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7. Abstract This document provides the functional design criteria for an addition to the 222-S facility. This project will provide space for manipulator repair, equipment and manipulator decontamination and laundry storage. The manipulator repair and storage area will provide for storage of 20 manipulators, an area for receiving potentially contaminated manipulators and an area for the repair of manipulators. The decontamination area will be capable of decontamination of manipulators and shipping casks, pigs, T-handle carriers and other shipping containers. The laundry storage area will provide space for potentially contaminated and clean laundry.		
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FUNCTIONAL DESIGN CRITERIA
W-367, 222-S ANCILLARY EQUIPMENT ADDITION

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**FUNCTIONAL DESIGN CRITERIA
W-367, 222-S ANCILLARY EQUIPMENT ADDITION**

1.0 INTRODUCTION

1.1 BACKGROUND

The 222-S Laboratory facility was constructed during the early 1950's to provide analytical and plant support for 202-S, the Hanford REDOX Plant. Through the years, the missions of the 222-S Laboratory have changed, and modifications have been made in response to new requirements and to increasingly restrictive operating and design criteria. Currently the mission is to provide quality analytical chemistry services in support of Hanford mission with emphasis on waste management and environmental restoration programs.

The primary mission at the Hanford Site over the next 30 years will be the cleanup of accumulated wastes which have resulted from past Defense Waste Production program operations. This will entail locating and identifying the waste sites, characterizing the waste products, and making appropriate decisions for dealing with these wastes. An essential prerequisite for making these cleanup decisions is accurate and documented information regarding the nature and extent of waste contamination, development of treatment technologies and monitoring activities after remediation is complete.

The 222-S Laboratory will provide analytical services in support of the Hanford Site missions, including characterization of tank waste, analysis and documentation of current effluent and process products to ensure that ongoing operations are within specified limits.

The 222-S facility is essential to achieving environmental clean up at Hanford and will continue to support waste management and other Hanford operations for the next 30 years.

1.2 SCOPE

The scope of this project will provide the 222-S Facility with an addition that will provide four separate functions. These functions will be manipulator repair, manipulator storage, equipment decontamination and laundry storage capability. The manipulator repair and storage portion of the addition will provide repair stations and storage for multiple manipulators being used within the 222-S facility. The equipment decontamination area shall provide space for decontamination equipment, decontamination hoods and storage capability for potentially contaminated equipment and cleaned equipment which is used regularly in the 222-S Facility. Equipment to be decontaminated in this area include manipulators, shipping casks, equipment used for transport of samples within the laboratory, pigs, T-handle carriers, door stops, and tank farm core samplers. The laundry portion of the addition shall provide separate storage for clean and dirty laundry that is utilized by the facility personnel. This facility will not provide repair functions for analytical equipment or maintenance functions as provided by the Maintenance Annex project W-368.

Decontamination hoods, walk in hoods, decontamination equipment used by analytical services, benches, shelving, and associated utilities for each function will be provided.

1.3 SITE LOCATION

The site is located next to the northwest portion of the 222-S Facility as approved in the Site Evaluation File #2W-94-04. Trailer M0-936 may require to be relocated to make room for the new addition if needed.

The site evaluation letter requires the following provisions:

- 1) A 2.4 meter clearance will be maintained over the roof from the aerial PAX and Paging cables.
- 2) Relocation of existing fire service underground piping.
- 3) Approval of the rerouting/removal of power lines by Electrical Utilities.
- 4) Approval of the rerouting of underground water lines by Water Utilities.
- 5) Locate such that manipulators can be transported from hot cells (1-A, 1-F, 1-E-1, 1-E-2 and W-041) that minimizes or eliminates passage across multiple zones.

1.4 PROJECT INTERFACES

Access for manipulators and equipment to and from the 222-S Facility to eliminate the crossing of radiological zones shall be evaluated during design. The facility must accommodate the shipment of potential hazardous waste. This will allow for a "cold" and a "hot" access to the new facility. Other access points shall be considered during the Conceptual Design stage to give the best possible access for manipulators and equipment to and from the 222-S Facility. Interfaces to be considered during design are shown below:

- o Manipulator repair facilities - access from the hot cells within the 222-S Facility is required. Crossing of zones while transporting manipulators from the hot cells to the repair facility shall be minimized or avoided if possible.
- o Communications - Communication services (i.e., fire alarm, PAX, LAN, telephone, etc) interruptions shall be minimized during construction to prevent impacts to operations within the 222-S Facility.
- o Electrical, water, and gas utilities additions or modifications shall be considered during design to minimize downtime of work within the 222-S Facility during construction.
- o Road access - Sample truck access to door 13 and the new Hot Cells shall be maintained during construction. Access to the 207-SL basins and the 219-S tanks shall also be maintained. Road access

for Hanford Fire Department, waste shipments and laundry trucks shall also be maintained.

- o Ventilation systems - Connection to the 222-S Facility existing ventilation system shall be investigated to insure that the existing system can adequately and safely handle the added capacity. If connection to the existing ventilation system is viable, any disruption of operations shall be minimized. Scheduling of outages or flow changes shall be arranged with Laboratory Engineering and Operations.

2.0 PROJECT CRITERIA

2.1 PURPOSE:

New missions and increased activities at the 222-S Laboratory include process development, hazardous waste receiving from offsite laboratories, increased tank waste characterization, and increased characterization of waste streams at the Hanford site. These activities will increase the requirements for support functions within the Laboratory such as maintenance, hazardous waste handling, manipulator repair, equipment decontamination and storage areas.

With the addition of seven new hot cells at the 222-S facility, 41 additional manipulators will be added to the normal maintenance inventory. This dramatic increase in the current level of manipulators impacts storage and repair space for manipulators and production levels for operations. The existing facility requires manipulators to cross potentially contaminated areas and clean areas when being transported for maintenance, thereby limiting the amount of time available for actual maintenance. Storage space for spare manipulators is presently at a premium and will be further impacted with the addition of the new manipulator spares. Spare parts for the manipulators are presently stored in 2101M building in the 200-E area. This impacts the time required for maintenance due to transportation to pick up required spare parts when needed.

Presently the equipment decontamination and equipment storage activities are being performed and stored in the 222-S Facility occupying valuable hood space and floor space.

There is no allocated space for the storage of soiled laundry within the 222-S Facility. The laundry is bagged and stored in the aisles of the facility until it is moved to a connex storage box outside of the facility.

2.2 PERFORMANCE REQUIREMENTS:

The project shall perform the functions of manipulator repair, storage, decontamination, equipment decontamination and laundry storage. The manipulator repair portion shall be sized to accommodate the repair of 1 manipulator per day and have a storage capacity for twenty (20) manipulators. Spare parts storage shall have the capacity to store required spares for a 7 day period.

The equipment decontamination and storage area can utilize similar functions and space as the manipulator decontamination and storage areas. These areas will require physical separation to prevent these functions from infringing on one another. The decontamination area requires a hood for decontamination of equipment and the cleaning of various sizes of casks. Space for equipment like the carbon dioxide non-destructive equipment, freon decontamination, ultra-sound decontamination and electro-polishing decontamination equipment shall also be made available, as required. The equipment decontamination area shall be capable of handling tank waste core carriers which weigh approximately 455 kilograms. Physical size of the tank waste core carriers are approximately .6 X .6 X 1.2 meters high. Additional space shall be provided for future decontamination technologies.

The laundry storage area shall be capable of accommodating clean and potentially contaminated laundry. The clean area will require shelving with separations for size and individual articles. A delivery door for clean laundry will be required. The potentially contaminated area (soiled) will require an area to accumulate 7 days of soiled laundry. Separate areas for different laundry articles (lab coats, coveralls, boot covers, gloves, etc.) will be required for separation. An exit for loading the soiled laundry onto the laundry truck is also required. The laundry storage shall be capable of handling 90 bags/week (approximately 16 m³) of clean laundry and 90 bags/week (approximately 16 m³) of soiled laundry.

2.3 OPERATIONAL REQUIREMENTS:

The operational requirements of this addition shall be consistent with the operational requirements of the existing 222-S facility. It is anticipated that the 222-S facility will be in operation for the next 30 years.

2.4 PERSONNEL REQUIREMENTS:

No new personnel requirements will result from this project.

2.5 GENERAL REQUIREMENTS:

Division 11 - Equipment and Division 13 - Special Facilities (Sections 1300 - General Requirements and 1325 - Laboratory Facilities (including hot laboratories)) DOE 6430.1A, General Design Criteria apply to enclosures and hot laboratories. Consideration shall be applied to these sections as well as to "-99.0, Nonreactor Nuclear Facilities - General" and "-99.1, Laboratory Facilities, Including Hot Laboratories" sections in the other divisions of this criteria.

3.0 PROCESS CRITERIA

3.1 INSTRUMENTATION AND CONTROL:

Combination beta-gamma Continuous Air Monitors (CAM) units shall be provided to meet operating requirements, as required. Record samplers shall be located in the manipulator repair area and the hazardous waste handling areas as required.

3.2 PIPING AND VESSELS:

The waste drain system material shall be compatible with the waste constituents used in the facility for decontamination of equipment and manipulators. The waste drain system shall be gravity flow to the 219-S facility. Corrosion protection system shall be evaluated during design and installed as required in accordance with WAC-173-303-640.

All piping and valves shall be labelled and piping shall be identified in accordance with the "American National Standards Institute (ANSI A13.1), Scheme for the Identification of Piping Systems".

3.3 GENERAL PROCESS:

Manipulators used in the hot cells may become slightly contaminated during use. When manipulators are removed for routine maintenance or failure they are surveyed for contamination after they are removed from the cells and placed on the transport/storage carts. Currently, if found to be contaminated, the contamination must be removed before the manipulator is moved to the repair area. If the contamination level or dose rate is too high, the affected parts are removed and disposed. During the decontamination process, operations in the hot cell area are curtailed. With the addition of the ancillary equipment facility, this process will be altered to allow the manipulator to be moved immediately to the new decontamination area. In this area, the manipulators will be decontaminated, repaired at the repair stations, and stored as ready spares.

Laundry at the 222-S Laboratory is received and stored in connex boxes. As needed it is loaded on carts and taken through the snow, rain or other elements into the building. After use, the laundry is bagged, surveyed, and thrown out one of the side doors. It is then loaded on a cart and taken to a separate connex box for storage until the laundry services take it for cleaning. This upgrade will provide an area to receive the laundry directly into the building, storage until needed, storage of the used laundry, and direct load out.

Equipment decontamination is conducted in a stainless steel hood in room 2B. This hood has leaded glass windows for shielding, sinks in which wash the equipment and drains routed directly to the 219-S waste tanks. Samples are received at 222-S in various types of shielded containers ranging from 15 kg to 350 kg and up to 1 meter in length. The samples are removed from these containers, diluted and placed in other smaller shielded containers. Often, the shipping containers and the smaller containers become contaminated during these processes. The containers are moved to room 2B for decontamination when

the process is complete. The existing hood works very well within limitations. Large equipment, like the core sample casks, are too long and heavy to be handled. The new facility will enable the decontamination of all types and sizes of sampling equipment."

3.4 GENERAL MECHANICAL PROCESSES:

No requirements for general mechanical process criteria. The facility is a maintenance, equipment decontamination and laundry storage facility only.

4.0 FACILITY CRITERIA

4.1 ARCHITECTURAL AND CIVIL/STRUCTURAL:

The facility shall provide sufficient space for manipulator repair, equipment decontamination and a separate space for laundry separation. The architecture and civil/structural portions of the facility shall be in compliance with applicable codes and the architectural design shall be compatible with the existing facility.

4.1.1 Manipulator Repair Shop:

The manipulator repair shop shall consist of a receiving (staging) area, decontamination area, storage area, a repair area and an office for a manager. The repair frequency of manipulators will be one manipulator per day.

The repair area shall consist of five (5) repair stations which will be capable of handling a manipulator under repair at each station. Repair stations shall consist of tables for tapes and manipulator repairs and associated tools. All tools shall have a designated storage area at each repair station. These tools consist of grinders, sanders, vices, presses and other small tools used during repairs. Additional ultrasonic cleaning baths shall be provided for the cleaning of small parts. Three (3) ultrasonic baths are required, one (1) in the 4-11 liters size and two (2) in the 28 cubic liters size will be required.

The manipulator storage area shall provide space for storage of twenty (20) manipulators and a weeks of the most common spares utilized during routine maintenance. This area shall be located where manipulators can be transported from hot cells (1-A, 1-F, 1-E-1, 1-E-2 and W-041) in a way that minimizes or eliminates passage across multiple zones. Manipulators awaiting decontamination, prior to repair and storage, shall be staged in a staging area. The receiving (staging) area shall have direct access to the manipulator decontamination area. The manipulator decontamination area shall have a walk in hood which will accommodate a manipulator for cleaning. The manipulator and equipment decontamination area shall share the same space with functional separation between the manipulator decontamination and the equipment decontamination area. These activities should be located in the same area to take advantage of common drains, water supply, HVAC, electrical and chemical storage requirements. The manipulators shall be considered as potentially contaminated with mixed waste. Laboratory personnel are currently evaluating alternative decontamination methods of manipulators and these methods shall be evaluated during the Conceptual Design phase.

4.1.2 Equipment Decontamination and Storage:

The equipment decontamination and storage area requires two separate areas, one for new and clean equipment and one for potentially contaminated equipment awaiting decontamination. The area shall be capable of handling and cleaning Tank Farm shipping casks, lead in

various forms, auger bits, sleeves, equipment, pigs and other various items. Lifting mechanisms shall be employed where required to move items in and out of the area.

The equipment decontamination and storage area can utilize similar utilities as the manipulator decontamination and storage areas. These areas will require functional separation to prevent these functions from interfering with one another. Cleaning and decontamination equipment shall be provided with hoods. Space allocation for these technologies shall be defined during Conceptual Design phase with the concurrence of Laboratory Engineering.

The equipment decontamination and storage area will be situated for ease of access by vendors supplying routine equipment decontamination services. Location for access shall be identified during the Conceptual Design phase with the concurrence of Laboratory Engineering.

4.1.3 Laundry Storage:

The laundry storage area shall be capable of accommodating a weeks supply of clean and potentially contaminated laundry. The clean area will require shelving with separations for size and individual articles. A delivery door for clean laundry will be required. The potentially contaminated area (soiled) will require an area to accumulate 7 days of soiled laundry. Separate areas for different laundry articles (lab coats, coveralls, boot covers, gloves, etc.) will be required for separation. An exit for loading the soiled laundry onto the laundry truck is also required.

4.2 HEATING, VENTILATING, AND AIR CONDITIONING:

Provide ventilation systems for heating, cooling and filtration for the three areas (manipulator repair, equipment decontamination and laundry) of the facility in accordance with the requirements of DOE Order 6430.1A, Section 1550, as applicable.

4.2.1 Functional Requirements:

1. The ventilation system(s) must maintain a controlled, continuous airflow pattern from the environment into the building, and then from non-contaminated areas of the building to potentially contaminated areas, and then to normally contaminated areas under both normal operation and during upset conditions.

2. Ducts shall be sized for the transport velocities needed to convey, without settling, all particulate contaminants. Duct work, accessories, and support systems shall be designed to comply with the ASHRAE Fundamentals handbook, SMACNA HVAC Duct Design Manual, ERDA 76-21, NFPA 45 and the appropriate SMACNA duct construction standards. Duct work shall also be designed to comply with NFPA 90A, including specification and installation of smoke and fire dampers at fire wall penetrations (with the exception of exhaust system ducting if it is

required to maintain confinement of hazardous materials during and after a fire event). Exhaust duct work must comply with NFPA 91.

3. Filtering of zone II recirculation streams and the exhaust streams discharging to atmosphere to within acceptable recirculation or discharge limits shall be provided.

4. Assure integrity of final filters are maintained during a design basis fire.

5. The manipulator repair stations and equipment decontamination stations will be occupied regularly by personnel. The manipulator, equipment storage areas and laundry will normally be unoccupied areas of the facility.

6. Enclosure design and ventilation shall comply with the American Conference of Governmental Industrial Hygienist Ventilation Manual (ACGIH) and DOE Order 6430.1A, Section 1100, Enclosures.

7. Walk-in hoods, and other equipment such as ultrasonic baths, freon decontamination, electro-polishing, carbon dioxide non-destructive cleaning equipment and other new unidentified technology shall be provided with ventilation as required by the process.

8. The ventilation systems shall be capable of maintaining safe air flows within the ancillary equipment addition. The new addition shall be maintained at negative pressure with respect to atmosphere upon loss of normal power.

4.2.2 Performance Requirements:

1. Ventilation zone differential pressures for this project, relative to outside atmospheric pressures, required for facility operations shall be per Table 1.

Table 1. Ventilation Zone Differential Pressures

ZONE	AREA	PRESSURE (cm H ₂ O)
I	Enclosures	-1.52 ⁺ - 0.25*
II	Enclosure Operating Area	-0.64 ⁺ - 0.13
IIIa	Radiological Operating and Equipment Area	-0.25 ⁺ - 0.13
IIIb	Buffer Zone	0.13 + 0.13, -0.00
IV	Atmospheric	0.0 + 0.13, -0.00

* Relative to surrounding Zone II area.

2. All open face hoods shall be designed to provide a minimum face velocity of at least 27.4 m/min to ensure capture of contaminants in the

hood exhaust (ACGIH Industrial Ventilation Manual). Air exhausted from a hood shall not be recirculated to occupied areas.

3. New room exhausts and recirculation returns from the secondary confinement areas must be provided with HEPA filtration as require to prevent potential contamination of the ducts. These HEPA filter installations must also include pre-filters installed upstream of the HEPA filter to extend the HEPA filter's life.

4. HEPA filter installations are to be coordinated with WHC to allow for testing of the HEPA filters using existing methods and equipment. Utility services shall be extended to the filter locations (e.g., electrical receptacles and compressed air) to facilitate testing work.

4.3 UTILITIES:

4.3.1 Steam:

No requirements for steam.

4.3.2 Water:

Sanitary water lines will be connected to existing water services within the 222-S Facility. Sanitary water lines will be connected to the addition and have approved backflow prevention devices as required. Water for fire protection shall be obtained from outside lines.

4.3.3 Sewage:

No requirements for sewage.

4.3.4 Electrical:

Electrical power is required for new power equipment, instruments, lighting, control systems and instruments. Electrical 480V AC normal and standby power sources for the new addition will be supplied from the existing outdoor switch gear.

Non powered self illuminating emergency exit signs shall be provided. Emergency lighting shall be provided from the building electrical system. The fire alarm system shall be connected to the existing building fire alarm system. These services shall also be provided with emergency power to continue fire alarm service, communication and PAX systems.

Operation of the vacuum air sampler pump and continuous air monitors must be maintained during power outages.

4.3.5 Lighting:

Interior lighting systems shall comply with DOE Order 6430.1A, General Design Criteria Section 1655 and with the IES Lighting handbook. Nonuniform lighting shall comply with 41 CFR 101-20.116-2 and with Section 1694, Energy Conservation. Exit and emergency lighting systems shall comply with NFPA 101 and NFPA 110.

Exterior lighting systems which may be required will comply with DOE Order 6430.1A Section 1650.

4.3.6 Safety Showers:

Safety showers, drains and emergency eye wash stations with sinks shall be provided in areas where corrosive and other skin or eye irritant chemicals are stored, handled, used or dispensed. Equipment shall comply with 29 CFR 1910.151(c) and ANSI Z358.1, serviced by sanitary water and be consistent with the rest of 222-S Laboratory.

4.4 COMMUNICATION SYSTEMS:

The following 222-S communications systems shall be extended to the new expansion:

- (1) Internal (PAX) dial type telephone system,
- (2) Internal paging system,
- (3) Emergency evacuation audible alarm system and
- (4) Fire alarm system.
- (5) LAN
- (6) Site telephone system

4.5 AUTOMATIC DATA PROCESSING:

No automatic data processing equipment will be required.

4.6 ENERGY CONSERVATION:

Energy conservation shall be considered in the design of this facility in accordance with DOE Order 6430.1A Section 0110-12.

4.7 MAINTENANCE:

This addition will increase on site maintenance requirements. Ease and minimization of maintenance shall be considered during design. Examples include, but are not limited to:

- Provide for visual inspection where possible,
- Use interchangeable parts,
- Provide access for disassembly, maintenance, repair and
- Provide access for utilities.

Wherever possible, design shall reflect the following order of preference for performing maintenance:

- Adjust unit in place,
- Repair unit by contact maintenance, and
- Replace with spare units unless it is more economical to remove, repair and return unit to service.

Where an equipment item requires special and unique maintenance tool(s) and/or instructions, those tool(s) and/or instructions shall be provided to the user.

4.7.1 Facility:

The design shall assure that all equipment, piping, filters, lights, etc., contained within the new facility are capable of receiving maintenance and being removed while minimizing personnel exposures. Particular attention shall be applied to the design of the manipulator repair area and the equipment decontamination areas that adequate decontamination of these areas can be maintained and that equipment is properly located within radiation and non-radiation zones.

4.7.2 Equipment:

Utilities and equipment installed by this project shall be designed to facilitate system testing. During operation of the new addition, all work performed will be performed in a manner to insure personnel exposure will be kept to a minimum using the low as reasonable achievable (ALARA) concept.

4.7.3 Materials:

In areas where corrosive chemicals, toxic or other hazardous materials are handled, construction items shall be of materials and components compatible with the characteristics of the materials being handled. A list of materials normally used can be found in Caption 51 and 57 of the Hanford Stores Catalog. Chemicals used by individual processes and procedures shall be identified during Conceptual Design.

5.0 GENERAL REQUIREMENTS

5.1 SAFETY

5.1.1 Criticality:

The 222-S Laboratory Facilities are classified as an "Isolated Facility," and as such are not allowed to contain more than 1/3 of a minimum critical mass of fissile material. Nuclear excursions in Limited Facilities are not credible.

5.1.2 Safety Analysis:

Safety classifications of systems, components, and structures are as identified and defined in the Westinghouse Hanford Company, "Management Requirements and Procedures Manual," WHC-CM-1-3, MRP 5.46. Westinghouse Hanford Company safety class 3 is the highest classification anticipated for any system, component, and/or structure which will be applied to this project based on the 222-S Laboratory Facilities Hazards Identification and Evaluation document. This safety classification is based on no new services or operations by this project and that the project does not change any operation over what is presently occurring at the Laboratory. The laboratory will be operated under the present HI&E until the Interim Safety Basis (ISB) document is issued. This project contains systems, components, or structures which are designed to provide fire alarm signals for personnel evacuation and fire department response. The failure of equipment and systems provided by this project would not adversely effect the environment or safety and health of the public or groups of personnel within the plant and/or plant boundaries.

5.1.3 Contamination Control:

Contamination control shall comply with DOE Order 6430.1A and WHC-SD-GN-DGS-30011, Radiological Design Guide, Section 3.0 as required.

5.1.4 Shielding:

The shielding design basis shall be to limit the maximum exposure to an individual worker to one-fifth of the annual occupational external exposure limits specified in DOE 5480.11 as recommended by DOE Order 6430.1A Section 1300-6.2. The use of lead for shielding shall be minimized.

5.1.5 Safety/Health:

During the construction phase all applicable Occupational Safety and Health (OSHA), Code of Federal Regulations (i.e., 29 CFR 1926.53), Washington Industrial Safety and Health (WISHA) and Department of Energy (DOE) standards (i.e., 5480.11) shall be complied with to minimize

safety risks. Removal of chemical or radiological contaminated materials (piping, concrete, soil) associated with this project will be accomplished according to the applicable Westinghouse Hanford Company procedures and standards to promote safety and minimize the potential for personnel injury or contamination spread. Safety precautions shall be provided for, but not limited to, the following items:

Industrial:

1. Routine construction hazards will exist during site preparation and construction activities. Field operations shall be conducted in compliance with recognized safety codes and practices to ensure a safe working environment.
2. Where construction is to be performed around lifting devices, adequate safety measures such as roped off areas, hard hats, signs, guardrail's, shall be employed to protect personnel from injury.

Radiological:

1. During elements of construction, personnel may be exposed to radiation from existing sources. The Operating Contractor will provide on-site radiation monitoring and surveying services, and will prescribe requirements for the use of protective apparel and exposure monitoring as appropriate.
2. Appropriate safety standards and procedures for working in a radiation area and for segregating, removing, packaging, transporting, and disposing of radioactively contaminated materials shall be followed.

The project design shall have the objective that no single credible project component failure shall result in unacceptable safety or health consequences. Unacceptable safety consequences are:

- Fire (other than localized minor fire, such as might be caused by shorting of electrical equipment).
- Explosion.
- Instantaneous release of radioactivity from the facility in excess of 5000 times DOE Order 5480.11 Table II values at the point of discharge.
- Exposure of personnel to ionizing radiation in excess of annual personnel exposure limits given in DOE Order 5480.11.
- Exposure of personnel to chemical substances and physical agents in excess of the Threshold Limit Values established by the American Conference of Governmental Industrial Hygienists.

5.1.6 Fire Protection:

The facility shall meet the requirements for fire protection as specified in DOE Order 6430.1A and NFPA 45, "Fire Protection for Laboratories using Chemicals."

The existing underground fire service, and 222-S service piping will required relocation to the outside wall of the new facility. Existing fire hydrants 8-S and R9-S will require relocation to the approval of a qualified Westinghouse fire protection engineer.

The fire protection features as required by DOE Order 6430.1A, DOE 5480.7A and RLID 5480.7 must be installed to meet the specific requirements of these orders. Requirements of the Uniform Building Code (UBC), Uniform Fire Code (UFC) and various NFPA standards and recommended practices will be complied with.

5.1.7 Traffic Safety:

Westinghouse Manual WHC-CM-4-3, Standard T-6 shall be complied with during the construction of this facility.

5.2 ENVIRONMENTAL PROTECTION AND COMPLIANCE:

Project activities shall be performed in compliance with the Environmental Compliance Manual, WHC-CM-7-5, Section for dealing with solid waste generated during site preparation and construction activities and Section 9 for design of laboratory waste handling facility modifications.

A Point of Contact (POC) checklist will be performed to identify all permits and approvals required based on the scope of the project prior to Conceptual Design efforts.

5.3 SAFEGUARDS AND SECURITY:

Existing safeguards and security measures will not be impacted by this project. No new measures beyond the current practices for entry into the area will be required (refer to WHC-CM-4-33, Security Manual and DOE Order 6430.1A, Section 0110-13, Physical Protection).

5.4 NATURAL FORCES:

The building shall comply with the earthquake, wind, snow and ash fall criteria defined in the Hanford Plant Design SDC 4.1, Rev 12, "*Standard Arch-Civil Design Criteria*."

5.5 QUALITY ASSURANCE:

Quality assurance (QA) activities for all contractors involved with the design, construction, testing, and inspection of the proposed facility shall be formulated and executed through the use of the project specific quality

assurance plan (QAP). The QAP shall establish QA program requirements which provide a format to verify inspection, testing, adequacy of design, and the quality of construction and manufactured components. The QA program requirements shall be in accordance with DOE 5700.6C, *Quality Assurance*.

5.6 DECONTAMINATION AND DECOMMISSIONING:

The facility shall be designed to facilitate decontamination for reuse and for ultimate decommissioning. Contamination control will be accomplished by incorporating WHC-SD-GN-DGS-30011, Radiological Design Guide during the design.

5.6.1 U.S. Department of Energy Regulations:

The design shall meet the requirements of DOE Order 6430.1A which are applicable.

5.6.2 Miscellaneous Design Features:

Design considerations shall include but not be limited to the following:

- Construction materials, and coverings for walls, floors, and ceilings should be resistant to the accumulation of contaminants.
- Incorporate smooth, crack free surfaces, rounded corners and junctions, and encased pipe and wiring.
- Minimize the amount of furniture and equipment required to support operations in confinement areas.

5.7 OPERATION PERSONNEL AND SERVICES:

No increase in operating personnel is anticipated for this facility. Increased maintenance requirements for equipment and ventilation systems is anticipated.

5.8 TESTING:

No special testing requirements will be imposed by this project.

6.0 CODES AND STANDARDS

Engineering and construction shall be in accordance with applicable regulations, codes and standards (including DOE Orders) referenced in the following documents. The latest editions in effect at the start of design shall be used; and applicable Richland Operations (RL) supplements to referenced DOE Orders shall be included:

- DOE Order 6430.1A, "General Design Criteria" (Division 1 provides an extensive list of regulations, DOE Orders, and "National Consensus" codes and standards to be applied as necessary).
- RLIP 5480.7, Fire Protection
- RLIP 5480.4C, "Environmental Protection, Safety and Health Protection Standards for RL"
- Uniform Building Code (UBC)
- Uniform Fire Code (UFC)
- Hanford Plant Standards:
 - SDC 1.3 "Preparation and Control of Engineering and Architectural Drawings", Revision 6
 - SDC 4.1 "Design Loads for Facilities", Revision 12
 - SDC 7.5 "Standard Electrical Design Criteria for Interior Power and Lighting Systems", Revision 25
- Washington Administrative Code, WAC-296-155, Safety Construction

7.0 REFERENCES

McVey, C. B., 1993, *222-S Laboratory Upgrade Strategy*, WHC-SD-WM-ES-243, Rev. 0, Westinghouse Hanford Company, Richland, Washington.