

12.5 Health Physics Facilities Design

12.5.1 Objectives

The health physics (HP) facilities are designed with the objectives of:

- Providing capability for administrative control of the activities of plant personnel to limit personnel exposure to radiation and radioactive materials as low as reasonably achievable (ALARA) and within the guidelines of 10 CFR 20.
- Providing capability for administrative control of effluent releases from the plant to maintain the releases ALARA and within the limits of 10 CFR 20 and the plant Technical Specifications.
- Providing capability for administrative control of waste shipments from the plant to meet applicable requirements for the shipment and receipt of the material at the storage or burial site.

12.5.2 Equipment, Instrumentation, and Facilities

The health physics (HP) facilities are located at elevation 100'-0" in the annex building. See Figure 1.2-18 for a plan view of elevation 100'-0" of the annex building.

12.5.2.1 Access and Exit of Radiologically Controlled Areas

Access to the radiologically controlled area (RCA) encompassing the containment and potentially contaminated areas of the annex, auxiliary, and radwaste buildings is normally through the entry/exit area of the health physics section of the annex building. Exit from the RCA is at the same location.

12.5.2.2 Facilities

The ALARA briefing and operational support center is located off the main corridor immediately beyond the main entry to the annex building. Near this room are several offices that may be used for other health physics functions.

Changes rooms are provided where radiation workers remove street clothes and put on modesty garments. These rooms are provided with lockers, wash sinks, showers and toilet facilities.

Radiation workers don anti-contamination clothing in the protective clothing pickup and suitup room. Workers then proceed to the central health physics booth.

Personnel access to and from the RCA is controlled at the health physics booth at the entry/exit points of the health physics area. Logging into the Radiation Permit System and

issuance of dosimetry is also handled at this location. The health physics booth is equipped with computer terminals, desks, filing cabinets, and shelves, and other facilities needed for effective control and monitoring of radiation workers in the RCA. Workers are logged into a radiation exposure tracking system. The health physics and security log-in functions are integrated. Facilities and equipment are provided at the health physics booth for the following functions:

- Issuing respirators, as needed
- Issuing radiation dosimetry, as required
- Updating radiation work permits as needed based on information provided by health physics at local control points and at the work locations

The booth has a counter such that the health physics personnel can easily monitor the flow of workers. It is located adjacent to and visible from the health physics pickup and suitup room.

As radiation workers exit the work areas they go through personnel contamination monitors, shower for decontamination if needed, and receive radiologically controlled first-aid if needed. The health physics area contains the personnel contamination monitoring equipment, decontamination shower facilities, and first-aid equipment.

The hot machine shop is located at elevation 107'-2" in the south end of the annex building. Contaminated equipment can be decontaminated at the facility and maintenance and repair operations can be performed in a low radiation background area within the RCA and with appropriate radiation protection and contamination control measures in place.

12.5.2.3 Whole Body Counting Instrumentation

The whole body counter(s) is located in a low background radiation area in the Annex Building. The whole body counting equipment is capable of detecting fractional body burdens of gamma emitting radionuclides.

12.5.2.4 Portable Survey Instrumentation

Portable radiation survey instrumentation is stored at the access control health physics booth and at in-plant control points. This instrumentation allows plant personnel to perform radiation, contamination, and neutron surveys, as needed, as well as collect samples for airborne analysis. Shielded rooms are provided in the health physics area for radioactivity analysis laboratory facilities and for calibration of survey instruments.

12.5.2.5 Other Health Physics Instrumentation

The area radiation monitoring system is installed in areas where it is desirable to have constant dose rate information. Monitors indicate dose rate in the control room and provide appropriate alarms upon reaching a preset dose rate. Fixed continuous airborne radioactivity monitors are also provided at strategic locations, where personnel exposure to airborne radionuclides is likely. More information on these fixed instruments is given in Sections 12.3 and 11.5.

12.5.3 Other Design Features

12.5.3.1 Radiation Protection Design Features

Specific design features for maintaining personnel exposure ALARA and plant shielding provisions are incorporated into the plant design. These features are described in Section 12.3.

12.5.3.2 Job Planning Facilities

Areas are provided where personnel may study, as appropriate: blueprints, drawings, photographs, videotapes, previous inspection reports, previous radiation and contamination surveys, or previous RWP's appropriate to the particular job prior to entry into radiation areas to perform inspections. Work rooms are provided where equipment is checked or calibrated to verify it is operating properly prior to entry into the radiation area. The ALARA briefing and operational support room in the annex building is an example of such a facility where job planning and ALARA briefing and debriefing activities can take place.

12.5.3.3 Radwaste Handling

The handling of radwaste has been minimized by plant design. Some of the activities involving radwaste or radioactively contaminated materials are performed offsite or using mobile equipment brought onsite. Cleaning of protective clothing and respiratory protective equipment are activities that are performed offsite or in mobile equipment.

The radwaste system is shielded and incorporates remotely operated liquid and solid radwaste systems. The systems are designed to minimize operator exposure in waste processing and handling operations. The liquid radwaste system and solid waste handling system are described in Chapter 11.

12.5.3.4 Spent Fuel Cask Loading and Shipping

Spent fuel handling and loading of a shipping cask is designed to be performed underwater, using the fuel handling cranes and/or manual extension tools.

Some of the design features included to maintain exposure ALARA are:

- Maintenance of at least ten feet of water above the fuel assembly to minimize direct radiation.
- Purification of fuel pool water to minimize exposure due to water activity.
- Cooling of the spent fuel pool water.
- Providing continuous air sampling while moving fuel to evaluate airborne activity.

12.5.3.5 Normal Operation

The plant is designed so that significant radiation sources are minimized, locally shielded, and/or located in shield cubicles. Much of the instrumentation required for normal operation reads out remotely in the control room or in other low radiation areas. Instrumentation that cannot be placed remotely or that is read infrequently is situated, where possible, so that it can be read from the entrance to the cubicle or from a low radiation area within the cubicle.

Area radiation monitoring equipment, which is included as part of the process effluent radiological monitoring system, is available and provides indication of radiation levels and local alarms. The ventilation system is designed to minimize spread of airborne contamination.

12.5.3.6 Sampling

Provisions are made for sampling of radioactive systems in the sampling room. Protective clothing and gloves are available when sampling radioactive systems to prevent contamination of personnel.

12.5.3.7 Surface Coatings

Special coatings are applied to walls and floors of areas containing radioactive fluids, which aid in decontaminating these areas.

12.5.4 Controlling Access and Stay Time

Areas in the plant are classified as non-radiation areas and restricted radiologically controlled areas for radiation protection purposes. Restricted areas are further categorized as radiation areas, high radiation areas, airborne radioactivity areas, contamination areas, and radioactive materials areas, to comply with 10 CFR 20 and plant procedures and instructions.

Entrance to the RCA area is normally through the access control area at the health physics area entry/exit location in the annex building, see subsection 12.5.2.

High and very high radiation areas are segregated and identified in accordance with 10 CFR 20. The entrances to high and very high radiation areas are locked or barricaded and equipped with audible and/or visible alarms, as required.

12.5.5 Combined License Information

The Combined License applicant will address the organization and procedures used for adequate radiological protection and to provide methods so that personnel radiation exposures will be maintained ALARA.