be suitable." (WAC 173-480-070) (Also refer to WAC 246-247)

4.4 Adequacy and Effectiveness of Operational ALARA

For each project phase shown below, the inspector should first review the ORP approved RPP/ERPP and determine whether the Contractor is conducting work within the scope of the RPP/ERPP.

For each section where it is suggested that training records should be reviewed, the inspector should first make a determination if Inspection Technical Procedure (ITP) I-150, "Radiological Control Program Training and Qualifications Assessment," has recently been performed and the extent to which it covered ALARA related training. The sample size should be adjusted to take credit for any recent inspection in this area.

4.4.1 Construction Phase

The inspector should perform the following activities, as applicable, prior to or during construction to verify the RCP addresses residual radioactivity at the site and exposure that might be received by workers:

- 4.4.1.1 Review the Contractor's RCP to determine how potential dose from residual radioactivity, industrial sources of radiation, co-location of Contractor workers to other sources of exposure, and other occupational exposure to Contractors and subcontractors is being maintained ALARA. (RPP, Requirements 112 and 113)
- 4.4.1.2 Select 10 workers from different work disciplines and verify they have received appropriate ALARA training. Recognizing that exposure to workers during construction should be minimal, it is necessary that all individuals entering the site be instructed to obey basic radiological posting and control instructions and they be trained in accordance with RPP Requirements 101 through 105 to minimize their dose. This training should be received prior to the start of work.
- 4.4.1.3 Verify the Contractor individuals performing radiation monitoring during the construction phase have received ALARA specific training pursuant to the RPP, Requirements 101 through 105.
- 4.4.1.4 Verify that the Contractor has implemented ALARA procedures to ensure that workers do not receive unnecessary exposure by observing the Contractor controls over NRC or State licensed activities and other DOE Contractor exposure generating activities during the construction phase.
- 4.4.1.5 Verify by observation, discussion, and/or records review, the approach the Contractor has used to limit exposure from residual radioactive material discovered on the facility site or resulting from DOE activities near the facility site.

- 4.4.1.6 Identify, from the current Safety Analysis Report, several key structures, systems, or components having a significant impact on dose. Review the design packages, construction plans, specific work plans, materials of construction, and walk down the structures, systems, or components to confirm implementation of the ALARA process.
- 4.4.1.7 Review the results of audits performed to assess the effectiveness of the Contractor's ALARA program during construction. (RPP, Requirement 20)

4.4.2 Hot Commissioning/Operations Phase

The inspector should review the following, as applicable, for Contractor performance during hot commissioning and operation to verify the RCP addresses the dose received by workers and members of the public.

- 4.4.2.1 Verify procedures for the specific RPP and ERPP requirements addressing ALARA during operations have been issued. (RPP, Requirements 112 and 113; SRD SC 5.1-1, and ERPP)
- 4.4.2.2 Review RCP procedures to confirm specific ALARA requirements regarding public dose objectives have been incorporated. (SRD, SC 2.0-1)
- 4.4.2.3 Verify radiological work planning and exposure control record keeping procedures have been specified in the RCP. (RPP, Requirement 91)
- 4.4.2.4 Verify Contractor procedures have been generated, in the hot commissioning phase, to ensure that ALARA design criteria have been effectively implemented. These procedures should address leak rate testing, instrumentation calibration, filter efficiency testing, process monitor response, and radiation zone exposure rate verification. The inspection should track the ALARA design criteria into the test procedures, observation of the test procedures, analysis of the test results, and observation of the Contractor's acceptance process to evaluate the effectiveness of its implementing procedures.
- 4.4.2.5 Verify effluent records, demonstrating implementation of the ERPP, are prepared and maintained.
- 4.4.2.6 Review Contractor audits of the ALARA program performed since the last inspection, if any. Follow-up selected identified deficiencies to determine if corrective actions were taken in a timely manner and if it is likely the actions will be effective in correcting the reported deficiencies. (RPP, Requirement 20)
- 4.4.2.7 Verify records that workers receiving planned special exposures receive instructions on measures to be taken to reduce their dose. (RPP, Requirement 29)
- 4.4.2.8 Verify dosimetry records are documented if any workers have exceeded the 1 rem/year design objective. If dose received is in excess of the objective, confirm the ALARA program has been fully implemented and corrective actions taken to achieve the design objective in the future.

- 4.4.2.9 Verify records are documented if intake of radioactive materials by workers resulted from failure to effectively contain or ventilate airborne releases. If so, determine if the ALARA program has been fully implemented and appropriate corrective actions taken. (RPP, Requirement 110)
- 4.4.2.10 Determine if monitoring is conducted to verify the effectiveness of engineering and process controls to contain radioactive materials and reduce radiation exposure and effluent releases and if so, where this is documented. Based on these monitoring results, verify by discussion with the radiological protection staff and review of records what actions are being taken to identify and control potential sources of exposure. (RPP, Requirement 43; and SRD Section 5.2-1)
- 4.4.2.11 Review the effectiveness of the ALARA process, as implemented in actual work activities, by physical observation of a maximum of 10 work activities, including routine operator rounds, specific operator activities, maintenance, cleanup, and decontamination. (RPP, Requirements 112 and 113)
- 4.4.2.12 Review the effectiveness of the operations and work practices combined with the design relative to the ALARA process by physically observing at least three topical areas (refer to Section 4.3.1.2 of this procedure).
- 4.4.2.13 Review training records for at least 10 workers involved in the above, to confirm that they had received ALARA training for their specific assignments and that training was provided before the start of work. (RPP, Requirements 90 and 103)

4.4.3 Deactivation Phase

- 4.4.3.1 The inspector should evaluate the effectiveness of the ALARA process during the deactivation phase using the same methodology presented above in 4.4.2.6 through 4.4.2.12.

4.5 Adequacy and Effectiveness of Consideration of Non-Radiological Hazards

- 4.5.1 During all phases, the inspector should review selected ALARA work planning documents and directly observe design, radiological work planning, and radiological work activities to determine if the ALARA process created significantly larger risks from other non-radiological hazards. Items to consider include the following: (SRD, SC 2.0-1 and Appendix I; and ISMP, Section 1.0)
- The work planning process should integrate the consideration of other industrial, physical, and chemical hazards that an individual may encounter.
 - Efforts to maintain worker doses ALARA should ensure that the risk of personnel injury from other hazards is not disproportionately increased.

- Use of excessive protective clothing to control personnel contamination events may lead to heat stress situations.
- Respiratory protective devices used to reduce intakes of radionuclides may slow work resulting in increased dose, and impair visual acuity and communications capabilities between workers.
- Protective clothing to protect workers from chemical hazards may slow work down leading to increase worker dose.

4.6 Adequacy and Effectiveness of the System of Records

4.6.1 ITP I-151, "RCP Documents, Records, and Reports Assessment," and QAM inspections will routinely address the adequacy of the Contractor's radiological program records management system. During the conduct of this inspection procedure, numerous records are reviewed to determine compliance with the RCP. These records should have contained the information in accordance with RPP, Requirement 91. No additional records need be reviewed to establish the effectiveness of the ALARA records.

5.0 REFERENCES

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

Application of ALARA in the Design Process, 24590-GPP-SRAD-002, Rev. 3, Bechtel National, Inc., 2003.

Design Guide for ALARA, 24590-GPG-SRAD-001, Rev. 1, Bechtel National, Inc., 2003.

DOE G 441.1-2, *Occupational ALARA Program Guide*, U.S. Department of Energy, 1999.

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

WTP Environmental Radiological Protection Program-Draft, 24590-WTP-PL-ENV-01-006, Rev. A, 2002. (Note: Rev. B is the latest revision and incorporated all ORP comments from PSAR review, but was never formally transmitted.)

Integrated Safety Management Plan, 24590-WTP-ISMP-ESH-01-001, Rev. 3, Bechtel National, Inc., 2003.

Preliminary Safety Analysis Report to Support Construction Authorization, 24590-WTP-PSAR-ESH-01-002, latest versions, Bechtel National, Inc.

Project Safety Committee, 24590-GPP-SREG-001, Rev. 4, Bechtel National, Inc., 2002.

Quality Assurance Manual, 24590-WTP-QAM-QA-01-001, Rev. 4, Bechtel National, Inc., 2003.
(Note: Rev. 4 is in the process of being approved by ORP per discussion with Al Hawkins on August 4, 2003.)

Radiation Protection Program for Design and Construction, 24590-WTP-RPP-ESH-01-001, Rev. 0, Bechtel National, Inc., 2001.

Radiological Control Program, 24590-WTP-PL-NS-01-001, Rev. 3, Bechtel National, Inc., 2002.

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6.0 LIST OF TERMS

ALARA	as low as is reasonably achievable
ASC	ALARA Subcommittee
BNI	Bechtel National Inc.
CEDE	committed effective dose equivalent
CFR	Code of Federal Regulations
DOE	U.S. Department of Energy
ERPP	Environmental Radiological Protection Program
ISMP	Integrated Safety Management Plan
ITP	Inspection Technical Procedure
NRC	U.S. Nuclear Regulatory Commission
ORP	Office of River Protection

PSAR	Preliminary Safety Analysis Report
PSC	Project Safety Committee
QAM	Quality Assurance Manual
RCP	Radiological Control Program
RPP	Radiation Protection Program
SC	Safety Criterion
SRD	Safety Requirements Document
TEDE	total effective dose equivalent
WAC	Washington Administrative Code
WTP	Waste Treatment and Immobilization Plant
WTPRCM	Waste Treatment Plant Radiological Control Manual

Attachments: None