BECHTEL JACOBS
Bechtel Jacobs Company LLC

ENVIRONMENTAL MANAGEMENT

BECHTEL JACOBS COMPANY LLC
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Environmental Management Waste Management Facility (EMWMF) Site-Specific Health and Safety Plan, Oak Ridge, Tennessee

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This document is approved for public release per review by:

BJC ETTP Classification & Information Office

4/21/0
Date

APPROVALS

Environmental Management Waste Management Facility (EMWMF) Site-Specific Health and Safety Plan, Oak Ridge, Tennessee

BJC/OR-2715/R2

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BJC/OR-2715/R2

Environmental Management Waste Management Facility (EMWMF) Site-Specific Health and Safety Plan, Oak Ridge, Tennessee

Date Issued–April 2008

Prepared for the
U.S. Department of Energy
Office of Environmental Management

BECHTEL JACOBS COMPANY LLC
managing the
Environmental Management Activities at the
East Tennessee Technology Park
Y-12 National Security Complex Oak Ridge National Laboratory
under contract DE-AC05-98OR22700
for the
U.S. DEPARTMENT OF ENERGY

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CONTENTS

ACRONYMS

ACGIH	American Conference of Governmental Industrial Hygienists
ACM	Asbestos containing material
AHA	activity hazard assessment
ANSI	American National Standards Institute
BCBG	Bear Creek Burial Grounds
BJC	Bechtel Jacobs Company LLC
BY/BY	Boneyard/Burnyard
CERCLA	Comprehensive Environmental Response, Compensation, and Liabilities Act
CFR	*Code of Federal Regulations*
CPR	cardiopulmonary resuscitation
CRZ	Contamination reduction zone
dBA	Decibels on the A-weighted scale
DOE	U.S. Department of Energy
EC&P	Environmental Compliance and Protection
ECP	Environmental Compliance Plan
EMWMF	Environmental Management Waste Management Facility
EPA	U.S. Environmental Protection Agency
ERT	Emergency Response Team
ES&H	Environmental, Safety and Health
ETTP	East Tennessee Technology Park
FR	Flame resistant
FRE	Field Radiological Engineer
HASP	Health and Safety Plan
HAZCOM	Hazard Communication
HAZWOPER	Hazardous Waste Operations and Emergency Response
HBV	Hepatitis-B vaccination
HCDA	Hazardous Chemical Disposal Area
IDLH	immediately dangerous to life or health
IH	industrial hygiene
ISMS	Integrated Safety Management System
LCS	Leachate Collection System
LEARN	Local Educative Administrative Requirements Network
LEL	Lower Explosive Level
LGWT	Liquids and Gaseous Waste Treatment
LO/TO	Lockout/Tagout
MSDS	Material Safety Data Sheet
NEC	National Electric Codes
NFPA	National Fire Protection Association
NIOSH	National Institute of Occupational Safety and Health
NRR	Noise Reduction Rating
NT	North Tributary
OLF	Oil Landfarm
ORNL	Oak Ridge National Laboratory
ORR	Oak Ridge Reservation
OSHA	Occupational Safety and Health Administration
PEL	Permissible Exposure Limit
POD	plan of the day
PPE	personal protective equipment

PSS	Plant Shift Superintendent/Park Shift Superintendent
PWT	Park Worker Training
QA	Quality Assurance
RCRA	Resource Conservation and Recovery Act
RCT	Radiological Control Technician
RI	Remedial Investigation
RWP	radiation work permit
SPO	Security Police Officer
SSHR	Site Safety and Health Representative
TLD	thermoluminescent dosimeter
TLV®	Threshold Limit Value
TSCA	Toxic Substances Control Act of 1976
TWA	time-weighted average
UL	Underwriters Laboratory
WBGT	wet bulb globe temperature

1. INTRODUCTION

The Bechtel Jacobs Company LLC (BJC) policy is to provide a safe and healthy workplace for all employees and subcontractors. The implementation of this policy requires that operations of the Environmental Management Waste Management Facility (EMWMF), located one-half mile west of the U.S. Department of Energy (DOE) Y-12 National Security Complex, be guided by an overall plan and consistent proactive approach to environment, safety and health (ES&H) issues.

The BJC governing document for worker safety and health, BJC/OR-1745, *Worker Safety and Health Program*, describes the key elements of the BJC Safety and Industrial Hygiene (IH) programs, which includes the requirement for development and implementation of a site-specific Health and Safety Plan (HASP) where required by regulation (refer also to BJC-EH-1012, *Development and Approval of Safety and Health Plans*). BJC/OR-1745, *Worker Safety and Health Program*, implements the requirements for worker protection contained in Title 10 *Code of Federal Regulations* (*CFR*) Part 851. The EMWMF site-specific HASP requirements identifies safe operating procedures, work controls, personal protective equipment, roles and responsibilities, potential site hazards and control measures, site access requirements, frequency and types of monitoring, site work areas, decontamination procedures, and outlines emergency response actions. This HASP will be available on site for use by all workers, management and supervisors, oversight personnel and visitors. All EMWMF assigned personnel will be briefed on the contents of this HASP and will be required to follow the procedures and protocols as specified.

The policies and procedures referenced in this HASP apply to all EMWMF operations activities. In addition the HASP establishes ES&H criteria for the day-to-day activities to prevent or minimize any adverse effect on the environment and personnel safety and health and to meet standards that define acceptable waste management practices. The HASP is written to make use of past experience and best management practices to eliminate or minimize hazards to workers or the environment from events such as fires, falls, mechanical hazards, or any unplanned release to the environment.

1.1 HAZWOPER APPLICABILITY

Operation of the EMWMF has been determined to be within the scope of OSHA 29 *CFR* 1910.120 and 29 *CFR* 1926.65, *Hazardous Waste Operations and Emergency Response* (HAZWOPER). As a disposal facility compliant with by 40 *CFR* Parts 264 and 265 pursuant to the Resource Conservation and Recovery Act (RCRA); or by agencies under agreement with U.S. Environmental Protection Agency (EPA) to implement RCRA regulations.

1.2 ZERO ACCIDENT PHILOSOPHY

BJC is dedicated to the concept that all accidents, injuries, and incidents are preventable, and is committed to integrating safety into all aspects of work, work planning, and execution. This integration is accomplished through the Integrated Safety Management System (ISMS). Personnel committed to safety in the workplace are key to the success of ISMS. Worker involvement is to be solicited from the onset of each task. Lessons learned and past tasks will be reviewed to add to the efficiency of the effort. ISMS principles shall be used to ensure the performance of quality work, completed safely and in a timely manner. BJC-GM-1400, *Integrated Safety Management System Description,* shall be used to implement ISMS during EMWMF operations activities.

1.3 WORK CONTROL

EMWMF operations activities are performed in accordance with BJC-FS-1001, *Work Control Process*, or the development of work packages. Each work package must contain task-specific job instructions or operating procedures with sufficiently detailed information to provide workers with a clear understanding of the tasks, materials, equipment, potential hazards and controls to mitigate identified hazards. BJC-EH-2010, *Hazard Assessment*, will be in conjunction with operating procedures or in the development of work package job instructions to ensure potential hazards associated with work activities are identified and appropriate control measures are included to mitigate those hazards. Worker involvement is a key element in the hazard assessment process and development of work control documents.

1.4 SUSPEND/STOP WORK AUTHORITY

All workers have the responsibility and authority to Suspend or Stop Work when actions or operations pose a danger to personnel or the environment, when unsafe conditions are observed, or they question the safety of the work to be performed. Workers shall have the right and obligation to report unsafe conditions and to Suspend or Stop Work without fear of reprisal.

2. EMWMF OPERATIONS STRUCTURE

2.1 ORGANIZATIONAL STRUCTURE

Roles and responsibilities for key personnel for EMWMF operations are described in BJC/OR-2713, *EMWMF Operations Plan.* An organization chart is also provided in that Plan. BJC EMWMF operations personnel designated as key contacts for emergency response activities are identified in BJC/OR-2714, *EMWMF Emergency Response and Contingency Plan.* Among the key contact personnel are the ETTP and Y-12 Plant Shift Superintendent (PSS).

2.2 ROLES AND RESPONSIBILITIES

Clearly defined roles and responsibilities are a significant element in the successful performance of all EMWMF operations activities. BJC/OR-2713, *EMWMF Operations Plan,* contains detailed descriptions of the roles and responsibilities for the BJC EMWMF operations organization.

All personnel have a clear understanding of their roles, and have the following responsibilities:

- Safety for themselves and others.
- Reporting unsafe conditions and suspend or stop work until condition is corrected.
- Reporting actual or potential environmental impacts.
- Performing work in a safe manner.
- Performing only the tasks for which they are trained.
- Notifying the Site Safety and Health Representative (SSHR) when taking prescription or nonprescription medication that might cause drowsiness, anxiety, or other side effects that could interfere with the safe performance of work.
- Immediately reporting all injuries, no matter how minor, to the SSHR and line supervision.
- Practicing good housekeeping by keeping work areas neat, clean, and orderly.

3. SITE DESCRIPTION

The EMWMF is located in East Bear Creek Valley, between Bear Creek North Tributaries NT-3 and NT-5, near Oak Ridge, Tennessee. It is located approximately one mile downstream of the headwaters of Bear Creek, which originates within the western portion of the Y-12 National Security Complex. The EMWMF is located well above the 100-year floodplain.

The EMWMF is a multi-celled, above-grade disposal facility authorized under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980. It is used for the disposal of low-level radioactive waste, hazardous waste as defined under the RCRA, hazardous waste as defined under the Toxic Substances Control Act (TSCA) of 1976, and mixed waste consisting of combinations of these waste types. Such wastes are generated during waste management/site remediation activities on the Oak Ridge Reservation (ORR) and facilities located off the ORR that are associated with past ORR activities. Additionally, the EMWMF is capable of accepting classified wastes.

Construction of the EMWMF was completed in early May 2002. Following acceptance of the Construction Completion Report by the EPA and the Tennessee Department of Environment and Conservation, the EMWMF began operations on May 28, 2002.

The EMWMF utilizes distinctly separate facilities directly involved in the waste disposal operations and include the following: disposal cells, a leachate transfer and storage system and contact water ponds. Waste shipments are transported in vehicles such as dump trucks, roll-off container trucks or flatbed trailers. It is then either dumped into the disposal cells from a dump ramp or direct dumped/placed onto the floor of the disposal cell. Waste disposed from dump ramps is pushed to a final disposal location with heavy equipment. Waste that is direct dumped/placed may be pushed but primarily is placed at the location where it is offloaded.

Leachate, precipitation that percolates through the disposed waste, flows by gravity to a lift station where it is pumped to one of five 30,000-gallon storage tanks. After sampling, leachate is transferred from the tanks into 4,500-gallon tanker trucks for transport to the Oak Ridge National Laboratory (ORNL) Liquids and Gaseous Waste Treatment (LGWT) facility.

Contact water, precipitation that falls onto waste but does not percolate through the waste, is pumped to one of four 450,000-gallon contact water ponds. Contact water is sampled for a list of constituents of concern and if below pre-established release criteria is pumped to the sediment basin with eventual discharge to Bear Creek. Contact water not meeting the release criteria is loaded into tankers and transported to ORNL LGWT facility.

Other ancillary support facilities such as office trailers and a craft change/decontamination trailer are also located at the site.

3.1 HISTORICAL USE

The Y-12 Plant was built by the U.S. Army Corps of Engineers in 1943 as part of the Manhattan Project. Liquid wastes generated by the B&W Y-12 consisted primarily of nitric acid, nitrate waste, pickling and plating waste, and miscellaneous liquid wastes associated with routine cleanup operations (e.g., mop water). Other wastes included solvents, dilute acid, machine coolants, caustic solutions, and acids with a pH of < 2.0. Solid wastes, including uranium metal, were generated by normal plant operations. Wastes were disposed of at various sites in Bear Creek Valley, which is estimated to have received 374,000 m^3 (489,000 yd^3) (volume estimate does not include SL1 and the OLF) of uranium, uranium-containing

material, and sludge [DOE 1997a]). The S-3 Ponds, BY/BY, OLF, SL1, and BCBG are considered the primary contaminant sources in Bear Creek Valley. In addition, a number of smaller sites in the Bear Creek watershed are either identified as solid waste management units or listed in the Federal Facility Agreement, such as the Bear Creek Road Debris Burial Area and the Creekside Debris Burial Area. Additional sites such as the Rust Spoil Area, Spoil Area 1, and SY-200 Yard have been used for waste disposal or storage. The latter two sites were addressed separately under Bear Creek Valley Operable Unit 2. Detailed descriptions of disposal histories and operations can be found in Tables 3.2 and 3.3 in the Remedial Investigation (RI).

3.1.1 Boneyard/Burnyard

BY/BY, located west of the S-3 Ponds and adjacent to OLF, consists of three sites: the Boneyard, the Burnyard, and HCDA. BY/BY was one of the first areas established in Bear Creek Valley for the disposal of waste generated at the Y-12 facility. BY/BY is estimated to have received 41,000 m^3 (54,000 yd^3) of uranium-containing material, which represents 11 percent volume of the uranium-containing material disposed of in Bear Creek Valley (DOE 1997a).

The Boneyard, a series of unlined earthen trenches located east of the OLF, was an active waste-disposal site from 1943 to 1970. Wastes have been characterized as ranging from ignitable and radioactive to inert. They included organics, metals, debris, acids, and beryllium. The total quantity of material is unknown. Magnesium chips were disposed of in the southwestern corner of the BY/BY by placing them in burn pans in unlined earthen trenches and using ignitable solvents to initiate burning. The residue remaining in the trenches was covered with soil and compacted until the trenches were filled. The trenches were then covered with topsoil and seeded with grass. The remaining land in the BY/BY was used to dispose of construction spoil material such as concrete and rebar. Observations made during field activities indicate the presence of contaminated debris at the surface (DOE 1997a).

The Burnyard functioned as an active waste site from 1943 to 1968. The site received approximately 268 m^3 of sanitary refuse from plant operations, including solids, liquids, and sludges. Waste materials may have contained empty pesticide containers, metal shavings, solvents, oils, and laboratory chemicals. Wastes were placed in unlined earthen trenches and burned. Oils and other flammable liquids (possibly transformer oils containing PCBs) were used to start and sustain combustion. When filled, the trenches were covered with soil. According to available information, no collection or treatment systems other than burning were used on-site.

Note: BY/BY has been remediated and the majority of the waste was disposed at the EMWMF.

3.1.2 Hazardous Chemical Disposal Area

The Hazardous Chemical Disposal Area (HCDA) received solid, liquid, and gaseous waste materials from 1975 to 1981. According to estimates, the site received < 3.8 m^3 of waste annually. The material was characterized as ignitable, reactive, corrosive, toxic, highly flammable, or, in some instances, inert. Generally, the HCDA received wastes that posed safety hazards within the Y-12 facility. The material came from gas cylinders with leaking or damaged valves and laboratory chemicals considered to be reactive or explosive. The laboratory chemicals included acids, bases, organics, water-reactive compounds, and explosive compounds such as picric acid, benzoyl peroxide, and ether. Bottles of chemicals were broken under water spray in a concrete vessel that was open to the atmosphere. After the chemical reaction occurred, the effluent was discharged into a small, unlined surface impoundment and allowed to percolate through the soil. The chemical residue remaining in the concrete vessel was removed periodically and transported to the BCBG. In 1989, the entire HCDA, including the contaminated soil, was capped with a RCRA-type multi-layer cap.

3.1.3 Sanitary Landfill I

Sanitary Landfill1 is approximately 1.3 km (0.8 mile) west of the B&W Y-12 facility, just north of Bear Creek and immediately south of the OLF. It was used between 1968 and 1980 for the disposal of combustible and decomposable solid waste. The landfill received materials such as paper, cardboard, plastics, rubber, wood, brush, animal bedding, organic garbage, textile products, and asphalt roofing materials. Although administrative controls were used to exclude the disposal of toxic chemicals and other contaminated materials, it is possible that some of these materials were disposed of in the landfill.

3.2 CONTAMINANTS OF CONCERN

Contaminants currently disposed of in the active waste cells include low levels of radionuclides such as: Uranium-233/234/235/236/238; Cesium-137; Neptunium-237; Am-241; thorium-228/230/232; radium-226/228; Plutonium-238/239; Cm-244; Tc-99 and Sr-90. In addition, low concentrations of volatile organics, semi-volatile organics, metals, pesticides, PCBs, and asbestos containing material (ACM) are present in disposed waste. Waste disposed of to date has included soils, concrete debris, scrap metal, equipment and piping, and construction debris.

Waste characterization data for approved waste lots that will be disposed at the EMWMF are provided by the generating remedial action projects. Data is provided for radiological and non-radiological contaminants.

4. SITE ACCESS REQUIREMENTS

EMWMF includes two access areas: the Limited Area and Property Protection Area. The Property Protection Area includes all area outside the Limited Area and the administrative office trailer area where visitors report. The Limited Area consists of the area within the security fence that surrounds the disposal cells. Security Police Officers (SPOs) control access to the Limited Area.

Access to the EMWMF Property Protection Area and Limited Area requires a DOE photo badge or a DOE visitor badge. Access to the Limited Area requires the completion, including name, badge number, badge type (e.g., KA), serial number, and clearance level, of an EMWMF Limited Area Access form. The form must be submitted to BJC at least 24-hours prior to planned access into the Limited Area.

Uncleared United States citizens may visit the EMWMF provided that the need for the visit is justified. BJC must transmit a visitor request form to the ETTP Visitor Control Center for uncleared visitors who do not have a DOE photo or visitor badge. A 24-hours advance notice must be provided to BJC to request this site access. The visitors are required to obtain a Visitor Badge from the ETTP Visitor Control Office prior to entering the EMWMF site. In addition, visitors are required to provide photo identification and sign the EMWMF Visitor Roster. Uncleared visitors will not be allowed to access the EMWMF Limited Area when classified waste disposal operations are being conducted, and they must be escorted during non-classified waste disposal operations.

All personnel and visitors are required to record their presence onsite by signing an EMWMF roster. The following sections discuss required training and the minimum personal protective equipment (PPE) required for site access.

4.1 ACCESS ORIENTATION

Personnel assigned to the EMWMF, DOE oversight, and others requiring unrestricted access to perform hands-on work at the site shall receive EMWMF Site Access Orientation. The orientation includes, but is not limited to, descriptions of EMWMF waste receipt and disposal operations, site hazards and controls to mitigate the hazards, PPE requirements, signs and barricades, access restrictions, security requirements, site speed limits, emergency response, evacuation and accountability.

4.2 VISITOR BRIEFING

Visitors going onsite shall receive a Visitor Briefing. This briefing is a condensed Site Access Orientation but does address operations for the day of the visit, hazards and controls for visitor's activities, e.g., site tour, PPE, signs and postings, access restrictions, and security requirements.

Visitors are escorted at all times by a trained employee. Minimum training for visitor escorts is Park Worker Training/General Employee Training, Escort Training, and Site Access Orientation.

4.3 DRIVER ORIENTATION

Drivers of waste transport vehicles are provided an EMWMF orientation briefing prior to making initial waste shipment deliveries at EMWMF. This briefing addresses site hazards and controls, traffic rules, PPE requirements, site layout and access to the disposal cell area (Limited Area).

4.4 MINIMUM SITE ACCESS PPE

Appropriate work apparel, as described in BJC-EH-2000, *General Safety Requirements,* shall be worn by EMMWF employees and visitors. In addition, minimum PPE requirements beyond the office and parking lot areas include sturdy leather work shoes, high visibility vest, safety glasses, and hard hats (where overhead hazards are present). Sandals and open-toed shoes in the gravel parking area by the office and support trailers are discouraged due to the potential for slips, trips and falls.

5. EMWMF OPERATIONS ACTIVITIES

Waste shipments to the EMWMF are primarily wastes generated during waste management/site remediation activities on the ORR and facilities located off the ORR that are associated with past ORR activities.

5.1 WASTE RECEIPT/DISPOSAL/PLACEMENT

Types of waste shipped to the EMWMF will include, but are not limited to, soil, soft waste, concrete and building debris, bulk items, organic materials, transite pallets and ACM. Waste will be transported via dump trucks, flat bed trailers, roll-off containers and other types of transport vehicles.

Waste transported from the ETTP will travel via the Haul Road, which is a road from ETTP to the EMWMF approximately 8 miles in length specifically constructed to keep waste shipments off public roads, or via Bear Creek Road. Upon arrival at the EMWMF waste transport vehicles entering the site from Bear Creek Road will cross a weigh scale and proceed to a checkpoint for an incoming radiological survey performed by BJC's radiological subcontractor personnel, and shipments arriving via the Haul Road receive incoming radiological surveys on a random basis. After the incoming survey transport vehicles proceed to the disposal cell area (Limited Area) and are directed to the appropriate dumping area to dispose of the waste shipment. EMWMF operations personnel (laborers) verify information on the shipping papers prior to directing the driver to the dump ramp or direct dump location. Waste transport vehicles receive an outgoing radiological survey before being released to return to the waste generating project. Disposed waste is either pushed to final placement in the active disposal cell, direct placed at a final location or if waste contains asbestos it is covered with clean fill or a fixative applied.

During waste receipt, disposal and placement personnel are exposed to physical and biological hazards such as slips/trips/falls, pinch points, ergonomic concerns (lifting and pushing), sharp edges, vehicle and heavy equipment operation, excessive noise, temperature extremes, and dust as well as potential exposure to radioactive and chemical contamination. Engineering controls such as dust suppression and appropriate PPE are among the controls utilized to mitigate these hazards.

5.2 LEACHATE AND CONTACT WATER MANAGEMENT

Leachate, precipitation that falls onto and percolates through the waste, is collected in the Leachate Collection System (LCS) and gravity flows to the Leachate Collection Tank where it is then pumped to the leachate storage tanks. The leachate storage tanks are sampled after every 140,000 gallons of leachate collected and contained in the tanks. The samples are analyzed for an established list of contaminants of concern, which is updated based on radiological and chemical constituents in the disposed waste, and then is pumped to transport tankers for offsite treatment and disposal.

Contact water, precipitation that falls onto but does not percolate through the waste, is pumped from catchments in the disposal cells to four contact water holding ponds. The contact water is sampled and analyzed for an established list of contaminants of concern that is updated based on radiological and chemical constituents identified in disposed waste lots. Contact water may be released from the contact water ponds directly to the site sedimentation basin if analytical results from sampling indicate all results to be within acceptable limits. If analytical results exceed acceptable limits then the contact water must be pumped to transport tankers and shipped for offsite treatment and disposal.

Management of leachate and contact water typically involves moving gasoline powered generators, hoses, pumps, opening and closing valves, and climbing fixed and/or portable straight ladders to operate transfer system components for loading transport tankers. Personnel are exposed to slips/trips/falls, pinch points, ergonomics related to lifting and pulling as well as the potential for radioactive and chemical contamination. Engineering controls, e.g., tying off of ladders and appropriate PPE are some of the controls used to address the hazards associated with the performance of these tasks.

6. MEDICAL SURVEILLANCE

6.1 HAZWOPER PHYSICALS

Compliance with the requirements of 29 *CFR* 1910.120 and 29 *CFR* 1926.65 ensures that EMWMF Operations personnel are medically qualified to perform their assigned tasks and to wear required PPE including respiratory protection. The Site Safety and Health Representative (SSHR) may recommend personnel to the Project Industrial Hygiene (IH) Lead, and assist in the determination, by the Project IH Lead, of which workers meet the criteria. Refer also to BJC/OR-1745, *Worker Safety and Health Program,* for requirements associated with occupational medicine for BJC self-performed and subcontractors at all tiers. HAZWOPER physicals are required for workers who:

- May be exposed to hazardous substances at or above the permissible exposure limit (PEL) for 30 days per year.
- Must wear a respirator for hazardous waste operations.
- Exhibit adverse health effects due to potential overexposures from hazardous substances.
- May respond (as part of job responsibilities) to hazardous spills or releases.

The SSHR will verify compliance with applicable medical qualification requirements for EMWMF.

6.2 RESPIRATOR QUALIFICATIONS

EMWMF personnel required to wear respirators during the course of waste disposal operations shall participate in a medical surveillance program that meeting requirements established in BJC-EH-5151, *Respiratory Protection Program.* Only personnel who are medically qualified to wear a respirator will be assigned to tasks requiring use of respiratory protection.

6.3 HEARING CONSERVATION

EMWMF operations personnel shall comply with requirements established in BJC-EH-5121, *Occupational Noise Exposure and Hearing Conservation Program.* Compliance will include employee participation in the Hearing Conservation Program that will provide for annual audiometric testing of designated employees. Hearing protection is required to be worn for all work in areas where noise levels are at or exceed 85-dBA. Posting requirements for noise hazards shall be instituted for those areas routinely exhibiting noise levels at or above 85-dBA. EMWMF operations activities where equipment noise levels may exceed 85-dBA include gas- or electrically-powered hand tools and equipment, generators, heavy equipment operation used for waste disposal and placement. Incoming machinery and equipment will be reviewed by the Project Industrial Hygiene Lead to determine if a noise level evaluation will be needed.

6.4 BIOASSAYS

The necessity and frequency of internal radiation monitoring (collection of bioassays) will be determined by the BJC Field Radiological Engineer Lead (FRE). Personnel, (BJC and subcontractor [if applicable]) are responsible for submitting bioassay samples as required by BJC. Failure of any BJC and/or

subcontractor personnel to comply with bioassay requirements will result in restricting that individual that is more than 28 days delinquent from radiological areas and radiological buffer areas until such time that the bioassay requirements are completed and the restriction has been lifted by Dosimetry.

7. TRAINING

7.1 ES&H TRAINING

Personnel assigned and working at EMWMF shall possess the experience, knowledge and skills necessary to safely and effectively fulfill their duties. A training matrix shall be maintained to ensure employees have completed all training necessary for their assigned work. All personnel must successfully complete the appropriate safety and health training in accordance with regulatory, DOE and site-specific requirements. Each individual will be responsible for executing work safely and in a manner consistent with the training provided.

7.2 SITE-SPECIFIC TRAINING

A training matrix specifying site-specific training requirements for EMWMF Operations personnel has been developed. The matrix is used to identify training requirements for each position in the EMWMF operations organization. The Site Safety and Health Representative (SSHR), Cell Operations Superintendent, and Maintenance and Facilities Superintendent are responsible for ensuring that all personnel, BJC and subcontractor, performing work at the EMWMF have completed required training prior to work being performed. Training requirements for subcontractor personnel performing work at EMWMF are described in subcontract requirements.

The BJC-issued Site Access Card shall be used to document training and medical qualifications for the following:

- Park Worker Training/General Employee
- Radiation Worker II
- HAZWOPER (basic 24- or 40-hour and current 8-hr refresher)
- Respirator training and fit test
- Bioassay
- Nuclear Criticality safety

7.3 SAFETY MEETINGS

All personnel will attend pre-job safety briefings. A record of attendance will be documented and maintained by the Superintendent or his designee. A plan of the day (POD) meeting will be conducted daily to discuss the day's planned work activities, review work hazards and controls, related safety topics and Lessons Learned. STARRT card reviews will be conducted at the work location prior to the start of a new task, when changed conditions warrant more frequent reviews.

7.4 TRAINING DOCUMENTATION

Training documentation for BJC personnel shall be maintained in the Local Educative Administrative Requirements Network (LEARN) database, and a hard copy file by the SSHR or designee. Training records for subcontractor and vendor (if applicable) personnel must be submitted to the SSHR or designee prior to the start of work. These records shall be maintained as part of the EMWMF operations files.

8. SITE-SPECIFIC PERSONAL PROTECTIVE EQUIPMENT

Personal protective equipment requirements will be in accordance with BJC-EH-2005, *Personal Protective Equipment* and BJC-EH-2000, *General Safety Requirements*. EMWMF Management and Superintendents are responsible for ensuring the proper PPE is worn in accordance with the applicable work control documents and radiological work permit (RWP). The Site Safety and Health Representative (SSHR) or designee is responsible for ensuring the proper PPE is identified for the potential hazards to which workers may be exposed. The decision to downgrade or upgrade PPE shall be made by the SSHR or designee, Project Industrial Hygiene Lead or Field Radiological Engineer, and in some situations shall require mutual agreement.

8.1 EMWMF WORK CLOTHING REQUIREMENTS

Basic clothing for EMWMF and subcontractor personnel for on-site work consists of full-length pants, sleeved shirt (sleeves at least 4 inches long), high visibility vest or shirt with reflective stripes, leather or task appropriate work gloves, safety-toed footwear (meeting ANSI Z41.1/ASTM F2413-05) or sturdy leather work boots depending upon where work is being performed. Tank tops, cut-off pants, shorts and tennis shoes are not permitted on the work site. Loose fitting clothes and jewelry will not be permitted near rotating machinery or equipment.

- **Eye protection** shall, at a minimum, consist of safety glasses with fixed or firm clip-on affixed side shields that meet the ANSI Z87.1standard. Prescription glasses worn as safety glasses shall also meet this requirement. ANSI compliant cover safety glasses used over prescription glasses that do not meet the ANSI standard will be permitted. Safety glasses with rigid side shields shall be worn at all times beyond the office/support trailer and parking lot areas. Face shields shall not be worn in lieu of safety glasses. Full-face protection shall be worn when grinding, chipping, air or water blasting, etc.

- **Foot Protection** shall consist of sturdy leather or safety toed work shoes or boots that meet ANSI Z41.1991/ASTM F2413-05. Safety toed shoes/boots are required for work performed in all industrial/construction work areas where there is potential for foot injuries due to falling or rolling objects, objects piercing the sole or where employee's feet are exposed to electrical hazards.

- **Hard hats** that meet ANSI Z89.1 (Type I) Class G as prescribed in 29 *CFR* 1910.135, *Head Protection*, are required for protection from falling or flying objects. Cowboy style hard hats and suspensions shall not be used. Hard hats shall be worn with the brim forward and the suspension properly installed. Hard hats shall not be damaged, painted, deformed, or marked in any way except for markings required to identify the worker, company, craft, or title. Based on the scope of work, the Site Safety and Health Representative (or designee) may determine that in certain areas a hard hat is not required. Such an area will be clearly defined and boundaries communicated to site personnel. Areas designated as a "no hard hat required" zone, must have no potential for a head injury from impact, falling or flying objects, or from head contact with overhead objects, piping, etc. Hard hats shall not be required when riding within an enclosed vehicle or enclosed heavy equipment.

- **Gloves** All personnel performing work shall have leather work gloves in their possession at all times while in operating areas. Operating areas are those areas beyond the administrative offices (9983-GV and 9983-GU). Gloves shall be worn when handling materials or equipment unless such use will create an additional hazard. Gloves will be selected for use by the Site Safety and Health Representative (or designee).

- **High visibility safety vests** or shirts with reflective stripes are required when walking/working near or around mobile equipment or when deemed necessary by the Site Safety and Health Representative (or designee). The exception to this requirement is personnel engaged in hotwork who shall not wear safety vests while performing "cutting or welding" activities because of flammability concerns with the vests.

- **Flame resistant (FR) clothing** is required for all individuals involved in hotwork activities. All hotwork activities shall be performed in accordance with BJC-EH-2007, *Hot Work.* Work performed where there is potential for electrical arc flash shall be performed in accordance with BJC-EH-2009, *Electrical Safety.*

8.2 PPE UPGRADE/DOWNGRADE AUTHORITY

There are various circumstances under which it may be necessary to upgrade or downgrade PPE levels. Some examples are listed below:

Reasons to upgrade:

- Known or suspected presence of dermal hazards.
- Occurrence or likely occurrence of gas or vapor emission.
- Change in work or work environment that will increase contact or potential contact with hazardous or radioactive materials or a physical hazard.
- Request of the individual performing the task.

Reasons to downgrade:

- New information indicating that the situation is less hazardous than was originally thought.
- Change in site conditions that decrease the hazard.
- Change in work task that will reduce contact with hazardous materials.

These are only guidelines, not rules for upgrading or downgrading PPE. The decision to change PPE levels will be made based on job site conditions. All employees shall be made aware of the upgrade or downgrade.

8.3 PPE DONNING/DOFFING GUIDELINES

Workers will carefully don (dress) and doff (remove) PPE in the appropriate sequence. Improperly fitted protective clothing represents a severe potential hazard and the appropriate size should be used. Where clothing is too small, worker movement is restricted, tear potential is increased, and the potential for worker fatigue is increased. Where clothing is too large, the possibility of a snag is increased and the dexterity and coordination of the worker may be compromised.

The major objective of doffing PPE is to restrict the transfer of potential contamination from the work area. A secondary objective is for the worker doffing the garment and others in the area to avoid contact with contaminants on the outside of the garment. An appropriate decontamination setup, careful decontamination (as required), and cautious doffing will largely prevent such cross-contamination.

Signs will be posted in radiological buffer areas or contamination reduction zones (CRZ) that will list the proper sequence for donning and doffing PPE.

9. INDUSTRIAL HYGIENE PROGRAM

9.1 EMWMF-SPECIFIC HAZARD COMMUNICATION

EMWMF operations shall follow the BJC HAZCOM program, which complies with 29 *CFR* 1910.1200. The BJC program is described in BJC/OR-1745, *Worker Safety and Health Program,* and in procedures BJC-EH-5140, *Hazard Communications,* and BJC-EH-5181, *Hazardous Materials Information System.* In accordance with the program, a monthly chemical inventory shall be submitted to the BJC HMIS manager. The Site Safety and Health Representative (SSHR), Project Industrial Hygiene Lead and line supervision are responsible for ensuring adherence to all the rules and regulations of this program, including ensuring that employees are aware of hazards associated with chemicals that may be used in the performance of their work, and that chemicals are properly stored, labeled, and placarded.

9.2 INDUSTRIAL HYGIENE MONITORING AND SAMPLING

The industrial hygiene monitoring and sampling requirements will vary by activity or task. Monitoring and sampling will be used to determine the effectiveness of engineering and administrative controls and to assess the effectiveness of PPE requirements. The waste streams that are disposed of at the EMWMF vary significantly and may include volatile organics, semi-volatile organics, metals, and inorganics. Although these constituents are present in very low concentrations, an industrial hygiene program is in place to understand the specific wastes and work activities performed.

The basis of the industrial hygiene monitoring and sampling is to evaluate baseline exposure level trends and subsequent periodic monitoring to verify baseline analytical results. Personnel exposure monitoring conducted to obtain a baseline involves sampling, at least 25% of the workers performing the activity or task (or a minimum of 2 employees), collecting a minimum of 10 samples (or fewer based on the duration of the work activity and approval of BJC lead industrial hygienist) to allow for statistical analysis. Initially this monitoring will be conducted to establish a valid trend of worker exposure levels. Waste lot characterization data will be used to identify those contaminants of concern that can subject workers to unacceptable levels of airborne exposure. Industrial hygiene monitoring for a specific work task may involve real-time monitoring, integrated exposure monitoring or both. Monitoring and sampling will be determined by the Project Industrial Hygiene Lead with input from the SSHR.

9.2.1 Monitoring and Sampling Methods and Instrumentation

Personal exposure monitoring/sampling will performed to evaluate the potential exposure to individual employees and to ensure that the proper level of PPE has been selected for the task to which an employee is assigned. As each new task with a potential for exposure is identified, personal exposure samples will be collected to document exposure and evaluate the effectiveness of PPE that has been selected. Samples will be collected in the employee's breathing zone using personal sampling pumps and the appropriate collection media. Sampling shall be performed by qualified individuals in accordance with EH-5560, *Workplace Industrial Hygiene Sampling.*

9.2.2 Sampling Frequency

Sampling frequencies for personnel exposure monitoring are shown in Table 1. Baseline sampling for personnel exposure is dependent upon the variety and duration of the tasks being performed.

Anomalous waste shipments: sampling may be required for constituents not listed in Table 1. Sampling and analyses shall be in accordance with NIOSH or OSHA methodology or approved equivalent.

9.3 CHEMICAL HAZARDS/CONTAMINANTS

9.3.1 Silica, Crystalline (Quartz and Crystabalite)

Waste lots received by the EMWMF frequently contain concrete from building demolition that can be the source of airborne silica. Repeated over-exposure to silica can lead to chronic obstructive pulmonary disease (silicosis). According to NIOSH, while there may be a factor of individual susceptibility to a given exposure, the disease tends to occur after an exposure measured in years rather than months. Dust suppression methods used both at the generator sites and at EMWMF are effective for minimizing silica exposures.

9.3.2 Heavy Metals

Wastes disposed of at the EMWMF normally contain various metals commonly used in building construction. Some of these metals can range from relatively innocuous to hazardous and have correspondingly higher or lower exposure limits. Target organs and health effects are specific to the various metals. Some of the metals of greatest concern are lead, cadmium, chromium, and beryllium. Repeated over-exposures to these metals can affect the lungs (e.g., beryllium sensitivity; berylliosis), skin and eyes, blood stream and kidneys. Some metals can affect the central nervous system (e.g., lead and/or mercury). While these metals typically are not in a significantly dispersible form (they are bound in either a soil matrix or in debris), a program of routine monitoring shall be in place to ensure exposures remain well below the established limits.

9.3.3 Asbestos

Various forms of friable and non-friable asbestos are received for disposal at the EMWMF. Exposure to asbestos can cause asbestosis and mesothelioma, a form of cancer. The waste acceptance criteria prescribe the method of waste receipt and disposal. Normally asbestos wastes are received in double bags, wrappings, or containers. This material is also received from the generator after having been treated with a wetting agent.

Wastes received at EMWMF are routinely sampled and special sampling campaigns are initiated as needed for circumstances where new baseline information is needed.

9.3.4 Total Dust

Routine operations involving pushing and/or covering waste at the cell work face is a source of dusts that are not otherwise classified as toxic. Respiratory illnesses can be the result of dust exposure depending on the particle size and concentrations. Control measures such as dust suppression (using a hydroseeder) are routinely used. Total dust sampling ensures that the control methods used at EMWMF maintain potential exposures as low as possible.

9.4 CONFINED SPACE MONITORING

All monitoring associated with EMWMF operations confined space work activities will be performed

Table 1. Sampling frequencies for personnel exposure monitoring

Source	Contaminant/Agent	Monitoring	Methodology	Frequency / Occurrence
Landfill disposal of friable and non-friable asbestos contaminated construction debris	Asbestos	Breathing zone samples and area samples (as determined by Project Industrial Hygienist)	Personal sampling trains Area monitoring	Monthly after baseline (minimum of 10 discreet samples) is established ; then monthly or as determined by Project Industrial Hygiene Lead
Confined spaces	Oxygen deficiency, Explosive gases, Hazardous gases	Direct-reading instrumentation for percent oxygen, percent lower explosive limit (LEL), hydrogen sulfide in parts per million (ppm), and carbon monoxide in ppm.	Real-time instrumentation	Prior to each entry, and as determined by the Project Industrial Hygiene Lead
Equipment and power tools	Noise	Sound level meters and/or Noise dosimetry	Real-time instrumentation Data-logging	Task-driven, as determined by the Project Industrial Hygiene Lead
Hot environment and/or Dress-out in impermeable or semi-permeable clothing	Heat stress	Environmental temperature or Pulse rates or Blood pressure or Heat stress index	Real-time instrumentation (WBGT) Trained personnel Trained personnel Reference material	Seasonal or task-driven, as determined by the Project Industrial Hygiene Lead
Extreme winter conditions	Cold stress	Weather thermometer and/or Wind chill chart	Visual readings Reference material	Seasonal or task-driven, as determined by the Project Industrial Hygiene Lead
Covering waste materials with soil	Total dust Respirable dust	Breathing zone samples	Personal sampling trains	Monthly after baseline (minimum of 10 discreet samples) is established ; then monthly or as determined by the Project Industrial Hygiene Lead
Grouting equipment designated for disposal	Silica (Quartz and cristobalite)	Breathing zone samples	Personal sampling trains	Monthly after baseline (minimum of 10 discreet samples) is established ; then monthly or as determined by the Project Hygiene Lead
Landfill disposal of construction debris	Heavy metals (such as lead, chromium, cadmium)	Breathing zone	Personal sampling trains	Monthly after baseline (minimum of 10 discreet samples) is established ; then monthly or as determined by the Project Hygiene Lead
Landfill gases and environmental sampling	Organic vapors	Area samples	Real-time instrumentation (Photoionization (PID) detector and/or Flame ionization (FID) detector)	Quarterly (environmental sampling)
Miscellaneous sampling during maintenance activities	Heavy metals, organic vapors	Breathing zone samples and area samples	Real-time instrumentation, personal sampling	As determined by the Project Industrial Hygiene Lead

10. CONTROLS FOR PHYSICAL AND OPERATIONS PROCESS HAZARDS

10.1 GENERAL SITE SAFETY

Achievement of "Zero Accident Performance" can be attained through the use of safe work practices and hazard controls. The guidelines listed below are provided to assist personnel in making informed decisions regarding the manner in which work is performed. Additional requirements are contained in BJC-EH-2000, *General Safety Requirements*.

- Personnel will be held accountable for understanding and complying with BJC-FS-1001, *Work Control Process*.
- Horseplay or fighting is prohibited.
- Eating, drinking, smoking, chewing gum, using tobacco, or any other hands-to-face activities are prohibited on the site except in designated areas after face and hands have been washed.
- When required to sit or kneel on the ground, avoid contaminated surfaces.
- Avoid placing tools or equipment on contaminated surfaces.
- Mobile and temporary facilities (trailers, storage sheds, etc) shall be properly grounded and anchored with Access/Egress routes established, and contain required fire protection extinguishers.
- Bringing defective or unsafe equipment onto the site is prohibited.
- Only authorized employees may enter the work areas. Work areas shall be barricaded with the appropriate material and signage. Stepping over or ducking under barricades is prohibited. Barricades shall be maintained at all times while in use.
- Hazard assessment is a continuous process. Personnel must be aware of their surroundings and constantly be aware of the chemical and physical hazards that are or may be present.
- The location of overhead power lines and underground utilities must be established prior to excavation/penetration activities and heavy equipment operation.
- Detection or appearance of unusual liquids, odors, or discolored soil could indicate the presence of contamination and should be reported to the Cell Operations or Maintenance and Facilities Superintendents and the Site Safety and Health Representative (SSHR) immediately.
- Personnel are to report any other unusual or potentially hazardous conditions to their immediate supervisor and the SSHR for investigation and/or corrective action.

10.1.1 Buddy System

The buddy system is to be used, to the extent practicable, while performing EMWMF operations activities In addition, personnel entering the contact water pond area are required to notify site RCTs prior to entry and must either have a "buddy" present or wear a U.S. Coast Guard approved flotation device (life vest).

When working near/around the sediment basin personnel are required to implement the buddy system. A two-way radio is to be carried while performing work at the EMWMF site.

10.1.2 Slips, Trips and Falls

A variety of walking/working surfaces exist at the EMWMF site e.g., soil, gravel, grass, and compacted waste. These surfaces may be flat, slightly or steeply sloped, wet and potentially slippery that create an abundance of slip, trip, and fall hazards. Operations personnel wear sturdy leather shoes or safety toed boots (depending upon work performed) and must take care to ensure good footing. Clear paths of ingress/egress are created and maintained to every workstation and shall be used by all personnel. Personnel should be aware of changes in walking/working surfaces, e.g., gravel to soil or grass, dry to wet, etc. Walking surfaces in the parking areas are gravel covered and may be unlevel in some locations therefore personnel entering/exiting the office trailers should exercise caution when walking in these areas to avoid slips, trips and falls.

Roadways, access ways, aisles, stairways, scaffolds, and ladders, shall be kept clean and clear of hoses, extension cords, welding leads, and other obstructions that may cause tripping or other accident hazards.

10.1.3 Housekeeping

As standard practice, good housekeeping will be strictly enforced. All material, scrap, tools, toolboxes, and other equipment will be stored in a neat and orderly fashion. Trash and scrap should be removed from the work area on a regular basis (i.e., at least daily, before leaving the work area for the day) and shall not accumulate, especially in walkways, under stairs, at the bases and landings of stairs and ladders, and near flammable substances.

- Litter - No discarded material shall be stored on-site for periods longer than one month. All discarded materials shall be disposed of properly in dumpsters marked for sanitary waste only.
- Areas identified for refueling operations shall be maintained clear of obstructions and shall be properly designated.

The requirements listed above shall be implemented and apply to sanitary solid waste generated during EMWMF operations activities.

Any waste materials that may have blown out of the waste cell shall be returned to the cell for appropriate burial.

10.1.4 Illumination

Adequate illumination intensity shall be provided in all active work areas and access ways in accordance with OSHA Standard 29 *CFR* 1926.56. Emergency lighting, where required, shall be tested and maintained per NFPA 101, Chapter 7. In general a minimum of 5 foot candles of lighting is required in all active work areas.

10.1.5 Signs and Barricades

All signs shall be properly colored and contain the required information as prescribed by OSHA standards.

- Signs shall be visible from a distance of 15 ft. Signs warning of specific hazards or hazardous work areas shall be posted to warn personnel of potential personal hazards where they are working (ex., high noise levels, moving vehicles, radiological, hazardous waste exclusion zone, etc.).

- Signs shall be constructed of metal, fiberglass or plastic and shall be promptly removed when no longer needed.

- Danger tags will be placed on devices/equipment that is unsafe to use.

- Tagged equipment shall not be used until the equipment/device has been repaired and it has been determined that repaired equipment/device is safe to operate.

- Signs shall also be conspicuously placed in conjunction with barricades. No minimum spacing is required unless otherwise specified in OSHA 29 *CFR* 1926 Subpart G.

The types of barricades permitted on the project include rope, tape, and hard barricades.

- The color of the barricades shall comply with OSHA requirements. If hazard information is not printed on barricades, then signs or tags shall be attached. DOE radiological color classifications shall be used for radiological barricades. Rope, tape, chain, and similar barriers used to designate the boundaries of posted radiological areas shall be yellow and magenta.

- Stepping over or ducking under barricades is prohibited. Barricades shall be maintained at all times while in use.

Guardrails and other fall-protection systems shall be constructed in accordance with 29 *CFR* 1926 Subpart M requirements. BJC-EH-2006, *Fall Prevention and Protection* shall be used for all work performed where fall-protection systems are required.

10.1.6 Noise

The operation of equipment during EMWMF waste disposal operations can create areas where noise levels exceed 85 decibels on the A-weighted scale (dBA). Exposure to excessive noise levels may lead to temporary or permanent hearing loss. All noise level monitoring and posting shall be performed in accordance with 29 *CFR* 1910, Occupational Noise Exposure and Hearing Conservation Program. Hearing protection shall be worn by EMWMF operations and subcontractor personnel where noise levels are suspected or shown by noise level meter monitoring to exceed 85 dBA. In the event that a new noise hazard, such as a new piece of equipment, is brought onsite, the Site Safety and Health Representative (SSHR) will coordinate with the Project Industrial Hygiene Lead to test the equipment or area for possible hazards.

10.1.7 Biological Hazards

Biological hazard refers to plants, animals, or their products that may present a potential risk to the health and well-being of humans. Operations at the EMWMF require working outdoors to perform waste disposal, pumping of contact water and leachate to collection ponds, storage tanks or transfer to tankers

for transport offsite to a treatment and disposal facility. Personnel working outdoors may come in contact with stinging and biting insects (wasps, bees, and mosquitoes), bird droppings, poisonous plants (poison ivy, poison oak), and venomous snakes and spiders. Proper identification of these hazards and avoidance whenever possible is the best prevention. Also, various barrier creams have shown positive results in preventing contact dermatitis from plants. Sprays and repellents can be used for insect control. Personnel with known allergies to insect stings shall inform the SSHR.

10.1.8 Severe Weather

Severe weather conditions may include, but are not limited to, a severe thunderstorm warning, tornado warning, the approach/duration of an electrical storm, and weather extremes such as wind speeds greater than 34 mph. The SSHR (or designee) or supervision will terminate outdoor operations because of weather conditions and shall authorize re-start after the severe weather passes. Outdoor operations shall be suspended when the following occurs:

- A lightning notification is received from the ETTP PSS via pager
- Lightning flashes are observed in the vicinity of the EWMMF
- A tornado **warning** has been issued by the National Weather Service or the ETTP PSS for the vicinity of EMWMF

Personnel will evacuate outdoor work areas to the office trailers or an appropriate offsite location until the all clear is given and work can be resumed. Work may not resume until 30 minutes after the last visibly observed lightning.

In the event a tornado warning is issued personnel will evacuate to areas identified in BJC/OR-2714, *EMWMF Emergency Response and Contingency Plan.*

Severe weather bulletins such as severe thunderstorm and/or tornado watches issued by the National Weather Service or ETTP PSS will be evaluated by the SSHR (or designee) and supervision and a determination made regarding outside operations.

If the wind speed exceeds 34 mph or 3 wind gusts exceed 34 mph in any 15 minute period operations shall be temporarily suspended and personnel removed from the work area to the office/support trailers. When wind speed reduces below 34 mph work may resume after the SSHR (or designee), supervision and a craft representative have inspected the work areas and determined them to be safe.

The SSHR or designee will provide formal guidance regarding weather related questions and or concerns based on visual observation, radar observation, radio warning, and notifications received from the PSS.

10.1.9 Temperature Extremes

BJC-EH-5136, *Temperature Extremes,* heat stress and cold stress prevention programs shall be implemented during periods of extreme temperatures. Working in protective clothing can greatly increase the likelihood of heat fatigue, heat exhaustion, and heat stroke, the latter being a life-threatening condition. Personnel will be reminded to monitor co-workers and themselves for adverse effects and that they may take breaks as needed. If employees are dressed out in protective clothing and temperatures at the work site are above 80°F, the wet bulb globe temperature (WBGT) shall be monitored by the SSHR or designee to assess the potential for heat stress. During periods of hot weather or when workers may be affected by heat stress, the line supervision shall provide cool down areas and ensure ready access to an

adequate supply of cool drinking water and/or electrolyte replenishing drink such as Powerade™.[1] The SSHR or designee shall be responsible for briefing workers on the signs of heat stress when temperature conditions require it. This may be done during the daily safety or plan-of-the-day briefing. Work/rest schedules shall be implemented, when necessary, within the guidelines of the American Conference of Governmental Industrial Hygienists (ACGIH), WBGT threshold limit values® (TLVs).[1] and the National Institute for Occupational Safety and Health (NIOSH).

For cold stress prevention, line supervision shall ensure that personnel use properly insulated clothing for the head, hands, feet, and body. During cold weather periods, heated break areas shall be available.

10.1.10 Sanitation

Potable water containers and portable toilets shall comply with OSHA 29 *CFR* 1910.141 requirements. Single-use cup dispensers and waste containers will be provided adjacent to all portable water dispensers. Water shall not be dipped from containers. Water dispensers shall be clearly identified as drinking water. Water dispensers in use shall be cleaned daily. Break areas shall be kept clean. Trash receptacles shall be stationed in all eating areas and emptied frequently.

10.2 MOTOR VEHICLES AND HEAVY EQUIPMENT

Equipment operators and personnel in areas where heavy equipment operates follow guidance for safe operation and responsibilities established in EMWMF work control documents such as work packages, procedures, and plans. Procedures used by EMWMF operations personnel that address safe operation include EMWMF-OP-003, *Waste Placement*, EMWMF-OP-008, *On-Site Staging*, and EMWMF-OP-012, *Equipment Decontamination,* and BJC-FS-1039, *Construction Equipment Inspection and Maintenance Program.*

10.3 LOCKOUT/TAGOUT

EMWMF operations and subcontractor personnel shall comply with the requirements of BJC-EH-2002, *Hazardous Energy Control (Lockout/Tagout)* when performing tasks requiring lockout/tagout (LO/TO). Site-specific guidance from the procedure includes the following:

- Identification of the LO/TO Issuing Authority, supervisor and effected employees;
- Only personnel trained in LO/TO are authorized to perform equipment inspection, maintenance, or servicing tasks requiring the use of LO/TO.

10.4 ELECTRICAL SAFETY

- Identification, control and/or avoidance of overhead and underground utilities that maybe encountered during the work, including how identification of energized utilities shall be coordinated with other DOE prime Contractors;

[1] Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof or its contractors or subcontractors.

- Procedures for implementation of the sections of the National Electric Codes (NEC), and OSHA requirements applicable to any electrical work that will be performed.

- All electrical work shall be performed in accordance with BJC-EH-2009, *Electrical Safety*.

10.5 FALL PROTECTION

The requirements of BJC-EH-2006, *Fall Prevention and Protection* shall apply when the distance from working or walking surface to grade or lower level is 6 feet or more for construction activities or 4 feet or more for operations activities (possibly less if other lower level hazards are present).

10.6 HOTWORK

All EMWMF welding/burning/hot work will be performed in accordance with the requirements found in BJC-EH-2007, *Hot Work*.

10.7 WORKING FROM LADDERS

EMWMF operations activities require frequent use of portable ladders. This primarily includes the use of step-ladders, extension ladders, and straight ladders. All ladder and scaffold use, inspection, and training activities at EMWMF will comply with BJC-FS-1015, *Scaffolds and Portable Ladders*.

10.8 FIRE PREVENTION

Proper housekeeping and storage techniques shall be used to keep all potential sources of ignition away from combustible/flammable materials. Managers, supervisors, and the SSHR are responsible for conducting work site inspections that include observations of compliance with the fire safety requirements. These inspections shall include observations of work-site safety and housekeeping issues and shall specifically address proper storage of chemicals and supplies, unobstructed access to fire extinguishers, and emergency evacuation routes. Good housekeeping requirements to minimize combustible "fuel" sources include:

- Oily rags, cleaning rags–To prevent fires from spontaneous combustion, oily rags only shall be stored in metal containers with tight fitting metal lids. Excessive amounts of "oily rags" shall not be allowed to accumulate.

- Combustible Waste–Combustible waste materials shall not be accumulated on-site for periods greater than one month.

The following safe work practices will be used to protect against fires:

- All office trailers and Boundary Control Stations will be equipped with a fire extinguisher of not less than 10: B units or higher.

- At least one portable fire extinguisher having a rating of not less than 20: B units will be located at each work area (refer to BJC-FP-2006, *BJC Program for Controlling Combustibles and Ignition Sources*).

- Each piece of heavy equipment on-site shall be equipped with at least one dry chemical or carbon dioxide fire extinguisher, having a minimum Underwriters Laboratory (UL) rating of 5-B:C. The pin shall be in place and proper operating pressure maintained.

10.9 TOOL SAFETY

Use of improper or defective tools can contribute significantly to the occurrence of accidents on-site. Tool safety requirements listed in BJC-EH-2000, *General Safety Requirements* and the individual tool manufacturer's requirements shall be implemented. All tools shall be maintained in good condition, properly stored, and used for their intended purpose only in accordance with the manufacturer's requirements manual and applicable OSHA standards including 29 CFR 1910, Subpart P, and 29 CFR 1926, Subpart I.

10.10 CONFINED SPACE ENTRY

All EMWMF confined space work activities shall be performed in accordance with the requirements found in BJC-EH-5138, *Confined Space Program Description.*

10.11 MATERIAL HANDLING AND STORAGE

Walkways and aisles shall be kept clear at all times, and laydown areas shall be neat and orderly. Walkways shall have a 3-foot aisle that shall remain clear at all times. Material shall be stored on level ground, and the boundaries of laydown areas shall be identified. Material shall not be stored within 6 ft of hoistways or floor openings. Poles, pipe, and other stock that may roll shall be wedged to prevent spreading and rolling.

All new material shall be stored on dunnage (off the ground) and secured as necessary to prevent blowing, falling, sliding, or collapsing. Debris and scrap material need not be stored on dunnage if the material is not to be moved with rigging and can be maintained in a stable manner. Nails shall be removed from lumber that is to be re-used. Nails in scrap lumber that will not be re-used shall be bent back. No material, tools, or equipment shall be leaned against other objects or walls unless they are secured from movement.

Chemicals shall be stored observing proper storage requirements listed on the MSDSs. Incompatible chemicals **shall not** be stored together. Personnel shall ensure that storage containers and ancillary equipment are constructed of materials that are chemically compatible with the product/chemical to be transferred from the original containers.

10.12 HOISTING AND RIGGING

All hoisting and rigging activities (i.e., use of overhead and gantry cranes, mobile cranes, derricks, hoist, rigging devices, forklift trucks, and devices such as wire rope, chain, metal mesh slings, synthetic-web slings, and special below-the-hook attachments and fixtures) shall be conducted in accordance with BJC-FS-1008, *Hoisting and Rigging*, BJC-FS-1009, *Qualification and Performance as Competent Person Rigger*, and BJC-FS-1037, *Hoisting and Rigging Hardware Inspection and Testing.*

10.13 EXCAVATION AND TRENCHING

The requirements of BJC-FS-1004, *Excavation/Penetration* will be followed at the EMWMF. In addition, applicable 29 *CFR* 1926 Subpart P, "Excavations" requirements shall be implemented to protect EMWMF operations personnel who work in or around excavations/trenches, penetrations into the earth surface, concrete, or pavement, and interior surface penetrations in building walls, floors, and ceilings. An Excavation/Penetration Permit will be obtained for all excavation/penetration activities except for those exempted activities listed in the procedure.

10.14 EMERGENCY EYE WASH AND PERSONNEL DECONTAMINATION SHOWER

The SSHR (or designee) will determine which tasks offer a reasonable potential for employee eye injury. Eye wash bottles are available in the Boundary Control Stations in the disposal cell area (Limited Area) and an emergency eye wash station capable of providing a drenching capability of 0.4 gallons per minute for at least 15 minutes is located in Building 9983-GU. Emergency drench units shall be inspected weekly and the inspection documented.

10.15 FIRST AID KITS AND SUPPLIES

First aid kits, for use by trained personnel, are located in the office and break trailers (9983-GV and 9983-GU) and in the Boundary Control Stations in the Limited Area. Trained personnel at EMWMF are the SSHR (or designee), Cell Operations Superintendent, and the Maintenance and Facilities Superintendent. These individuals shall have current first aid and cardiopulmonary resuscitation (CPR) training as well as Bloodborne Pathogen training. Kits may be placed at other locations (approved by the SSHR) to provide support for minor injuries by trained personnel or for use while waiting for emergency response. First aid kits shall, at a minimum, meet the requirements of ANSI Z308.1. First aid kits shall be inspected weekly by the SSHR (or designee) and replenished as necessary. A log of all first aid kit use shall be maintained and submitted to the BJC Safety Manager monthly.

10.16 ASBESTOS AND MAN-MADE FIBERS

All work involving asbestos is to be performed in accordance with BJC-EH-5177, *Asbestos and Other Fibrous Materials* and BJC/OR-1745, *Worker Safety and Health Program*. Activities involving the disposal of friable, respirable, or uncharacterized fibrous glass and other synthetic (man-made) vitreous fibers, which may reasonably be expected to exceed airborne concentrations at or above established Occupational Exposure Limits shall require implementation of appropriate safe work practices and controls.

11. RADIOLOGICAL PROTECTION

EMMWF operations personnel shall comply with BJC-EH-4000, *Radiation Protection Program Description.* Activities will be performed under approved RWPs. The Field Radiological Engineer (FRE) will provide direction on radiological issues. The FRE will coordinate with other safety and health disciplines in areas of mutual interest, such as respiratory protection, PPE, and heat stress.

12. ENVIRONMENTAL COMPLIANCE

EMWMF operations shall comply with BJC/OR-1747, *Environmental Compliance and Protection Program Description.* The Environmental Compliance and Protection (EC&P) Lead will provide direction on environmental issues.

All operations activities performed at the EMWMF are designed to prevent the release of pollutants into the environment and to comply with regulatory guidelines as presented in BJC/OR-2711, *Environmental Compliance Plan* (ECP). Contaminated substances are to remain within the *EMWMF* unless released and transported from the site under strictly controlled conditions. Operating controls minimize the release of pollutants to air by dust control management, to surface water by preventing surface water access to the EMWMF and with stormwater controls, and to groundwater by the design and operation of a liner and leachate collection system. Environmental monitoring of air, surface water, stormwater, and groundwater is performed during operations on a regular basis to ensure the containment of contaminants generated or potentially released during operations of the EMWMF.

13. SITE COMMUNICATIONS

Primary forms of site communications used during EMWMF operations activities include: two-way radio, the Y-12 plant telephone system, and cellular telephone.

13.1 TWO-WAY RADIOS

EMWMF operations personnel shall use two-way radios as a primary means of site communications. Radio checks shall be performed routinely to ensure that radios are functioning properly. Radio communications will be in accordance with BJC-FS-1031, *Communications.*

13.2 DEPARTMENT OF ENERGY (DOE) TELEPHONE SYSTEM

Hard line telephone communications at the EMWMF site are part of the DOE telephone system. The nearest hard line telephone communications to the EMWMF active waste disposal cell area are located in Buildings 9983-GV and -GU. These hard line telephones will be used for dialing 911 in the event of a site emergency.

13.3 CELLULAR TELEPHONES

Cellular telephones should not be used when operating equipment or motor vehicles at the EMWMF site. In case of an emergency, personnel shall dial the PSS' seven-digit telephone number (Y-12: 574-7172 and ETTP 574-3282), and not 911 if calling from a cellular telephone.

14. NOTIFICATION AND REPORTING

Personnel shall immediately notify the Site Safety and Health Representative (SSHR) or designee and their immediate supervisor of all occupational injuries/illnesses. In case of an emergency involving personal injury or illness, a designated first aid and CPR responder will render immediate first aid. Additional emergency medical services may be summoned if deemed necessary based upon the severity of the injury or illness. The B&W Y-12 and ETTP Park Shift Superintendent (PSS) will be contacted at 574-7172 or 574-3282, respectively.

14.1 MEDICAL ILLNESS/INJURY

The SSHR, safety support personnel and the field superintendents at EMWMF have current first aid and cardiopulmonary resuscitation (CPR) training. Because of the potential for occupational exposure to potential pathogenic bodily fluids and tissue, providers of first aid and CPR shall receive Bloodborne Pathogen Training as specified in 29 *CFR* 1910.1030 and have the opportunity to receive, free of cost, Hepatitis-B vaccinations (HBV).

Employees requiring medical treatment (e.g., minor first aid treatment) for non-serious or non-life threatening injuries or illnesses shall be taken to one of the medical facilities indicated below in Table 2 for treatment. Employees with minor injuries shall not be allowed to drive themselves to receive medical attention. An EMWMF supervisor shall drive the employee with minor injuries/illnesses to a medical provider.

NOTE: ETTP Health Services is the first choice for employees to receive medical attention beyond first aid depending on the severity of the injury or illness and the time of day.

Table 2. Non-Emergency Treatment Locations

ETTP Health Services (K-25 Medical)	Methodist Medical Center of Oak Ridge
Building K-1007 Highway 58 Oak Ridge, TN 37831 (865) 574-8562 Office Hrs.: 7:30 a.m. – 4:00 p.m.	990 Oak Ridge Turnpike Oak Ridge, TN 37831-2529 (865) 835-1000 Main Switchboard (865) 835-4908 Emergency Department (NOTE: for after hours/off shift work only)

In case of an illness or injury, the SSHR, with assistance of the field superintendents, will evaluate the nature of the illness/injury. The affected worker should be decontaminated to the extent possible, if required. All non-emergency work-related injuries will be treated by BJC Health Services at ETTP. When a worker sustains a minor injury, the SSHR or designee shall immediately notify the BJC Health Services (574-8562) if the injury occurs during weekday hours of 7:30-4:00, or the ETTP PSS (574-3282) during off-hours. Key Personnel Emergency Contact Names and Numbers are posted at all building exits, provided on laminated cards following completion of EMWMF Site Access Orientation, in Building/Facility Emergency Plans (orange books) and an up-to-date listing will be maintained and posted in the Boundary Control Stations in the Limited Area. **Emergency response for serious injuries or illnesses shall be through the immediate notification to the Y-12 and ETTP PSS offices.**

14.2 ACCIDENT/INCIDENT REPORTING AND RECORDKEEPING

The SSHR and line supervision shall be notified immediately in the event that a work-related injury or illness occurs for operations personnel or subcontractor employees, vendors, or visitors. Line supervision in conjunction with the SSHR (or designee), will investigate and report each accident or incident involving work-related injury or illness, or damage to government vehicles and property. Requirements of BJC-EH-2001, *Accident/Incident Reporting,* will be followed.

15. EMERGENCY RESPONSE

BJC/OR-2714, *Environmental Management Waste Management (EWMF) Emergency Response and Contingency Plan* contains detailed descriptions of emergency response actions to be taken at EMWMF. A brief summary of some emergency response actions are contained in the sections below.

15.1 EMPLOYEE RESPONSIBILITIES

The minimum requirements of EMWMF employees during an emergency are to know the following about his or her work area:

- location of site emergency exit routes.
- location of the facility assembly point(s).
- location of the nearest fire extinguisher. Fire extinguishers should only be used by personnel who know how to operate them safely, in addition to knowing the type of fire (e.g., electrical, petroleum product, wood) and the appropriate type of fire extinguisher to be used under the existing conditions.
- location of other emergency equipment such as the eye wash station.
- location of the nearest telephone or other means of communication such as radio or cellular telephone and emergency contact list.

15.2 REPORTING AN EMERGENCY

Upon discovering an emergency situation, an employee must immediately take action to initiate emergency response activities. This action involves first removing himself/herself from immediate danger and notifying the Site Safety and Health Representative (SSHR) and site Superintendents. The SSHR shall initiate site emergency response and contingency plan actions (in accordance with BJC/OR-2714, *Emergency Response and Contingency Plan*) immediately upon notification by contacting both the Y-12 and ETTP PSS of the emergency situation so that the emergency response system can be activated. Y-12 emergency response personnel will provide "first responder" services until such time that ETTP emergency response personnel arrive at EMWMF.

15.3 EVACUATION ROUTES

Maps of EMWMF evacuation routes are posted in the office and employee break trailers, in the Building/Facility Emergency Plan binders (orange books), and are included in this HASP as Fig. 2.

15.4 ASSEMBLY POINT(S)

The primary assembly point at EMWMF is Assembly Station Number 23 located immediately east of the driveway that encircles the office trailer (Bldg. 9983-GV) and the northeast corner of the building.

A secondary assembly point is located immediately north of Bldg. 9983-GV at the gravel entrance to the material laydown area.

EMWMF site sign in rosters will be used for accountability in the event of a site emergency requiring evacuation to the assembly point (or shelter in place).

16. REFERENCES

BJC-EH-1015,. *Scaffolds and Portable Ladders*, Bechtel Jacobs Company LLC, Oak Ridge, TN.

BJC-EH-2000,. *General Safety Requirements*, Bechtel Jacobs Company LLC, Oak Ridge, TN.

BJC-EH-2001, *Accident/Incident Reporting*, Bechtel Jacobs Company LLC, Oak Ridge, TN.

BJC-EH-2002, *Hazardous Energy Control (Lockout/Tagout)*, Bechtel Jacobs Company LLC, Oak Ridge, TN.

BJC-EH-2005, *Personal Protective Equipment*, Bechtel Jacobs Company LLC, Oak Ridge, TN.

BJC-EH-2006, *Fall Prevention and Protection*, Bechtel Jacobs Company LLC, Oak Ridge, TN.

BJC-EH-2007, *Hot Work*, Bechtel Jacobs Company LLC, Oak Ridge, TN.

BJC-EH-2009, *Electrical Safety*, Bechtel Jacobs Company LLC, Oak Ridge, TN.

BJC-EH-2010, *Hazard Assessment*, Bechtel Jacobs Company LLC, Oak Ridge, TN.

BJC-EH-4000, *Radiation Protection Program Description for Bechtel Jacobs Company LLC, Oak Ridge, Tennessee,* Bechtel Jacobs Company LLC, Oak Ridge, TN.

BJC-EH-5121, *Occupational Noise Exposure and Hearing Conservation Program,* Bechtel Jacobs Company LLC, Oak Ridge, TN.

BJC-EH-5138, *Confined Space Program Description,* Bechtel Jacobs Company LLC, Oak Ridge, TN.

BJC-EH-5140, *Hazard Communications*, Bechtel Jacobs Company LLC, Oak Ridge, TN.

BJC-EH-5151, *Respiratory Protection Program*, Bechtel Jacobs Company LLC, Oak Ridge, TN.

BJC-EH-5177, *Asbestos and Other Fibrous Materials*, Bechtel Jacobs Company LLC, Oak Ridge, TN.

BJC-EH-5181, *Hazardous Materials Information System*, Bechtel Jacobs Company LLC, Oak Ridge, TN.

BJC-FS-1031, *Communications*, Bechtel Jacobs Company LLC, Oak Ridge, TN.

BJC-EH-5121, *Occupational Noise Exposure and Hearing Conservation Program,* Bechtel Jacobs Company LLC, Oak Ridge, TN.

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BJC-FS-1001, *Work Control Process*, Bechtel Jacobs Company LLC, Oak Ridge, TN.

BJC-FS-1004, *Excavation/Penetration Permit*, Bechtel Jacobs Company LLC, Oak Ridge, TN.

BJC-FS-1008, *Hoisting and Rigging*, Bechtel Jacobs Company LLC, Oak Ridge, TN.

BJC-FS-1009, *Qualification and Performance as Competent Person Rigger*, Bechtel Jacobs Company LLC, Oak Ridge, TN.

BJC-FS-1031, *Communications*, Bechtel Jacobs Company LLC, Oak Ridge, TN.

BJC-FS-1037, *Hoisting and Rigging Hardware Inspection and Testing*, Bechtel Jacobs Company LLC, Oak Ridge, TN.

BJC-FS-1039, *Construction Equipment Inspection and Maintenance Program*, Bechtel Jacobs Company LLC, Oak Ridge, TN.

BJC-GM-1400, *Integrated Safety Management System Description*, Bechtel Jacobs Company LLC, Oak Ridge, TN.

BJC/OR-1745, *Worker Safety and Health Program,* Bechtel Jacobs Company LLC, Oak Ridge, TN.

BJC/OR-1747, *Environmental Compliance and Protection Program Description*, Bechtel Jacobs Company LLC, Oak Ridge, TN.

BJC/OR-2711, *Environmental Compliance Plan*, Bechtel Jacobs Company LLC, Oak Ridge, TN.

BJC/OR-2713, *EMWMF Operations Plan,* Bechtel Jacobs Company LLC, Oak Ridge, TN.

BJC/OR-2714, *EMWMF Emergency Response and Contingency Plan*, Bechtel Jacobs Company LLC, Oak Ridge, TN.

EMWMF-OP-003, *Waste Placement*, Bechtel Jacobs Company LLC, Oak Ridge, TN.

EMWMF-OP-008, *On-Site Staging*, Bechtel Jacobs Company LLC, Oak Ridge, TN.

EMWMF-OP-012, *Equipment Decontamination*, Bechtel Jacobs Company LLC, Oak Ridge, TN.

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