14 WASTE CONFINEMENT AND MANAGEMENT EVALUATION

14.1 Conduct of Review

This chapter of the Safety Evaluation Report (SER) evaluates the waste management systems of the Humboldt Bay ISFSI. Chapter 6, "Waste Management," of the Safety Analysis Report (SAR) (Pacific Gas and Electric Company, 2004) provides information about the waste confinement and disposal systems that are a part of the facility. This review specifically focused on radioactive wastes that would be generated by site activities involving the handling and storage of spent nuclear fuel (SNF). These activities may produce (i) gaseous wastes, (ii) liquid wastes, and (iii) solid or solidified wastes during loading and unloading of the multi-purpose canister (MPC-HB). Neither the actual SNF nor the waste generated by the Humboldt Bay Power Plant (HBPP) falls within the scope of this review. The review objective for this chapter is to determine whether the ISFSI design and procedures provide safe confinement and management of radioactive waste generated from ISFSI operations.

The review considered how the SAR and related documents address the regulatory requirements of 10 CFR §72.24(f), §72.24(l), §72.40(a)(13), §72.104(a), §72.122(e), §72.122(h)(3), §72.126(c)(1), §72.126(d), §72.128(a)(5), and §72.128(b). Complete citations of these regulations are provided in the Appendix of the SER.

14.1.1 Waste Source

A review of the sources of radioactive waste described in Chapter 6 of the SAR included consideration of various sources during the operation of the facility. As described in Section 6.2 of the SAR, some amounts of liquid, gaseous, and solid radioactive wastes may be generated during loading and decontamination activities before storage.

A small quantity of low-level solid waste may be generated during MPC-HB loading operations and will be processed using the existing HBPP radioactive waste control systems, which are described in Sections 3.2.1, 3.2.2.7, and 4.4.5.2 of the HBPP Defueled Safety Analysis Report (DSAR) (Pacific Gas and Electric Company, 2002). Contaminated water from the loaded MPC-HBs is drained back into the spent fuel pool (SFP) with no additional processing. Liquid wastes from the decontamination activities in the Refueling Building (RFB) are directed to the existing liquid radwaste treatment system of the HBPP. Potentially contaminated air and helium that may be released from the MPC-HB during loading and unloading operations in the RFB will be routed and processed through the RFB ventilation exhaust and stack filtration system before release.

The staff finds that the use of the existing HBPP facilities for processing solid and liquid wastes generated during fuel loading and decontamination activities related to ISFSI operations satisfies the requirements of 10 CFR §72.128(b). The passive design of ISFSI components minimizes the volume of radioactive waste that could be generated by the operation of the ISFSI. The staff finds that the Humboldt Bay ISFSI satisfies the requirements of 10 CFR §72.128(a)(5) and §72.24(f). The details provided in the SAR regarding the treatment of the generated solid, liquid, and gaseous wastes satisfy the requirements of 10 CFR §72.24(l).

No radioactive waste material is generated during transfer and storage at the ISFSI. The dry cask storage system is a passive design requiring no active systems to ensure adequate decay heat removal and to ensure adequate confinement. The system also does not require intrusive periodic maintenance. The staff finds, based on a review of the system design, that radioactive waste is not generated during cask transfer and storage at the ISFSI.

14.1.2 Off-Gas Treatment and Ventilation

As described in Section 6.1 of the SAR, the MPC-HB is designed to endure normal, off-normal, and accident conditions of storage with maximum decay heat loads without loss of confinement. Permanent area radiation and airborne radioactivity monitors are not needed at the ISFSI because the storage system is passive and system design makes leakage non-credible. During fuel loading, existing SFP instrumentation will monitor for any releases of airborne radioactivity. These monitors are designed to automatically change the building ventilation exhaust system from normal to emergency mode upon detection of radiation levels above preset alarm levels. During fuel loading and closure of the MPC-HB, potentially contaminated air will be collected and processed through the gaseous radioactive waste system. This contaminated vented gas will be redirected and processed using existing plant facilities and procedures subject to the requirements of the HBPP 10 CFR Part 50 license.

The MPC-HB confinement boundary ensures that, after the MPC-HB is seal-welded, there will be no release of radioactive materials under any postulated condition. Therefore, no radioactive wastes are produced by the HI-STAR HB system during transfer from the RFB to the ISFSI site or while the fuel is in storage.

The staff finds that the applicant has provided sufficient design features and controls to ensure the confinement of airborne radioactive particulate materials during normal, off-normal and accident conditions, in compliance with 10 CFR §72.122(h)(3). In addition, the staff finds that the proposed design and operation of the ISFSI satisfy the requirements of 10 CFR §72.104(a) and §72.126(d). Because no effluents are expected under normal or accident conditions, the requirements of 10 CFR §72.126(c)(1) regarding measurement and dilution of effluents are not applicable.

14.1.3 Liquid Waste Treatment and Retention

Contaminated water from the loaded MPC-HBs is drained back into the SFP and is subjected to the normal treatment for the SFP water. A small amount of liquid waste is generated due to the decontamination of the exterior surfaces of the HI-STAR HB overpack in the RFB. These liquid wastes will be processed using existing HBPP radioactive waste control systems and procedures.

The applicant will be using the existing HBPP facilities to process the liquid waste generated in the RFB. The HI-STAR HB dry cask storage system will not generate any liquid effluents due to the operations at the ISFSI. Thus, the staff finds that no special liquid radioactive waste treatment and retention systems are needed at the ISFSI. Therefore, the staff finds that the requirements of 10 CFR §72.128(b) are satisfied. Use of the HBPP facilities to process radioactive waste, subject to the provisions of 10 CFR Part 50, satisfies the requirements of 10 CFR §72.128(b).

14.1.4 Solid Wastes

A small quantity of low-level solid waste may be generated during MPC-HB loading operations. The solid waste may include disposable anti-contamination garments, paper, rags, tools, and such, which will be processed using the existing HBPP radioactive waste control systems as described in HBPP DSAR (Pacific Gas and Electric Company, 2002). The staff finds that the requirements of 10 CFR §72.128(b) will be met, based on the applicant's representations that the HBPP facilities under the Part 50 license will be used to process radioactive wastes generated during loading operations and that such waste will not be generated during any other phase of ISFSI operations.

14.1.5 Radiological Impact of Normal Operations

Based on the staff's assessment of welded cask enclosures, as stated in Interim Staff Guidance 5 (ISG-5) (U.S. Nuclear Regulatory Commission, 2003a) and ISG-18 (U.S. Nuclear Regulatory Commission, 2003b), the staff finds that the MPC-HB, which is the confinement system for the HI-STAR HB system, provides reasonable assurance that no effluents will be released during normal, off-normal, or accident conditions and, therefore, requires no monitoring for leakage. The seal weld will be inspected and tested in accordance with the description in Section 4.2.3.2.1 of the SAR. This inspection protocol is the same as that licensed generically for the HI-STAR 100, for which additional detail is provided in Section 9.1.1.1 of the HI-STAR 100 Final SAR (Holtec International, 2002). These requirements were reviewed during the certification of the HI-STAR 100 system and were found to be acceptable. These requirements were also reviewed specifically for the HI-STAR HB system and evaluated in Section 9.1.1 of this SER. The cumulative effects of generated wastes due to combined operations at the ISFSI and HBPP will not constitute an unreasonable risk to the health and safety of the public in compliance with 10 CFR §72.122(e), as discussed in Section 11.1.3.2 of this SER. Based on its review of waste confinement and management activities described in the SAR, the staff finds these activities to be in compliance with 10 CFR §72.40(a)(13).

14.2 Evaluation Findings

The staff makes the following findings regarding waste confinement and management of the Humboldt Bay ISFSI, based on its review of the information in the SAR:

- The SAR adequately describes acceptable features of the ISFSI design and operating modes that reduce, to the extent practical, the radioactive waste volume generated by the installation in compliance with 10 CFR §72.128(a)(5) and §72.24(f).

- Use of HBPP facilities approved under the provisions of the HBPP 10 CFR Part 50 license for processing solid and liquid wastes generated during loading and decontamination activities related to ISFSI operations satisfies the requirements of 10 CFR §72.128(b) and §72.104(a).

- Because no effluents are expected to be generated under normal or accident conditions, the requirements of 10 CFR §72.126(c)(1), regarding measurement and dilution of effluents are considered not applicable.

- Use of HBPP facilities approved under the provisions of the HBPP 10 CFR Part 50 license to ensure the confinement of airborne radioactive particulate materials during normal and off-normal conditions satisfies the requirements of 10 CFR §72.122(h)(3).

- The design of the ISFSI provides acceptable means to limit the release of radioactive materials in effluents during normal operation to levels as low as reasonably achievable and to control the release of radioactive materials under accident conditions in compliance with 10 CFR §72.126(d).

- The effects of the operation of the proposed ISFSI combined with those of other nuclear facilities at the site (HBPP) will not constitute an unreasonable risk to the health and safety of the public, in compliance with 10 CFR §72.122(e).

- The waste confinement and management activities described in the SAR support the conclusion that the activities authorized by the license can be conducted without endangering the health and safety of the public in compliance with 10 CFR §72.40(a)(13).

- The SAR adequately describes acceptable equipment to be used to maintain control over radioactive materials in gaseous and liquid effluent produced during normal operations and expected operational occurrences in compliance with 10 CFR §72.24(l).

14.3 References

Holtec International. *Final Safety Analysis Report for the Holtec International Storage, Transport, and Repository Cask System (HI-STAR 100 Cask System).* Rev. 1. HI-2012610. Docket 72-1008. Marlton, NJ: Holtec International. 2002.

Pacific Gas and Electric Company. *Humboldt Bay Power Plant Unit 3 Defueled Safety Analysis Report*. Rev. 4. Avila Beach, CA: Pacific Gas and Electric Company. August 2002.

Pacific Gas and Electric Company. *Humboldt Bay Independent Spent Fuel Storage Installation Safety Analysis Report*. Amendment 1. Docket No. 72-27. Avila Beach, CA: Pacific Gas and Electric Company. 2004.

U.S. Nuclear Regulatory Commission. Interim Staff Guidance 5 (ISG-5), *Confinement Evaluation*. Rev. 1. Washington, DC: U.S. Nuclear Regulatory Commission. 2003a.

U.S. Nuclear Regulatory Commission. Interim Staff Guidance 18 (ISG-18), *The Design/ Qualification of Final Closure Welds on Austenitic Stainless Steel Canisters as Confinement Boundary for Spent Fuel Storage and Containment Boundary for Spent Fuel Transportation*. Washington, DC: U.S. Nuclear Regulatory Commission. 2003b.