2. POWER BURST FACILITY DESCRIPTION

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2. POWER BURST FACILITY DESCRIPTION

The text and figures in this chapter are presented as an aid for the reader and are for descriptive purposes only. Dimensions for equipment and facility features are given as nominal.

2.1 Reactor Facility Structure and Equipment

2.1.1 Reactor Building

The reactor building (PER-620) was constructed in 1970, and has an exterior area of 13,500 ft^2 (1,250 m^2). It is a two-story steel-framed building with steel plate interior and aluminum siding exterior and pumice block wings. The building is divided into a main reactor high-bay room, two single-story wings, a two-level basement, and a subpile room. The ceiling height varies from 15 to 43 ft. The building is equipped with a 1-ton jib crane, and a 15-ton bridge crane (620-MS-52) with two hooks: one 15-ton hook and one 5-ton hook.

The building has two basement levels. The first basement level contains part of the reactor vessel enclosure, Loop Cubicles 10 and 13, process and utility equipment, experiment loop pipe access tunnel, and a sampling area. The second basement level contains the loop knockout drum room, subpile room, warm and hot waste room, additional process and utility equipment, and the waste gas exhaust room. A recent seismic safety assessment was performed for the PBF reactor building and it was concluded that the original design meets the current seismic requirements of DOE-STD-1020[1] applicable to Performance Category (PC)-2 structures.[2] Some areas of the building have a fire sprinkler system as described in Section 2.4.1, and selected systems are equipped with standby power.

The PBF canal joins the reactor on the south side. Plan and section views of the canal and reactor building are shown in Figures 1-1 and 1-2, respectively. The canal is 8 ft wide, 16 ft long, and 20 ft deep, except for a special 6.5 × 6.5 × 37-ft-deep pit provided for storage and loading and unloading operations associated with the inpile tube (IPT).

The bottom of the canal and the deep pit are lined with stainless steel (Type 304). The canal walls are partially lined with stainless steel. Bottom liners are 11 gauge and wall liners are 14 gauge. The walls not covered by stainless steel are faced with 0.25-in. carbon-steel sheets coated with epoxy paint. Temporary and permanent fuel storage racks are located in the southeast portion of the canal and along the west wall, respectively, for storage of shim, reflector, and spacer rods.

2.1.2 Temporary Fuel Storage Racks

The temporary fuel storage racks sit on the canal bottom and were originally designed to hold the full contents of the PBF core. The temporary storage racks (now empty of fuel rods) are approximately 69.7 in. long × 36.7 in. wide × 74 in. high 6061-T6 aluminum alloy frames with an interior storage array. The structure consists of 3-in. channel aluminum and 3 × 3-in. angle aluminum for support legs. The bottom of the racks is constructed of an aluminum open-bar grating.

The frame legs are secured to the canal floor by hold-down fixtures. A removable bolt secures the rack base plate to the hold-down fixture, which is welded to the canal liner plate. Each rack has two support legs secured in this manner at opposing corners.

2.1.3 Permanent Fuel Storage Rack

The permanent fuel storage rack was originally designed to contain PBF reactor canister assemblies. The permanent fuel storage rack is bolted to the canal west wall. The permanent rack has 10 individual storage compartments in a 1 × 10 linear array. The 10 ports are open at the top and have an aluminum open-bar grate at the bottom. The permanent rack is approximately 112 in. in length × 60 in. in height and 10 in. wide. The rack is framed with stainless-steel structural shapes (angle and channel) and 1-1/4-in. bar grating. The framing member connections are welded. The rack is bolted to a 124-in. × 66.4-in. × 1-1/2-in. carbon-steel plate. The plate is bolted directly to the canal wall liner, using seven 1/2-in.-diameter stainless-steel bolts.

2.1.4 PBF Fuel Transfer/Storage Bucket Stand

The bucket stand frame fastens to the canal parapet and extends underwater to a holding fixture, which was originally used to receive the PBF fuel transfer/storage buckets.

2.1.5 Turnover Fixture

The turnover fixture is attached on the west wall of the PBF storage canal. The turnover fixture was originally designed to accept and secure PBF reactor core canisters, and to allow the canisters to be rotated vertically 180 degrees so that the PBF rod hold-down bolts may be removed from the bottom of the canisters. The turnover fixture canister carrier was rotated back into the upright position to allow removal of PBF rods from the reactor canisters. A hold-down device is used in conjunction with the turnover fixture. The hold-down device attaches to the top of the canister assemblies to hold the PBF rods in position in the inverted canister when the bolts have been removed. The canister carrier can also be moved up and down vertically in the canal to facilitate the use of tools and/or visual equipment when using the turnover fixture.

2.1.6 Canal Bridge

The canal bridge provides workers with access above the fuel storage racks, bucket stand, and turnover fixture to facilitate disposition activities and is supported by wheels that travel north-south on the reactor bay floor beside the parapets. The bridge can be rolled manually. The canal bridge span allows workers to be directly above fuel canister assembly positions in the temporary storage racks during the operation of attaching the canister handling tool to the canisters. The loading of the transport containers can be accomplished over the deep pit using the canal bridge.

2.1.7 PBF Neutron Startup Source Rod

The PBF neutron startup source contains 1.162 g of Pu-238 as powdered oxide, double encapsulated in a stainless-steel cylindrical container. The Be mass is 7.2 g. The inner encapsulation material is made from Ta (tantalum). The neutron startup source container has an outer diameter of 0.665 in. and length of 4.1 in. The neutron startup source is contained within a stainless-steel tube that resembles a PBF fuel rod. The length of the source rod is 47.5 in. long, and the stainless-steel tube has a 0.75-in. outer diameter with 0.028-in. wall thickness. The neutron startup source is accountable special nuclear material (SNM). The neutron startup source is not considered fissile material because it contains less than 2 g of plutonium, which is predominantly Pu-238.

2.1.8 PBF Fuel Canisters

There are six sizes of canisters that were used in various positions in the PBF reactor core. The canisters are constructed of aluminum, and have the capacity to contain 28, 34, 46, 49, 51, or 62 PBF fuel rods, depending on specific canister size and shape. The canisters are 60 in. long, and have external dimensions of 5.9 in. × 3.50, 5.90, 6.44, 8.25, or 8.81 in. wide (the 46- and 49-rod canisters are both 5.9 in. × 5.9 in.; the 46-rod canister has a corner bevel). Canisters can contain nonfueled solid aluminum and stainless-steel rods that served as shims, fillers, or reflectors in the reactor core. The PBF neutron startup source rod is also contained in a reactor canister.

2.1.9 Cask Stand

The cask stand, located in the PBF reactor vessel, has three legs that rest on the core support ring in the PBF reactor vessel. For disposition operations, an adapter will be fitted to the stand in order to accept the IPT.

2.1.10 CNS-1-13C II Cask

The Chem-Nuclear Systems (CNS) 1-13C II Cask was used originally in support of the Three Mile Island (TMI) shipping campaign to transfer TMI distinct components to the INEEL for research. Currently, the CNS 1-13C II Cask is used for radioactive waste shipment at the INEEL to the Radioactive Waste Management Complex (RWMC). This cask may be used to transfer the shim rods, reflector rods, spacer rods, and other radioactive material from the PBF to the RWMC.

The CNS 1-13C II Cask design includes a double-wall, steel cylinder body with an outside diameter of 39 1/8 in. and height of 68 1/2 in. The diameter of the inside cavity of the cask is 26 1/2 in., with a height of 54 1/16 in. The 5-in. area between the two steel plates on the sides of the cask and the 6-in. area between the bases of the two plates are filled with lead shielding. The cask lid, which is filled with 6 in. of lead, is secured to the body with 12, 1-1/4-in. bolts. Two seals are used to seal the lid to the cask body.

The cask design includes a drain port, used for wet loading of the cask, and a vent/test port used for venting and leakage testing of the cask. Each port is sealed with a closure bolt and seal to prevent leakage. The cask will be positioned vertically on a temporary platform located in the deep pit area of the canal. For transport, the cask is assembled with a bottom and top impact limiter, connected together with ratchet binders. The cask is positioned vertically, in a cradle or stand, on a transport trailer. Overall dimensions of the assembled cask, with impact limiters, are 60 in. in diameter and 99 5/8 in. high. Gross weight of the loaded package is approximately 27,000 lb.

An inner cask basket may be used inside the cask. The cask basket has an internal cavity diameter of approximately 23.25 in. at the shell inside wall and a design cavity length of approximately 48.49 in. The estimated internal volume is approximately 11.9 ft^3 (89 gal). The cask basket is planned for underwater loading, and remote handling. Dividers, cells and internal supports, if required may be added to the cask basket on a case-by-case basis, dependent on the intended contents.

Leakage testing of the CNS 1-13C II cask is done in accordance with approved procedures to verify the integrity and proper sealing of the cask. The leakage test is performed on a loaded cask prior to shipment. The test verifies the proper assembly of the cask containment system during the annual inspection and maintenance and prior to each shipment after the cask is loaded.

2.1.11 Concrete Shield Vaults and Temporary Deep Pit Platform

Concrete shield vaults will be used to transfer waste from the canal. The vaults will be positioned inside an overpack vault for transfer to the disposal facility. The shield vaults and overpack vaults are constructed of 6 in. of concrete for the walls, floor, and lid. The concrete shield vault is 5 × 5 ft square and weighs 16,000 lb loaded.

The Temporary Deep Pit Platform is designed to span across the 6-ft 6-in. × 6-ft 6-in.-deep pit opening in the PBF canal to allow positioning the precast concrete shield vault or the CNS-1-13C II Cask for loading.

2.1.12 Inpile Tube

The IPT is made from Inconel 718 and resided in the PBF reactor from 1972 through 1985. The IPT is approximately 191 in. long, with a 7.875-in. outside diameter and a 6.1-in. inside diameter. The IPT weighs approximately 1,800 lb.

The IPT support structure is an aluminum-framed support bearing on the canal floor. It is secured to the canal parapet. The IPT support is approximately 38 ft in length and weighs 200–300 lb. As a whole, the IPT system consists of the IPT, IPT support columns, acoustic fillers, thermal swell accumulators, gas jacket and inlet/outlet nozzles. It provided a suitable environment, which coolant water temperatures, pressures, and flows could be controlled independent of the reactor itself.

Characterization was performed and documented in Engineering Design File (EDF)-2257, "Power Burst Facility In-Pile Tube Radiological Waste Characterization."[3] The results indicate that the IPT is Greater-than-Class C (GTCC) waste, primarily due to Nb-94; however, concentrations of Ni-59 and Ni-63 also exist (very little C-14 was determined to have been generated). Due to the IPT being GTCC waste, an immediate disposal path has not been determined; therefore, the IPT will be stored in the reactor vessel pending an evaluation under a National Environmental Policy Act (NEPA) environmental assessment (EA) for the reactor vessel disposition.

2.1.13 Other Equipment

A variety of equipment is stored in the canal or reactor vessel and suspended on nylon ropes or slings. This equipment includes the permanent fuel rack bumper, E Row canisters, ion and fission chambers, flow partition plates, corner beams, and miscellaneous items. The following miscellaneous items have been identified from videotaped inspections of the canal:

- Pieces of duct tape
- Stainless-steel filings from cutting shim rods
- Miscellaneous small pieces of plastic and nylon rope and tie wraps
- Nylon slings

- Hacksaw blades, screwdrivers, pry bars, fittings, and miscellaneous parts and pieces of tools and equipment
- Piece of stainless-steel shim rod, approximately 1 ft long, located on the canal floor.

2.2 Process Description

Facility disposition involves unique or one-of-a-kind work activities that can introduce hazards and challenges different from those encountered in operations of the facility. These activities may also present the potential for exposure to hazards that may have been initially unknown or unforeseen, and this represents a dangerous aspect of the work. Effectively addressing those hazards requires strong management commitment and worker involvement. Credit is taken for institutional safety programs that provide worker protection in the facility disposition work. Therefore, this SAR will analyze and provide controls for hazards and conditions expected to be encountered. As work progresses and new processes are needed or required, the unreviewed safety question (USQ) process will be used to evaluate whether hazards identified are bounded by the safety basis.

2.2.1 PER-620 Canal Disposition Processes

Disposition processes include isolating the canal operational systems and removing the fuel storage racks and fuel repackaging equipment; empty canisters; the reflector, shim, and spacer rods; the fuel turnover fixture, moving the IPT to the reactor vessel, several fission chambers, ion chambers, neutron startup source rod, contaminated equipment and debris, hazardous materials and fuel handling equipment; and canal sediment and water.

The equipment in the canal will be removed, packaged, and disposed of in accordance with company procedures. The canal sediment will be vacuumed and the filters will be disposed. The IPT will be transferred to the reactor vessel to await D&D. The canal water will be evaporated in an open lined tank located to the east of the reactor building. The canal water may be recirculated and will be filtered through an ion exchange system to reduce contaminants and then may be transferred to the evaporation tank. There are approximately 25,000 gallons of water currently stored in the canal and the capacity of the open evaporation tank is approximately 125,000 gallons. The canal and adjacent parapet area will be decontaminated or residual contamination will be fixed in place, and an engineered cover will be fitted to the canal for safety and cleanliness purposes.

The main connection between the canal and the reactor is the canal gate. It was designed to allow movement of the IPT, reactor fuel, test trains, etc. from the canal to the reactor and back. The canal gate is equipped with an inflatable seal; however, if the seal failed during deactivation activities in the canal (pumping canal water to the evaporation tank), additional water would enter the canal. To prevent water from entering the canal, a piece of stainless-steel angle will be installed along the canal side of the gate and seal welded to the gate and liner. The reactor and canal water levels will be lowered until the gate is exposed. A man-basket may be used to facilitate welding and inspection operations of the gate. When the welding operations are complete, the man-basket will be removed and water from the canal will be pumped into the reactor vessel. Piping systems that penetrate the canal (specifically, canal scum and floor drains, the old canal vacuum system, canal cleanup and ion exchange system, and demineralized water system) will be isolated.

2.2.2 PBF Neutron Startup Source Rod Disposition Process

Within the PBF neutron startup source rod is a double-encapsulated neutron source container. The PBF neutron startup source rod will be cut under water and the neutron source container will be placed in a shielded container before being removed from the canal. The rod will be cut around the double-encapsulated neutron source container and the neutron source container will be slid out of the rod and placed in a shielded container for removal.

2.2.3 Other Facility Processes

Other facility activities will include draining fluids from hydraulic units, and removing lead and cadmium from the detector cave and from the shield cave. Characterization activities in various parts of the facility are also included (such as the PER-751 radioactive waste storage tank). Disposition activities are scheduled for various support structures and equipment, including the PER-751 tank. Surveillance and maintenance activities will be performed throughout the facility.

2.3 Confinement Systems

2.3.1 PBF Reactor Building

The PBF reactor building was designed to provide some confinement of potential airborne releases during the reactor operation phase of its lifecycle. Because the PBF is geographically remote, the reactor building was not designed for containment, as required for reactors near populated areas. The PBF reactor bay walls and ceiling are fabricated from standard structural members with 3/16-in. carbon-steel-plate liner on the walls.

2.3.2 Ventilation System

The PBF reactor building ventilation is designed such that the airflow path is from areas with the least potential for contamination to areas with higher potential for contamination. By using supplemental exhaust fans, the system maintains a negative pressure in areas with a relatively higher probability of contamination. The system also contains and collects vent gases from the warm-waste sump, hot-waste tank, and the loop coolant system. The arrangement of equipment induces a flow path that provides ventilation to reactor building areas and minimizes the possibility of spreading contamination due to a release in one of the basement areas.

Fans supply air to the building through a supply plenum. Air from the reactor bay is drawn down to the first basement level through floor grates, and into the second basement level through floor grates, a pipe tunnel, and the stairwell. The main exhaust unit, located in the second basement level waste gas exhaust room, comprises two plenums, roughing and high-efficiency particulate air (HEPA) filter units, and two axial flow exhaust fans. The HEPA filters are tested in accordance with approved INEEL procedures. The exhaust fans are interlocked so that only one fan may run at a time. Air is ultimately released to the atmosphere through the 18-in.-diameter, 80-ft-high exhaust stack at the north end of the building.

2.3.3 Liquid Waste Management

Radioactive water from the canal, reactor vessel, equipment drains, or floor drains may be stored in storage tanks. Water is also stored in two tanks as a result of severe fuel damage and loss-of-coolant accident tests that were previously conducted at the PBF. One tank, the 2,700-gal blowdown tank, is located in Cubicle 13 in the first basement level of the PBF reactor building. The other tank, the 2,200-gal knockout drum, is located in the knockout room of the second basement level of the PBF reactor building. The blowdown tank is empty, and the knockout drum contains approximately 1,100 gal of radioactive water. Water from the blowdown tank was discharged to the 1,000-gal hot waste tank (currently out of service) located in the second basement level of the PBF reactor building. Water in the knockout drum can also be discharged to the hot waste tank. Water in the hot waste tank can be pumped directly to a tank truck at the pumping station located between the PBF reactor building and the hot waste storage tank (PER-732) and transported from the facility. Waste water can also be discharged to the hot waste storage tank and then pumped into a tank truck from either the warm waste tank or the hot waste tank. The waste water is transported in the tank truck for treatment and disposal. Liquid waste will be sampled in accordance with waste management procedures to verify that it is within the levels required by the transportation guidelines. Liquid waste in the warm waste sumps have shown a maximum alpha activity of 2.01E+02 pCi/mL[4] and a maximum beta/gamma activity of 5.05E+03 pCi/l.[5]

The reactor and canal water will be pumped to the evaporation tank (PER-706) for disposition by evaporation. The PER-706 tank is made of two layers of hypalon and is open on the top. It is situated approximately 300 ft from the reactor building. The capacity of the evaporation tank is 125,000 gal.

The primary water storage tank (PER-730) is a 14,000-gal aboveground storage tank located inside a concrete dike east of the PER-620 building. The PER-730 tank was used to store potentially contaminated reactor primary coolant water. The PER-730 tank is no longer used.

The cooling tower (PER-720) is no longer used, but the basin in the cooling tower is used for process cooling water in PER-620. The corrosive waste disposal sump (PER-731) and evaporation tank (PER-706) receive water from treatment of cooling tower and other secondary system water that could contain phosphates, sulfuric acid, and sodium hydroxide. Septic tank PER-728 receives sanitary waste from PER-620. The PBF area also includes the former radioactive waste storage tank (PER-751), which is now empty and no longer in use.

2.4 Safety Support Systems

2.4.1 Fire Protection

2.4.1.1 Fire Suppression System. A fire hazard analysis has been prepared for PBF facilities (PER-620, -604, -730, -731, and -732).[6] A new WROC/PBF firewater supply system was installed in 1995, as part of a fire protection upgrade project. This system consists of an underground distribution system supplied by two independent 2,500-gpm pumps. The pumps are Underwriters Laboratory, Inc. (UL)-listed, Factory Mutual (FM)-approved, and configured to run from starting until manually shut off. The fire protection and domestic water systems for the WROC/PBF area are combined into a single piping system. Water is supplied to the WROC/PBF areas from two deep wells that supply water to a 415,000-gal water storage tank that has 332,166 gal reserved for fire protection. From the 415,000-gal water tank, three domestic water pumps provide static pressure to the distribution system, and circulate the water as part of the freeze protection measures.

The water distribution system contains four branches. A branch main feeds each remote facility from the main control area. The PBF leg distribution system piping consists of an 8-in.-diameter main line. Post-indicating valves (PIVs), located throughout the distribution system, allow isolation of individual branch lines and facilities from the rest of the system. This minimizes the impact on the fire suppression system if a section is taken out of service. Additional PIVs are positioned in the pumphouse to allow for isolation of either fire pump without impairing the distribution system. The majority of PIVs are supervised with an alarm. The remaining PIVs are locked. The WROC/PBF water distribution system satisfies the demand requirements as shown in the fire hazard analysis for the PBF.[6]

Portions of the PER-620 reactor building are protected by an automatic preaction sprinkler system. A combination of heat and smoke detectors provide the action necessary to release the sprinkler riser valve. The main floor, except for the high bay, has a full coverage sprinkler system. The first basement level contains partial sprinkler protection. The second basement level contains no sprinkler protection. The sprinkler system meets the requirement for the PBF, as shown in the fire hazard analysis for the PBF.[6]

There are three hose connections in the building: one located in the high-bay, and two in the first basement level. The hose system has been reviewed, and it was determined that it is not needed to support the fire suppression requirements for the building.[7] The hose has been removed and the system is no longer in service. Three fire hydrants are located approximately 50 ft from the building for use by the fire department. Portable fire extinguishers are installed throughout PER-620. The present arrangement is considered to provide worker protection, as shown in the fire hazard analysis for the PBF.[6]

2.4.1.2 Fire Detection and Alarm Systems. PER-620 is equipped with a fully functional proprietary fire alarm system. Alarms are initiated by the sprinkler system water flow alarm, smoke or heat detector activation, or by actuation of manual fire alarm pull stations, which are provided at each exit. Alarms are routed through a local fire alarm panel (located in the hallway at the south entrance), which sounds locally audible and visible alarms in the building. The alarm signal is also sent to the multiface interface panel (MIP)-3 and forwarded to the INEEL Fire Department Central Alarm Station, which is manned 24 hours a day, 7 days a week.

2.4.1.3 Fire Barriers. The main floor high bay is separated from adjacent building areas to the west and east by concrete block wall deemed capable of providing a 3-hr fire rating. However, the presence of unprotected heating, ventilating, and air conditioning (HVAC) and personnel egress openings within the walls provide fire propagation routes to adjacent building areas. Openings between the main floor and the boiler room have fire dampers. EDF-2862[8] concludes that none of the separations in PER-620 need to be credited as fire barriers to achieve DOE fire-loss objectives.

2.4.2 Emergency Notification System

In 1994, an Emergency Notification System (ENS) was installed throughout the PBF/WROC area as part of a fire alarm system upgrade. The voice paging and tone generation portions of the Fire Quest 200 panels are utilized for the ENS. This system has manually actuated chime, voice paging, evacuation, and take cover capabilities that can be heard throughout the PBF/WROC area via the fire alarm system speakers and several speakers mounted outside. No signal is transmitted external to the area.

The ENS can be actuated from PER-609, -612, -613, -619, -620 and -632. The control stations consist of a handset that looks like a telephone handset, a spring-loaded press-to-talk toggle switch, and two covered toggle switches for evacuation and take cover. Chimes automatically sound whenever the

handset is lifted off its hook notifying area residents an announcement is about to be made. The Fire Quest 200 panels that provide the ENS are powered from commercial power with battery backup.

2.5 Utility Distribution Systems

Commercial power is supplied to the PBF from a 13.8-kV overhead line. A 2.4-kV transformer provides power to the secondary coolant pump. Power is supplied to the remaining loads through 120/240-V, single-phase; and 480-V, three-phase transformers. The main PBF transformer yard (PER-719) is located west of the reactor building. The circuitry is arranged to allow selected circuits to be transferred to battery backup power if commercial power fails.

Battery backup power is provided to the ENS and the fire alarms to permit notification of facility personnel in the event of a commercial power failure.

Metallic devices and structures are connected to a grounding network that prevents the buildup of electric potentials caused by lightning, electric insulation failure, static charges, or induced voltages. The grounding network consists of ground rods interconnected by copper cables to which metallic structures are electrically connected.

As stated in Section 2.4.1.1, the fire protection and domestic water systems for the WROC/PBF area are combined into a single piping system.

2.6 Auxiliary Systems and Support Facilities

2.6.1 Terminal Building

The terminal building (PER-604) is a 610-ft^2 one-story corrugated-metal building. The building is not heated and is presently used for radioactive material storage. There is no permanently installed electrical power in the building.

2.6.2 Maintenance and Storage Building

The maintenance and storage building (PER-625) is a 3,200-ft^2 one-story steel-framed building used for storage of radioactive equipment, chemicals, and spare parts. The walls are metal panels with portions sheet rocked or with bare insulation, and the roof and siding are corrugated sheet metal. The building has electric heat, a safety shower, and a fire sprinkler system. An air compressor supplying plant and instrument air to the reactor (PER-620) is located in this building.

2.6.3 Radioactive Waste Storage Area

The radioactive waste storage area (PER-704) is a 30 × 90-ft outdoor storage area located south of PER-620. The area is used for storage of radioactive waste from the PBF facility. Waste is stored within a fenced area or in dumpsters, boxes, cargo containers, etc. within a posted area.

2.6.4 Liquid Nitrogen Storage Yard

The liquid nitrogen storage yard (PER-723) is a fenced area north of the PER-620 building that was used to store liquid nitrogen. It is no longer in use; however, a piping tunnel extends from here to the PER-620 first basement.

2.7 References

1. DOE-STD-1020-02, "Natural Phenomena Hazards Design and Evaluation Criteria for Department of Energy Facilities," U.S. Department of Energy, January 2002.

2. EDF-2190, "PBF-620 Periodic Seismic Safety Assessment," N. B. Smith, Rev. 1, November 2, 2002.

3. EDF-2257, "Power Burst Facility In-Pile Tube Radiological Waste Characterization," Rev. 0, July 1, 2002.

4. B. K. Harris letter to D. F. Haney, "WGS-032-01 PBF Warm Waste Sump-BKH-02-16," April 17, 2002.

5. D. N. Thompson to L. P. Davis, "Transmittal of the Limitations and Validation (L&V) Report Pertaining to the Radiological Analysis of Samples Collected in Support of the PBF Warm Waste Sump Project, Sample Delivery Group (SDG) #W03201011RH," June 17, 2002.

6. PBF-HAD-10, "Fire Hazards Analysis/Fire Safety Assessment Power Burst Facility Reactor Building PER-620," Rev. 2, October 2003.

7. R. R. Nii letter to S. Thorne, "Fire Hoses taken out of Service in Type II Modules at RWMC and PBF Reactor Building (PER-620)," January 31, 2002.

8. EDF-2862, "Derating of Fire Barriers and Fire Dampers at PER-620," Rev. 0, R. R. Nii, September 18, 2002.