BECHTEL PARSONS BLUE GRASS
A Joint Venture of Bechtel National, Inc. and Parsons Government Services Inc.

Blue Grass Chemical Agent-Destruction Pilot Plant (BGCAPP)

Environmental Document

Attachment I - SDC 2000 Closure Plan

Contract W52P1J-09-C-0013
(CDRL A010)

24915-80-G01-GGPT-00001

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Program Executive Office –
Assembled Chemical Weapons Alternatives (PEO ACWA)

Approval

JTG Review Concurrence has completed on 24915-80-G01-GGPT-00001 SDC 2000 Closure Plan R0.

JTG Review Concurrence on 24915-80-G01-GGPT-00001 SDC 2000 Closure Plan R0 has successfully completed. All participants have completed their tasks.

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Record of Revision

Revision No.	Effective Date of Revision	Brief Revision Description
0	05 SEP 2024	Initial issue

List of Changes

Change No.	Effective Date of Change	Brief Change Description
1	02 DEC 2024	Editorial DECOD to correct typographical and numerical errors.
0	05 SEP 2024	See Record of Revision description.

Table of Contents

1.0 PURPOSE

401 Kentucky Administrative Regulations (KAR) 39:090 Section 1; 40 Code of Federal Regulations (CFR) 264.112(a) and 761.65

This closure plan describes the processes that will be used to close the Blue Grass Chemical Agent-Destruction Pilot Plant (BGCAPP) Static Detonation Chamber (SDC) 2000 to achieve Resource Conservation and Recovery Act (RCRA) clean closure of the facility. Additionally, this closure plan addresses closure of Toxic Substances Control Act (TSCA)-regulated polychlorinated biphenyl (PCB) waste storage and processing areas as part of final closure activities.

2.0 SCOPE

The BGCAPP operations include the Main Plant and supporting facilities, as well as two SDC systems. Each of the SDC systems' RCRA hazardous waste operating permits are separate from the Main Plant RCRA Permit. This closure plan is applicable to RCRA-permitted units located in the SDC 2000 Facility. The Main Plant and the SDC 1200 facilities will be closed under separate closure plans.

The objectives of closure are to clean close the facility in a manner that is protective of human health and the environment and to eliminate the possibility of any future releases. There are two major components that must be addressed for industrial clean closure of the SDC 2000 facility: (1) closure performance standards and (2) closure verification. The closure performance standards identify the requirements or conditions that must be satisfied to close the facility in a manner that is protective of human health and the environment, and they are addressed in this closure plan. The closure performance standards address RCRA, chemical agent, and TSCA closure performance standards, as well as the treatment standards for hazardous debris. This closure plan describes how the SDC 2000 facility will be closed to satisfy the closure performance standards for industrial clean closure.

The second component of closure is closure verification. Closure verification provides confirmation that the industrial clean closure criteria have been met through an approved sampling and analysis plan. The industrial clean closure criteria are quantitative concentrations or levels of contaminants that, if not exceeded, will ensure protection of human health and the environment, and they are defined in the Closure Verification Sampling and Analysis Quality Assurance Project Plan (CVQAPP). The CVQAPP is a separate, stand-alone plan that complements this Closure Plan. The CVQAPP presents the policies, organization, functions, field sampling design, and Quality Assurance/Quality Control (QA/QC) requirements designed to achieve the data quality goals associated with field and Lab sampling operations for BGCAPP closure verification sampling.

3.0 DEFINITIONS

The following terms are used in this closure plan and are defined as follows:

Action Level	Media concentration below which clean closure or industrial clean closure is achieved Action levels are defined in 24915-CL-5PL-80-00001, *SDC 2000 Closure Verification Sampling and Analysis Quality Assurance Project Plan* (under development). Action levels established generally correspond to health-based screening levels or established pre-operational background levels. For agents, the action level corresponds to the monitoring level established for each airborne exposure limit (AEL) using each applicable monitoring method at which precision and accuracy studies demonstrate there is a 95% confidence that the corresponding AEL concentration will not be exceeded. Implementing procedures will document applicable action levels for specific monitoring methods and agents.
Active Life	The period from the initial receipt of hazardous waste until the Director receives certification of final closure (40 CFR 260.10) The active life of the unit or facility includes the closure period prior to final closure certification.
Active Portion	That portion of a facility where hazardous waste treatment, storage or disposal operations are being, or have been, conducted and which is not a closed portion
Air Wash	A decontaminating method that allows equipment, process systems, and areas to be exposed to ambient atmosphere within engineering controls to remove agent-vapor-based contamination
Airborne Exposure Limit (AEL)	Allowable concentrations of airborne chemical agent for workplace and general population exposures AELs include general population limits (GPLs), worker population limits (WPLs), short term exposure limits (STELs), and values that are immediately dangerous to life or health (IDLH).
Ancillary Equipment	Any device including, but not limited to, such devices as piping, fittings, flanges, valves, and pumps, that is used to distribute, meter, or control the flow of hazardous waste from its point of generation to a storage or treatment unit, between hazardous waste storage and treatment units, or to a point of shipment for disposal offsite unless it is specifically identified as a permitted hazardous waste management unit in the BGCAPP RCRA Permit
Container Accumulation Area (CAA)	Any onsite hazardous waste container accumulation area with hazardous waste accumulating in containers (less than 90-days) subject to the large quantity generator requirements of 401 Kentucky Administrative Regulations (KAR) 39:080 Section 1 (40 CFR 262.17) that meets the conditions for exemption from the storage facility requirements in 40 CFR 124, 264 through 268, and 270

Clean Closure	Decontamination and/or removal of all equipment, systems, and areas containing, or contaminated with, hazardous waste (including agent) or hazardous constituents in a manner that is protective of human health and the environment and such that no post-closure care is required Industrial clean closure is achieved by meeting clean closure standards applicable to industrial land uses.
Clean Closure Criteria	Quantitative concentrations or levels of contaminants that, if not exceeded, will ensure protection of human health and the environment Criteria may consider reasonably expected future land use such that industrial exposure assumptions may be applied provided continued maintenance and use as industrial land.
Closed Portion	That portion of a facility that an owner or operator has closed in accordance with the approved facility closure plan and all applicable closure requirements
Closure Performance Standards	Requirements or conditions that must be satisfied to close the facility in a manner that is protective of human health and the environment; they are addressed in this closure plan The closure performance standards address RCRA, chemical agent, and TSCA closure performance standards as well as the treatment standards for hazardous debris.
Closure Verification	Confirmation that the industrial clean closure criteria have been satisfied through an approved sampling and analysis plan Achieving the industrial clean closure criteria will allow BGCAPP to close without the need for further maintenance or controls (post-closure care) for future industrial land use. Analytical results from closure verification sampling and analysis will be used to demonstrate that industrial clean closure criteria have been met as part of the closure certification process.
Closure Verification Sampling and Analysis Quality Assurance Project Plan (CVQAPP)	Defines the methodology and quality requirements for closure verification sampling that will demonstrate that the decontamination, decommissioning, and demolition activities described in the Closure Plan have been performed effectively such that hazardous waste and hazardous constituents have been removed in a manner that is protective of human health and the environment so that no post-closure care is required
Contamination	The deposit, absorption, or adsorption of a hazardous substance on surfaces, equipment, structures, personal protective equipment, or personnel Agent-contaminated items are those where agent is known or suspected to be on or contained within the matrix at some level of potential health concern such that safeguards are required.

Debris	A solid material exceeding a 60 mm particle size that is intended for recycling or disposal and that is any of the following: • A manufactured object • Plant or animal matter • A natural geologic material A mixture of debris and other material is still classified as debris if the mixture is comprised primarily of debris by volume based on visual inspection. A mixture of debris that has not been treated to meet the chemical agent and PCB closure performance standards in this closure plan and the hazardous debris treatment standards provided in Section 7.4 [401 KAR 39:060 Section 4, (40 CFR 268.45)] that is combined with other material is subject to regulation as hazardous debris if the mixture is comprised primarily of debris, by volume, based on visual inspection. Any material that has a specific treatment standard defined in 40 CFR 268 is not debris. Examples of items which are not debris include cadmium batteries; process residuals such as residues from the treatment of waste, wastewater, sludge, air emission residues; and intact containers of hazardous waste that are not ruptured and that retain at least seventy-five percent of their original volume. BGCAPP may use the conditioned exclusion of treated debris (40 CFR 268.45 [c]) for decontaminated items that meet the chemical agent closure standards in this closure plan and the applicable performance standards defined in the *Alternative Treatment Standards for Hazardous Debris*, Table 1, 40 CFR 268.45.
Decommission	Withdrawal of the facility or equipment from service followed by decontamination and transition to the required end-state configuration Decommissioning ensures readiness for demolition or turnover.
Decontamination and Decommissioning Package (DDP)	Documents defining the prerequisites, boundaries, and scope of field work to be performed to close a system, room, area, or building to prepare the facility for demolition and disposal or for turnover to other tenants
Decontamination	The process of making safe any person, object, or area by absorbing, destroying, neutralizing, making harmless, or removing the hazardous substance (e.g., chemical agent) on that person, object, or area Physical or chemical means to remove, deactivate, or destroy hazardous substance (e.g., chemical agents) on the surface and in the matrix of protective clothing, object, or equipment.

Demolition	Dismantling, destruction, or wrecking of facilities or equipment for scrap recovery followed by offsite disposition and/or disposal Precision, or targeted, demolition is a labor-intensive and detailed approach to dismantle and size-reduce items into manageable or salvageable components for scrap recovery, further use, or disposal offsite. Mass demolition is large-scale wrecking and destruction of equipment and structures utilizing conventional mechanical equipment or explosives to reduce manual labor and facilitate resource recovery and offsite disposal.
Designated facility (40 CFR 761.3)	Specific facility serving as the offsite disposer or commercial storer of PCB waste designated on the manifest as the facility that will receive a manifested shipment of PCB waste
Director	"Director" means "Cabinet" as defined by KRS 224.1-010(8) and is a reference to the Director of the Division of Waste Management within the Kentucky Department for Environmental Protection The terms "Cabinet," "Director," "Division," and "Manager" can be used interchangeably (401 KAR 39:005, Section 1) in this closure plan.
Dismantle	Disassembly and breaking down equipment or systems into multiple pieces that can be removed from their existing location for disposition
Disposal	Under RCRA, the discharge, deposit, injection, dumping, spilling, leaking, or placing of any solid waste or hazardous waste into or on any land or water so that such solid waste or hazardous waste or any constituent thereof may enter the environment or be emitted into the air or discharged into any waters, including ground waters (40 CFR 262.10) Under TSCA, disposal means intentionally or accidentally to discard, throw away, or otherwise complete or terminate the useful life of PCBs and PCB items. Disposal includes spills, leaks, and other uncontrolled discharges of PCBs as well as actions related to containing, transporting, destroying, degrading, decontaminating, or confining PCBs and PCB items (40 CFR 761.3).
Engineering Controls	The device, room, or structure immediately surrounding the agent source that provides the primary protection to the workers from the chemical agent hazard and is under negative pressure relative to the location of unprotected workers Examples of engineering controls are hoods, gloveboxes, or rooms under negative pressure relative to the adjacent vestibule, corridor, or room.

Excluded Scrap Metal [40 CFR 261.1(c)(9) and 261.4(a)(13)]	Processed scrap metal, unprocessed home scrap metal, and unprocessed prompt scrap metal being recycled (collectively referred to as excluded scrap metal) that are all excluded from the definition of solid waste and therefore not subject to RCRA Subtitle C regulations • Processed scrap metal is scrap metal which has been manually or physically altered to either separate it into distinct materials to enhance economic value or to improve the handling of materials. Processed scrap metal includes, but is not limited to, scrap metal which has been baled, shredded, sheared, chopped, crushed, flattened, cut, melted, or separated by metal type (i.e., sorted), and, fines, drosses and related materials which have been agglomerated • Home scrap metal is scrap metal as generated by steel mills, foundries, and refineries such as turnings, cuttings, punchings, and borings (not applicable to BGCAPP) • Prompt scrap metal is scrap metal as generated by the metal working/fabrication industries and includes such scrap metal as turnings, cuttings, punchings, and borings. Prompt scrap is also known as industrial or new scrap metal (not applicable to BGCAPP) The exemption from Subtitle C hazardous waste management regulation applies at the point of generation. Scrap metal that does not meet the conditions of the 40 CFR 261.4(a)(13) exclusion (i.e., all other scrap metal) is considered a solid waste but continues to be exempt from substantive Subtitle C regulation if being reclaimed [40 CFR 261.6(a)(3)(ii)]
Facility	All contiguous land, and structures, other appurtenances, and improvements on the land used for treating, storing, or disposing of hazardous waste
Federal Acquisition Regulations (FAR)	Federal regulations governing the acquisition and disposition of real and personal property acquired, owned, and dispositioned by the Federal government
Final Closure	Closure of all hazardous waste management units at the facility in accordance with all applicable closure requirements so that hazardous waste management activities under 40 CFR parts 264 and 265 are no longer conducted at the facility unless subject to the provisions in 40 CFR 262 for hazardous waste generators Closure verification will be performed as part of final closure.

General Population Limit (GPL) (68 FR 58348)	A highly protective vapor exposure criterion for a 24-hour/day lifetime exposure of the general population including those more susceptible individuals A GPL is a no-observed-adverse-effect-level (NOAEL) representing an exposure at or below which there are no anticipated adverse health effects from either short- or long-term repeated exposures (i.e., that occur 24 hours daily for up to 70 years). GPLs are 24-hr time averages for GB ($1x10^{-6}$ mg/m^3) and VX (6×10^{-7} mg/m^3).
Hazardous Debris	Debris that contains a hazardous waste listed in 401 KAR 39:060, Section 3, in addition to those substances listed in Subpart D of 40 CFR, part 261, or that exhibits a characteristic of hazardous waste identified in Subpart C of 40 CFR part 261 Any deliberate mixing of prohibited hazardous waste with debris that changes its treatment classification (i.e., from waste to hazardous debris) is not allowed under the dilution prohibition in 40 CFR 268.3. This definition only applies to debris that is subject to Subtitle C regulations when it is generated. A mixture of items ≤ 60 mm in size and items > 60 mm in size that is comprised mostly of larger items (> 60 mm) is considered debris and is subject to the applicable debris treatment standard if contaminated with hazardous waste.
Hazardous Waste Control Limit (HWCL)	The concentration limit below which a hazardous constituent can be released from controls prohibiting its treatment or disposal at a permitted hazardous waste facility Concentration limits for chemical agent are those established by the United States Army Public Health Command (USAPHC) (see Chemical *Agent Health-Based Standards and Guidelines Summary*, Table 2: "Criteria for Water, Soil, Waste," July 2011, or current revision) using chronic toxicity criteria and risk assessment modeling similar to that used by EPA Region IX. While such facilities may be expected to safely manage/treat/dispose of chemical agents at much higher levels, the HWCL values established for chemical agents apply conservative exposure scenarios to limit any potential adverse impacts from occasional exposure to agent at permitted hazardous waste facilities.
Hazardous Waste Management Unit (HWMU)	A contiguous area of land on or in which hazardous waste is placed or the largest area in which there is significant likelihood of mixing hazardous waste constituents in the same area Examples of hazardous waste management units include a surface impoundment, a waste pile, a land treatment area, a landfill cell, an incinerator, a tank and its associated piping and underlying containment system and a container storage area. A container alone does not constitute a unit; the unit includes containers and the land or pad upon which they are placed. (Refer to Code of Federal Regulations [CFR] Title 40, Part 260.10.) A permitted unit does not become a HWMU until the initial receipt of hazardous waste.

Headspace Monitoring	The process of monitoring off-gassing vapors from a substance in an enclosed, unventilated space Effective headspace monitoring requires appropriate definition of environmental conditions (time, temperature, mixing), minimization of potential dilution air, and prior verification that object monitored does not sorb agent (e.g., activated carbon) or contain cavities/crevasses where liquid agent may remain isolated from the headspace (refer to 24915-GEN-5PL-00-00006, *Equipment Decontamination Plan*).
Immediately Dangerous to Life and Health (IDLH)(68 FR 58348)	Atmosphere that poses an immediate threat to life, would cause irreversible adverse health effects, or would impair an individual's ability to escape from a dangerous atmosphere The IDLH for chemical agent is the maximum airborne concentration from which one could escape within 30 minutes. The IDLH levels for chemical agents are 0.1 mg/m^3 for GB and 0.003 mg/m^3 for VX.
Industrial Clean Closure	Decontamination and/or removal of all equipment, systems, and areas containing, or contaminated with, hazardous waste (including agent) or hazardous constituents in a manner that is protective of human health and the environment which relies on industrial exposure assumptions to determine the level of decontamination necessary to satisfy the “remove or decontaminate” standard Industrial clean closure requires continued maintenance of nonresidential land use and any necessary additional cleanup should land use change through institutional controls.
Non-Hazardous Waste Control Limit (NHWCL)	The concentration limit of a hazardous constituent below which a waste material may be released for disposal at a non-RCRA disposal facility Concentration limits for chemical agent constituents are those established by the USAPHC (see Chemical Agent Health-Based Standards and Guidelines Summary, Table 2: “Criteria for Water, Soil, Waste,” July 2011, or current revision) using chronic toxicity criteria and risk assessment modeling similar to that used by EPA Region IX. The NHWCL values established for chemical agents apply conservative exposure scenarios to limit any potential adverse impacts from occasional exposure to agent at public and private disposal facilities receiving municipal solid waste.

Occluded Space	Confined volume within a system, structure, or component that can potentially trap liquid agent, prevent contact with a decontamination solution, and/or prevent agent vapors from trapped liquid agent from being detected during unventilated monitoring Examples of occluded spaces are as follows: • A screw or bolt may create an occluded space if while it was removed, agent was splashed down into the tapped hole and was then replaced. Agent contained behind the screw or bolt may not be detectable by air monitoring • An agent pipe that has been blinded, capped, or otherwise sealed on both ends so that none of the air inside can escape for air monitoring • The space under a floor mat, support plate, or something movable which covers a contaminated surface. If the floor is splashed with agent before the pad, mat, or plate is placed, then there exists a potential for the pad, mat, or plate to prevent decontamination solution from contacting the surface and also prevent monitoring from detecting agent contamination. • Internal check valves or complex geometry valves have the potential to trap liquid agent in packing, behind double seal O-rings, or in internal spaces where decontamination solution will also be prevented from contacting potential agent. Air monitoring may not detect materials contained in these locations. Many of the tools in process areas may have been contaminated with agent. If these tools were not decontaminated and were placed into a closed toolbox, the toolbox would be considered an occluded space.
Other Scrap Metal	Material that meets the definition of scrap metal but not the definition of “excluded scrap metal” in 40 CFR 261.4(a)(13) Other scrap metal is a solid waste under 40 CFR 261.2(c)(3) when sent for recycling/reclamation and is considered a hazardous waste if it exhibits a characteristic or has become contaminated with a listed waste. 40 CFR 261.6(a)(3)(ii) exempts hazardous scrap metal that is sent for recycling/reclamation from 40 CFR Parts 262-270. Therefore, the need to make a hazardous waste determination in accordance with 40 CFR 262.11 does not apply so long as the materials are not mixed with hazardous waste (e.g., no significant liquid component) and are properly managed to minimize any releases to the environment.
PCB Waste	Waste that is potentially contaminated with regulated levels of PCBs. At BGCAPP, no liquid PCBs were known to be present; contamination was potentially present in the solid binder material of fiberglass Shipping and Firing Tubes (SFTs).

Point Source Monitoring	A method of monitoring designed to identify agent emission sources (i.e., to locate a known or suspected area of contamination on an item or within a room that is under engineering controls) and is distinct from area or room monitoring Point source monitoring is performed by placing the monitoring sampling line close to the presumed contaminated area.
Scabble	Physical extraction technologies that remove surfaces or layers of concrete, which include abrasive blasting, scarification, grinding, planing, spalling, vibratory finishing
Scrap Metal	Bits and pieces of metal parts (e.g., bars, turnings, rods, sheets, wire) or metal pieces that may be combined together with bolts or soldering (e.g., radiators, scrap automobiles, railroad box cars), which when worn or superfluous can be recycled
Secondary Waste	Waste generated from hazardous waste operations (e.g., personal protective equipment (PPE), filters, plastic sheeting) that requires additional treatment, storage and/or offsite disposal
Solid Material	A material that retains its volume at room temperature without the need for support Common examples of solid materials that are debris (if intended for discard and if their particle size is 60 mm or greater) include the following: glass, concrete, tanks, pipes, valves, scrap metal, plastic and rubble. Metallic components that are legitimately recycled are exempt from the Land Disposal Restriction (LDR) treatment standards under the scrap metal exemption in 40 CFR 261.6(a)(3)(ii).
Solid Waste Management Unit (SWMU)	Any discernable unit that has ever accumulated, treated, stored, or disposed of solid wastes, irrespective of whether the units were intended for waste management SWMUs include areas that have been contaminated by routine and systematic releases of hazardous waste or hazardous constituents, excluding one-time spills that are immediately remediated and cannot be linked to solid waste management activities (e.g., product or process spills).
Structures, Systems, and Components (SSCs)	Manufactured items designed, built, or installed to support the operation of the facility A structure is an element or a collection of elements to provide support or enclosure such as a building, freestanding tank, basin, dike, or stack. A system is a collection of components assembled to perform a function such as piping; cable trays; conduits; or heating, ventilation, and air conditioning. A component is an item of equipment such as a pump, valve, relay, or an element of a larger array such as a length of pipe, elbow, or reducer. For purposes of this closure plan, SSCs include all primary, secondary, and ancillary RCRA, TSCA, and Clean Air Act Title V equipment and structures.

Triple Rinse	A flushing process for removal of residual (waste) material. Generally, triple rinsing should be performed by flushing three times with 10% or more capacity of a tank, pipe, pump, container, or other type of enclosed volume using a suitable solvent such that all potentially contaminated surfaces are contacted. Floors or other surface are considered triple rinsed when three successive rinses are performed. No strict requirements apply, however; factors such as waste properties, potential solvent options, container configuration and ability to manipulate, and waste minimization efforts all factor into the design of the triple rinse operation. 40 CFR § 261.7(b)(3) allows for an alternate method to be used when triple rinsing is determined to be inappropriate.
Uncontrolled Environment	A situation where the atmosphere is not continuously monitored during the presence of a chemical agent to determine concentration levels or the type of agent hazard (vapor, aerosol, liquid) is unknown, or cannot be identified (such as a storage magazine)
Unventilated	A condition achieved within an enclosed space (e.g., room) where air is not mechanically exchanged or replaced with exterior air
Unventilated Monitoring Test (UMT)	A test involving the collection of a representative air sample while the area is isolated from ventilation Final unventilated monitoring may be conducted after decontamination of all liquid-contaminated and potentially-liquid-contaminated equipment, process systems, or areas has been completed and after an occluded space survey (and resolution of any identified occluded spaces) has been completed. The real property being monitored is first isolated from the building ventilation system and sealed to minimize exchange of air. Fans are installed, as needed, to ensure homogeneity of the air volume. The UMT should be performed using a hold-time of not less than 4 hours and a temperature of not less than 70°F.
Universal Waste (UW)	Hazardous wastes that are subject to the UW requirements of 401 KAR 39:080 and 40 CFR 273 UW includes batteries, pesticides, mercury-containing equipment, lamps, and aerosol cans.
Vapor Screening Level (VSL)	The agent concentration level to which an item is monitored under unventilated conditions to determine the level of cleanliness For BGCAPP, the VSLs for GB and VX are the results of a single near-real-time (NRT) monitoring cycle and are based on the STEL concentration for each agent (0.00001 mg/m3 for VX, and 0.0001 mg/m3 for GB).

Worker Population Limit (WPL) (68 FR 58348)	The maximum time-averaged allowable concentration that an unmasked worker could be exposed to for an 8- or 12-hour workday 40 hours per week for 30 years without adverse effects For GB, the WPL for 8 hours without respiratory protection is 0.00003 mg/m^3. For VX, the WPL for 8 hours without respiratory protection is 0.000001 mg/m^3.

4.0 FACILITY END STATE

Facilities, equipment, and other infrastructure constructed or acquired by the Program Executive Office – Assembled Chemical Weapons Alternatives (PEO ACWA) will be appropriately decommissioned, disassembled as necessary, and dispositioned in accordance with contract requirements, environmental permits, and other applicable regulatory requirements. Regulatory requirements include closure of the facility in accordance with both RCRA and TSCA regulations and permits.

PEO ACWA is a tenant on the Blue Grass Army Depot (BGAD) which owns all real property on the BGCAPP footprint. Real property consisting of facilities and other infrastructure constructed or acquired by PEO ACWA will be removed and dispositioned or retained in accordance with BGAD requirements and instructions. Personal property (e.g., tools, supplies, equipment, items, and materials) is owned by PEO ACWA and will be dispositioned in accordance with applicable Federal Acquisition Regulations (FAR) governing the disposition of Federal government property.

5.0 APPLICABILITY

401 KAR 39:090 Section 1; 40 CFR 264.110 and 761.65

The RCRA requirements of 40 CFR Sections 264.111 through 264.115 apply to closure of the BGCAPP hazardous waste management facility and cover the active life of the facility. The requirements at 40 CFR Sections 264.116 through 264.120 do not apply since BGCAPP does not operate any disposal facilities and post-closure care is not anticipated. In addition, the TSCA requirements of 40 CFR 761.65 apply to closure of PCB waste storage and processing areas addressed in the TSCA PCB Storage and Treatment Approval. The facility will undergo TSCA closure concurrently with RCRA closure in a manner that eliminates the potential for post-closure releases of PCBs which may present an unreasonable risk to human health or the environment (40 CFR 761.65). A discussion of the RCRA and TSCA requirements is provided here.

The active life of a RCRA Treatment, Storage or Disposal Facility (TSDF) means the period from the initial receipt of hazardous waste at the facility until the Director receives certification of final closure. The SDC 2000 first received hazardous waste on 24 JAN 2023 when two skids holding GB containerized rocket warheads (CRW) were transported from the Main Plant to the SDC 2000 Earthen Covered Magazine (ECM). Although the facility was managing hazardous wastes onsite prior to 24 JAN 2023, those activities were conducted under the Hazardous Waste Generator provisions of 401 Kentucky Administrative Regulations (KAR) 39:080, Section 1 (40 CFR Part 262). Therefore, 24 JAN 2023 is considered the date for which the SDC 2000 facility commenced active hazardous waste operations. Any regulated units identified in the SDC 2000 Part B RCRA Permit on, or after, 24 JAN 2023 will be closed in accordance with this Kentucky Department for Environmental Protection (KDEP) approved closure plan.

An extensive record of RCRA-permitted units constructed for the purpose of hazardous waste operations and approved for use by KDEP exists in the facility operating record. This record includes the Facility Construction Certification (FCC) documentation for permitted units that has been submitted to KDEP in accordance with the requirements of 401 KAR 39:060, Section 5, and 40 CFR 270.30(l)(2). Not all permitted units were placed into hazardous waste service which is discussed further in Section 5.3.

The RCRA and TSCA permitted units addressed by this plan are located within the SDC 2000 facility. RCRA permitted units include one 40 CFR Subpart J Tank (Bleed Water Tank); various Subpart X Miscellaneous Units, and several Subpart I Container Storage Units. Closure of the SDC 2000 facility will address the clean closure requirements of 40 CFR 264.111 through 264.115. However, the closure and post-closure care requirements of 40 CFR 264.116 through 264.120 will not apply unless the industrial clean closure requirements cannot be achieved.

The PCB processing and storage areas that will be closed under the TSCA Approval and 40 CFR 761.65 include the DC Loading System, Detonation Chamber (DC), Buffer Tank (BT), Thermal Oxidizer (THO), off-gas treatment system (OTS) and Subpart I container storage areas. The DC scrap bins and associated roll-off containers are dedicated PCB containers that will be decontaminated to meet the PCB decontamination standards of 40 CFR 761.79 as identified in the TSCA Approval or disposed in accordance with Project procedures.

Closure of the SDC 2000 facility will occur after agent operations are complete and will proceed in accordance with this plan, and no partial closure activities are anticipated. Notably, replacement of all or part of an operational Hazardous Waste Management Unit (HWMU) with functionally equivalent equipment or early disassembly and decontamination of obsolete equipment or areas does not constitute closure or partial closure of the unit. Certain pieces of equipment may fail and require replacement during the operating life of the facility (e.g., pumps, valves) and will be replaced as part of routine maintenance activities not related to facility closure.

5.1 Permitted Hazardous Waste Management Units to be Closed

401 KAR 39:090 Section 1; 40 CFR 264.111 and 761.65

This plan is focused on closure of permitted HWMUs that have received and managed hazardous waste and/or PCB waste. Permitted units that manage TSCA-regulated PCB waste are described in Section 5.2 and permitted units that were constructed but never placed into service are discussed in Section 5.3.

The permitted HWMUs are designed, operated, and maintained to prevent releases to the environment, and the expectation at closure of the facility is to clean close the units and verify that hazardous waste management activities at BGCAPP did not result in contamination of the site.

Table 1 lists the RCRA permitted HWMUs that received and managed hazardous waste on or after 24 JAN 2023 and will be closed in accordance with this closure plan.

Table 1 – RCRA-Permitted HWMUs to be Closed

RCRA-Permitted Units to be Closed			
Permit Condition	**40 CFR 264 Subpart I Container Storage Area[1]**	**Type/Amount of Waste Permitted**	**Secondary Containment**
S.III.I.(9)(a)	Earthen Covered Magazine (ECM)	16,000 gallons; GB chemical agent filled M55 rockets with M441 shipping and firing tubes (SFTs) with or without single-round container overpack, containerized chemical agent M56 rocket warheads, and M67 rocket motors contained within wooden storage and shipping crates or overpack containers and separated shipping and firing tube warhead sections	Spill pallets; portable secondary containment units; floor and coatings
S.III.I.(9)(b)	SDC Storage Area	4,000 gallons; Munitions items to be treated and various process wastes and secondary wastes that will be generated at the facility	Spill pallets; portable secondary containment units
S.III.I.(9)(c)	OTS Storage Area A	3,500 gallons; secondary wastes generated from operation and maintenance of the SDC facility	Spill pallets; portable secondary containment units
S.III.I.(9)(d)	OTS Storage Area B	40,000 gallons; bulk liquid waste that is discharged from the OTS	Secondary containment integral to the containers; spill pallets
S.III.I.(9)(e)	SDC Debris Area	35,500 gallons; SDC scrap discharge residue – metal munition fragments and ash	N/A
Permit Condition	**40 CFR 264 Subpart J Tank System[3]**	**Type/Amount of Waste Permitted**	**Secondary Containment[2]**
S.III.J.(8)	Bleed Water Tank (BWT)	Not greater than 476 gallons, Spent OTS bulk liquid waste	OTS Room concrete floor, curbs, and coatings
Permit Condition	**40 CFR 264 Subpart X Miscellaneous Unit**	**Type/Amount of Waste Permitted**	**Secondary Containment**
S.III.X(1)	Miscellaneous unit consists of loading system, detonation chamber, buffer tank, scrap chute, and associated equipment prior to the OTS Thermal Oxidizer	GB chemical agent filled M55 rockets with M441 SFTs, containerized chemical agent M56 rocket warheads, uncontaminated GB and VX rocket motors in a SFT and/or overpack container, and secondary wastes consisting primarily of metal.	Coated concrete floor with curb

5.2 Permitted TSCA Units to be Closed

40 CFR 761.65

In addition to RCRA, this closure plan addresses final closure of permitted TSCA storage and processing units at SDC 2000. The PCB storage and processing units are designed, operated, and maintained to prevent releases to the environment, and the expectation at closure of the facility is to clean close the TSCA units and verify that PCB bulk product waste management activities at BGCAPP did not result in contamination of the site.

Table 2 lists the TSCA permitted units that are subject to this closure plan.

Table 2 – TSCA-Permitted Units to be Closed

TSCA-Permitted Units to be Closed		
Area	**Designated Area/Equipment**	**Process or Storage**
Earthen Covered Magazine	ECM - Subpart I Container Storage Area	Storage of M55 rockets and overpacked M55 rocket leakers, separated warhead SFT sections and rocket motors in SFTs prior to treatment
Enclosure Building (EB)	SDC Room - Subpart X Miscellaneous Units (DC and BT, Scrap Discharge System)	Treatment of chemical agent munitions (Rocket Warheads, Rocket Motors, Rockets with and without SRCs), and uncontaminated GB and VX rocket motors in a SFT and/or overpack containers
EB	SDC Room – Subpart I Container Storage	Munitions items to be treated and various process wastes and secondary wastes that will be generated at the facility
Northeast corner of facility	SDC Debris Area – Subpart I Container Storage	SDC scrap discharge residue – metal munition fragments and ash
EB	SDC Room - OTS (Thermal Oxidizer)	Treatment of PCBs in offgas from DC and BT

5.3 Permitted Units Never Placed in Service

401 KAR 39:090 Section 1; 40 CFR 264.111

There are RCRA-permitted units in the SDC 2000 facility that were constructed but never placed into hazardous waste operations. Since hazardous waste was never introduced to these units, they do not meet the definition of a HWMU and do not require RCRA closure.

Permitted units that were never placed in service will be decontaminated as needed (e.g., industrial wastes) in accordance with the DDP and accompanying risk assessment requirements to achieve the designated physical end state of the facility (i.e., demolition or reuse). These units will be assessed for re-use or material salvage value and administratively closed following verification that the units are not regulated by the RCRA Permit. Any of the units that may have been in the proximity of chemical agent will be assessed for agent contamination, decontaminated as necessary, and decommissioned as required for future use or for removal and offsite disposition.

An administrative closure evaluation will be performed in which the operating record will be reviewed to confirm the status, and administrative closure documentation will be placed in the facility operating record stating that no further actions are required for completing closure in accordance with this plan.

Table 3 lists the RCRA-permitted units at the SDC 2000 Facility that were never placed into hazardous waste management service.

Table 3 – RCRA-Permitted HWMUs Never Placed in Service

RCRA-Permitted HWMUs Never Placed in Service			
Permit Condition	**40 CFR 264 Subpart X Miscellaneous Unit**	**Type/Amount of Waste Permitted**	**Secondary Containment**
S.III.X(1)	Miscellaneous units in the ECM consist of the Rocket Warhead Containerization System (RWCS), Rocket Non-Destructive Evaluation (RNDE) System, and Vertical Rocket Cutting Machine (VRCM).	GB chemical agent filled munitions (Rocket Warheads, Rocket Motors, Rockets with and without SRCs), and uncontaminated VX rocket motors in overpacks	Coated concrete floor with curb

5.4 BGCAPP Support Infrastructure

The BGCAPP facility includes structures, systems, and equipment that are shared among the Main Plant, SDC 1200, and SDC 2000. Key infrastructure that is shared among the three agent destruction facilities includes the Laboratory Building (LAB) and Medical Facility, as well as waste management areas including the Chemical Storage Facility (CSF) and Waste Transfer Station (WTS). Closure of these areas is discussed under the Main Plant RCRA closure plan and is not addressed here.

6.0 PRIMARY TYPES OF CONTAMINATION

The original stockpile of chemical weapons included GB, VX, or mustard chemical agent contained in projectiles, rockets, and Department of Transportation (DOT) bottles. These items were stored onsite at BGAD in the Chemical Limited Area (CLA) managed by the BGCA prior to demilitarization. The SDC 2000 facility was constructed specifically to provide a safe alternative method for destroying nerve agent stockpile munitions.

The two primary types of contamination that are associated with demilitarization of chemical weapons at the SDC 2000 facility are nerve agent associated with destruction of M55 rockets and CRWs, and PCBs associated with Shipping and Firing Tubes (SFTs) that are components of the M55 rocket assemblies. The M55 rocket assemblies and CRWs also contain energetic materials (propellant and/or explosive charges) which are fully contained within the rocket assemblies, and the materials are not released until the destruction event within the detonation chamber. Since the energetic materials are fully contained and destroyed within the detonation chamber, contamination from explosives has not occurred outside the detonation chamber. Therefore, energetic materials are not considered to be a significant contaminant that will be encountered during closure.

Spills of industrial materials or agent-derived wastes that occurred throughout operations are cleaned up immediately in accordance with Project procedures (24915-GEN-5PR-00-00018, *Emergency Response Procedure – Blue Grass Chemical Agent-Destruction Pilot Plant*, and related documents) and are not addressed in this closure plan. One-time accidental spills that are cleaned up immediately are not considered significant events that cause contamination to the surfaces of structures, systems, and components (SSCs) or environmental media (i.e., one-time spills are not automatically considered to be categorized as a Solid Waste Management Unit [SWMU]). Minor amounts of hazardous constituents other than chemical agents are likely to be encountered during closure, but the decontamination methods that are effective for the chemical agents will be effective for those contaminants as well.

The following sections identify areas that are likely to be contaminated with chemical agent as closure begins and defines the categories of agent contamination that will be encountered during closure. Areas and equipment within toxic areas of the SDC 2000 are routinely decontaminated during demilitarization operations to minimize or prevent the spread of contamination. The DDP-specific agent contamination status will be captured in the closure planning risk assessment which will be used to guide decontamination and decommissioning activities during the closure period.

6.1 Probable Areas of Agent Contamination

Chemical agent demilitarization and storage activities are constrained to the SDC Room in the SDC Enclosure Building (EB) and the ECM. Demilitarization consists of direct feed of overpacked munitions and munitions components to the DC. Chemical agent cavities are not accessed during the demilitarization process which minimizes the risk of liquid agent contamination at the EB. The ECM was initially permitted for demilitarization activities but has only been used for permitted storage of containerized items within secondary containment. Therefore, there is a low probability of liquid agent contamination of the ECM storage unit. For areas and equipment within the scope of this plan, no agent contamination has occurred outside of engineering controls to date.

Any agent vapor inside the EB or ECM is controlled with a ventilation system and exhausted through carbon filtration systems, and clean air is discharged to the atmosphere. Therefore, interior portions of the carbon filtration systems are potentially contaminated with chemical agent vapor.

Agent-contaminated secondary wastes generated at the SDC 2000 are initially stored within secondary containment in container storage areas at the facility. Therefore, there is a low probability of liquid agent contamination in the permitted storage unit. Containers holding agent-contaminated secondary wastes are routinely transferred and managed at the CSF and WTS prior to off-site treatment and disposal. Closure of the CSF and WTS is addressed within the Main Plant Closure Plan (24915-00-G01-GGPT-00007, *Attachment I – Closure Plan*) and is outside the scope of this plan.

6.2 Categories of Agent Contamination

Chemical agent-contaminated areas and items are subject to Army regulations as well as Kentucky hazardous waste regulations. The following categories of agent contamination support health-based risk assessments in determining how areas and equipment are managed during the closure period to achieve the physical end state configuration of the BGCAPP facility in a manner that is protective of both human health and the environment. Specific decontamination criteria for reuse of potentially agent contaminated equipment, process systems, and areas are provided in document 24915-GEN-5PL-00-00006, *Equipment Decontamination Plan (EDP)*.

6.2.1 Liquid Agent Contaminated

Areas or items that were exposed to liquid agent or agent aerosols are considered contaminated with liquid agent. Chemical agent contamination assessments will be performed through the risk assessment process for areas and items potentially contaminated with liquid agent to verify levels of contamination. If left in place for reuse or demolition, these areas or items require decontamination, removal of absorptive items (e.g., carbon), evaluation and elimination of occluded spaces, and localized headspace monitoring (enclosed to minimize/eliminate airflow) to verify effective decontamination, followed by final unventilated monitoring to the appropriate Airborne Exposure Limit (AEL) for the final end-state (i.e., <1 VSL for all campaign agents for demolition, <1 WPL for reuse under government control, or < GPL for reuse by the general public). Alternatively, these items may be dismantled and decontaminated with methods shown in Appendix A and managed for offsite disposition in accordance with Project procedures (24915-OPS-5PR-00-00023, *Hazardous Waste Management and Hazardous Material Reporting Procedure*; 24915-OPS-5PR-00-00030, *Waste Shipping*; and related documents).

6.2.2 Vapor Agent Contaminated

Items that are exposed to an atmosphere exceeding the IDLH level and items within an uncontrolled environment with potential for vapor exposure are considered to be vapor agent contaminated. Items/areas exposed to an atmosphere above the VSL but below the IDLH are assessed through a health-based risk assessment process to determine whether they are classified as vapor agent contaminated. If left in place for demolition or reuse, vapor agent-contaminated items require decontamination, removal of absorptive items (e.g., carbon), and decontamination verification using unventilated monitoring to the appropriate AEL for final end-state. Alternatively, these items may be dismantled and/or decontaminated with methods shown in Appendix A and managed for offsite disposition in accordance with Project procedures (24915-OPS-5PR-00-00023, *Hazardous Waste Management and Hazardous Material Reporting Procedure* [CDRL D012]; 24915-OPS-5PR-00-00030, *Waste Shipping*; and related documents).

6.2.3 Clean for Unrestricted Use

In accordance with Department of the Army Pamphlet (DA PAM) 385-61, areas maintained in a continuously controlled environment that have never been exposed to agent-vapor concentrations greater than the IDLH may be considered clean based on a risk assessment that addresses, at a minimum, the following factors:

- Temperature during time of exposure
- Type of process, operation, or task applicable to the equipment/area exposed
- Concentration, duration, and frequency of agent exposures
- Materials of construction for equipment/areas exposed to agent vapor
- Historical documentation for similar operations and items
- Type of equipment/area
- Potential contamination based on considerations for the source of vapor and predominant airflow direction

6.2.4 Not Agent Contaminated

Areas and items that have never been in an agent environment or exposed to agent are not agent contaminated. Such items/areas do not require further decontamination or verification with a UMT if removed for reuse or disposal or left in place for demolition.

6.3 Basis of Agent Contamination

The *SDC 2000 Health-Based Risk Assessment* (under development) captures information from spill tracking documentation, event reports, logs, and general operating knowledge to provide a clear picture of areas of known liquid and vapor contamination. The chemical agent exposure history and potential for agent contamination determine the decontamination criteria for release of SSCs for demolition or reutilization. Specific decontamination criteria for reuse of potentially agent-contaminated equipment, process systems, and areas are provided in the EDP.

6.4 PCB Contamination

The SDC 2000 has processed articles that included Shipping and Firing Tubes (SFT) known to contain regulated levels of PCB aroclor 1254. For this reason, the Detonation Chamber (DC) and downstream treatment equipment (i.e., Buffer Tank, Thermal Oxidizer and associated equipment) are considered potentially PCB-contaminated. Other processing equipment may generate fiberglass fragments, cuttings, or dust (collectively referred to as residue) that are defined as a non-liquid PCB bulk product waste.

With the exception of the DC and downstream treatment equipment, the solid physical state of the PCBs in the SFTs and residue prevents contamination of processing equipment and structures beyond the immediate surface(s) in contact with the SFT/residue under ambient temperatures. Based on the physical and chemical properties of the PCB bulk product waste managed at BGCAPP, all surfaces in contact with PCBs (excluding the DC and downstream processing equipment) are considered non-porous for decontamination purposes.

This section identifies areas that are likely contaminated with PCBs and the criteria for determining PCB contamination which will be used to guide decontamination and decommissioning activities during the closure period.

6.4.1 Potential Areas of PCB Contamination

The PCB management areas and processing equipment covered by TSCA closure activities include the various treatment and material handling systems and equipment including robots and conveyors within the EB, and various PCB-item storage areas used for the handling and storage of containerized SFTs and CRWs.

6.4.2 Basis for PCB Contamination

The PCB-contaminated wastes managed at SDC 2000 are the SFTs and the wastes derived from processing them. The SFTs are manufactured products known to contain non-liquid PCBs that are embedded in the resin matrix of the fiberglass tube. The PCB concentration varies within the SFTs, but the mean PCB concentration in the fiberglass material exceeds 50 parts per million (ppm). The SFTs and any residues derived from storage or processing activities are regulated as PCB bulk product waste which are subject to TSCA disposal requirements at 40 CFR 761.62.

7.0 CLOSURE PERFORMANCE STANDARDS

401 KAR 39:090 Section 1; 40 CFR 264.111, 264.601, and 761.65

This closure plan identifies the closure performance standards that must be satisfied to close the facility in a manner that is protective of human health and the environment. The closure performance standards address RCRA, chemical agent, and TSCA closure performance standards, as well as the treatment standards for hazardous debris. Structures, equipment, bases, liners, and other materials containing, or contaminated with, hazardous wastes, waste constituents, or residues must meet the closure performance standards identified in this closure plan to achieve industrial clean closure.

The RCRA closure performance standards may be divided into two parts: the general standards applicable to all permitted TSDFs and the technical standards for specific types of HWMUs located within the facility. Chemical agents and secondary wastes that are derived from their treatment are listed hazardous wastes in the Commonwealth of Kentucky which are also subject to closure performance standards designated by US Army policies and regulations. The chemical agent performance standards are discussed in Section 7.2.

7.1 RCRA Closure Performance Standards

Hazardous waste management units that are required to be closed must satisfy the RCRA regulations for procedural and technical closure requirements. Closure means that a HWMU or <90 day Container Accumulation Area (CAA) has been taken out of service and has met the applicable closure performance standards.

7.1.1 General Performance Standards for RCRA

401 KAR 39:090 Section 1; 40 CFR 264.111, 264.601

This closure plan is designed to ensure that the BGCAPP facility will be closed in a manner that achieves the following:

- Eliminates the need for further maintenance or post-closure care
- Controls, minimizes, or eliminates the escape of hazardous wastes or hazardous constituents from the closed facility to the extent necessary to protect human health and the environment
- Complies with the applicable closure provisions of Commonwealth of Kentucky environmental statutes and regulations (which incorporate, by reference, Federal closure requirements) and 40 CFR Subpart G

As part of meeting these standards for industrial clean closure, BGCAPP will remove all wastes from the closing units and remove or decontaminate all waste residues, contaminated containment system components, contaminated soils (including ground water and any other environmental media contaminated by releases from the closing units), and structures and equipment contaminated with hazardous waste and hazardous constituents.

7.1.2 Technical Performance Standards for RCRA

401 KAR 39:090 Section 1; 40 CFR 264.178, 264.197 and 264.601 – 264.603

The technical performance standards of 40 CFR Subpart G require BGCAPP to close permitted units in a manner that complies with the applicable closure requirements of 264.178 (containers), 264.197 (tank systems), and 264.601 through 264.603 (miscellaneous units). The requirements for meeting the technical performance standards are addressed in the following sections.

7.1.2.1 Subpart I Container Storage Areas – 401 KAR 39:090 Section 1; 40 CFR 264.178

Technical Standard: For closure of Subpart I container storage areas, all hazardous waste and hazardous waste residues must be removed from the containment system. Remaining containers, liners, bases, and soil containing or contaminated with hazardous waste or hazardous waste residues must be decontaminated or removed.

This technical standard will be met by:

- Removal of containers of wastes and portable containments from Subpart I-permitted container storage areas
- Removal of visible waste residues from storage areas and fixed containment systems
- Characterization and offsite disposal of removed wastes at a permitted treatment and/or disposal facility
- Decontamination of agent-contaminated items to meet the applicable closure performance standards in Section 7.2 of this closure plan for items that are to be left in place for demolition or reuse. Decontamination methods are described in Appendix A.
- Dismantlement of container storage areas and removal from site or clean close and leave in place
- Performance of required closure verification (sampling and analysis)
- Placement of supporting documentation in the operating record for closure certification

Soils beneath the permitted container storage areas are not expected to be contaminated. Containments for all Subpart I container storage areas are maintained in good operating condition and are routinely inspected for defects in accordance with the applicable requirements of the RCRA Permit to prevent releases to the environment. The results of the inspections are maintained in the facility operating record and will be reviewed at closure along with performing a visual inspection of the containments to identify cracks, defects, or damage that would have allowed hazardous waste or hazardous constituents to reach the underlying soils if contaminated liquids had been present during the operating life of the facility. Following this review or during progression of closure, it is possible that BGCAPP may discover an area having a probable release of a hazardous waste or hazardous constituent (i.e., an area of concern [AOC]) that needs to be investigated. In such an event, a remediation plan will be developed for KDEP approval which will address sampling and analysis for the investigation and remediation of the AOC. The remediation plan will draw upon the constituent of potential concern (COPC) lists, Closure Target Levels, and general sampling and analysis methodology contained in the SDC 2000 CVQAPP but will be prepared and submitted for approval independent of the CVQAPP.

The closure process for Subpart I container storage areas is provided in Section 8.3.1.

7.1.2.2 Subpart J Tank Systems – 401 KAR 39:090 Section 1; 40 CFR 264.197

Technical Standard: At closure of a tank system, the owner or operator must remove or decontaminate all waste residues, contaminated containment system components, contaminated soils, and structures and equipment contaminated with waste, and manage them as hazardous waste unless 40 CFR 261.3(d) applies. If any contaminated soils beneath the tank system cannot be removed or decontaminated, then the owner or operator must close the unit and perform post closure care.

This technical standard will be met by:

- Removal of wastes and waste residues from Subpart J-permitted tanks and associated ancillary equipment
- Characterization and offsite disposal of removed wastes at a permitted treatment and/or disposal facility
- Decontamination of agent-contaminated items to meet the applicable closure performance standards in Section 7.2 of this closure plan for items that are to be left in place for demolition or reuse. Decontamination methods are described in Appendix A.
- Dismantlement of the tank system and removal from site or clean close and leave in place
- Performance of required closure verification (sampling and analysis)
- Placement of supporting documentation in the operating record for closure certification

Soils beneath the permitted tank systems are not expected to be contaminated. Containments for Subpart J tank systems are maintained in good condition and are routinely inspected for defects in accordance with the applicable requirements of the RCRA Permit to prevent releases to the environment. The results of the inspections are maintained in the facility operating record and will be reviewed at closure along with performing a visual inspection of the containments to identify cracks, defects, or damage that would have allowed hazardous waste or hazardous constituents to reach the underlying soils if contaminated liquids had been present during the operating life of the facility. Following this review or during progression of closure, it is possible that BGCAPP may discover an area having a probable release of a hazardous waste or hazardous constituent (i.e., an AOC) that needs to be investigated. In such an event, a remediation plan will be developed for KDEP approval which will address sampling and analysis for the investigation and remediation of the AOC. The remediation plan will draw upon the COPC lists, Closure Target Levels, and general sampling and analysis methodology contained in the SDC 2000 CVQAPP but will be prepared and submitted for approval independent of the CVQAPP.

The closure process for Subpart J Tank Systems is provided in Section 8.3.2.

7.1.2.3 Subpart X Miscellaneous Units – 401 KAR 39:090 Section 1; 40 CFR 264.601-603

Technical Standard: For closure of Subpart X Miscellaneous Units, hazardous waste and hazardous waste residues must be removed, and the units must be closed in a manner that will ensure protection of human health and the environment. If any contaminated soils beneath the Subpart X unit cannot be removed or decontaminated, then the owner or operator must close the unit and perform post-closure care.

This technical standard will be met by:

- Removal of wastes and waste residues from Subpart X-permitted units and associated equipment (e.g., conveyors and THS equipment)
- Characterization and offsite disposal of all removed wastes at a permitted treatment and/or disposal facility
- Decontamination of agent-contaminated items to meet the applicable closure performance standards in Section 7.2 of this closure plan for items that are to be left in place for demolition or reuse. Decontamination methods are described in Appendix A.
- Dismantlement of the miscellaneous unit and associated equipment, and removal from site or clean close and leave in place
- Performance of required closure verification (sampling and analysis)
- Placement of supporting documentation in the operating record for closure certification

The active Subpart X Miscellaneous Units at the SDC 2000 facility are located within the secondary containment system shared with other permitted hazardous waste management units. Soils beneath the miscellaneous units are not expected to be contaminated. Containments for Subpart X Miscellaneous Units are maintained in good condition and are routinely inspected for defects in accordance with the applicable requirements of the RCRA Permit to prevent releases to the environment. The results of the inspections are maintained in the facility operating record and will be reviewed at closure along with performing a visual inspection of the containments to identify cracks, defects, or damage that would have allowed hazardous waste or hazardous constituents to reach the underlying soils if contaminated liquids had been present during the operating life of the facility. Following this review or during progression of closure, it is possible that BGCAPP may discover an area having a probable release of a hazardous waste or hazardous constituent (i.e., an AOC) that needs to be investigated. In such an event, a remediation plan will be developed for KDEP approval which will address sampling and analysis for the investigation and remediation of the AOC. The remediation plan will draw upon the COPC lists, Closure Target Levels, and general sampling and analysis methodology contained in the SDC 2000 CVQAPP but will be prepared and submitted for approval independent of the CVQAPP.

The Closure Process for Subpart X Miscellaneous Units is provided in Section 8.3.3.

7.1.2.4 Large Quantity Generator Accumulation Units – 401 KAR 39:080 Section 1, 40 CFR 262.17(a)(8)

The large quantity generator (LQG) closure performance standards apply to <90-day CAAs that were established during the operating life of the facility on or after the effective date of the Hazardous Waste Generator Improvements Rule (GIR) at 401 KAR 39:080 which was July 1, 2018. The operating life of the facility includes construction, startup, systemization, operation, and closure of the facility. During the operating life of the SDC 2000, BGCAPP operated CAAs and placed notices in the operating record to track the operating history and location of these units beginning with the GIR effective date. When an individual unit is closed, the notices in the operating record satisfy the applicable requirements of 40 CFR 262.17(a)(8)(i)(A).

BGCAPP also operated SAAs in accordance with 40 CFR 262.15 during the operating life of the facility. However, SAAs are exempt from the closure performance standards of 40 CFR 262.17(a)(8) as stated in 40 CFR 262.17(a)(8)(v). The location and operation of the SAAs are tracked in the operating record, and each SAA will be removed from service in accordance with 24915-OPS-5PR-00-00023, *Hazardous Waste Management and Hazardous Material Reporting Procedure*.

BGCAPP will meet the closure performance standards for CAAs by closing the waste accumulation areas in a manner that:

- Minimizes the need for further maintenance by controlling, minimizing, or eliminating, to the extent necessary to protect human health and the environment, the post-closure escape of hazardous waste, hazardous constituents, leachate, contaminated run-off, or hazardous waste decomposition products to the ground or surface waters or to the atmosphere [40 CFR 262.17(a)(8)(iii)(A)(1)]
- Removes or decontaminates contaminated equipment, structures, and soil and any remaining hazardous waste residues from waste accumulation units including containment system components (e.g., pads, liners), contaminated soils and subsoils, bases, and structures and equipment contaminated with waste unless § 261.3(d) of this chapter applies [40 CFR 262.17(a)(8)(iii)(A)(2)]
- Any hazardous waste generated in the process of closing either the generator's facility or unit(s) accumulating hazardous waste must be managed in accordance with all applicable standards of parts 262, 263, 265 and 268 of 40 CFR, including removing any hazardous waste contained in these units within 90 days of generating it and managing these wastes in a RCRA Subtitle C hazardous waste permitted treatment, storage and disposal facility or interim status facility [40 CFR 262.17(a)(8)(iii)(A)(3)].

For closure of CAAs, all containers, hazardous waste and hazardous waste residues must be removed from the containment system. Remaining liners, bases, and soil containing or contaminated with hazardous waste or hazardous waste residues must be decontaminated or removed.

These performance standards will be met by:

- Removal of all containers of wastes and portable containments from LQG container storage areas
- Removal of all visible waste residues from storage areas and fixed containment systems
- Characterization and offsite disposal of removed wastes at a permitted treatment and/or disposal facility
- Performance of an agent risk assessment in container storage areas that may have been exposed to chemical agent
- Decontamination of agent-contaminated items to meet health-based screening levels in Section 7.2 of this closure plan for items that are to be left in place for demolition or reuse.

  Decontamination methods are described in Appendix A.
- Decontamination of PCB-contaminated items to meet health-based screening levels for items that are to be left in place for demolition or reuse.

  Decontamination methods are described in Appendix A.
- Performance of closure verification inspections of the storage area
- Placement of supporting documentation in the operating record for closure certification

In general, if an LQG has been managing its hazardous waste CAAs in accordance with the provisions of 40 CFR 262.17 including proper accumulation standards and spill clean-up, then clean closure will consist of removing the containers from the accumulation area. At a minimum, CAAs will be visually inspected for contamination, and any residues will be removed and managed in accordance with Project procedures (24915-OPS-5PR-00-00023, *Hazardous Waste Management and Hazardous Material Reporting Procedure*).

In accordance with the applicable requirements of 40 CFR 262.17, CAAs are inspected weekly to verify that the containers are in good condition and do not show signs of leakage. Any leaks or deficiencies discovered during the inspection are corrected immediately. Additionally, containers are kept in spill pallets or other containment devices to prevent releases to the environment.

At closure of the facility, BGCAPP will satisfy the notification requirements of 40 CFR 262.17(a)(8)(ii) and meet the closure performance standards of 40 CFR 262.17(a)(8)(iii) for closure of CAAs. The Project did not operate <90-day hazardous waste tanks, containment buildings, or drip pad units, and the closure requirements for those units are not applicable.

The notification requirements will be met by notifying the Director at least 30 days prior to closing the facility, and BGCAPP will notify the Director within at least 90 days after complying with facility closure performance standards of 40 CFR 262.17(a)(8)(iii). The CAA units may be closed sequentially or in parallel as the needs of the facility change during RCRA closure of the facility. In accordance with 40 CFR 262.17(a)(8)(ii)(B), BGCAPP will notify the Director if the closure performance standards for CAAs cannot be met.

For closure of an individual CAA, all containers of hazardous waste and any visible residues will be removed and managed in accordance with Project procedures (24915-OPS-5PR-00-00023, *Hazardous Waste Management and Hazardous Material Reporting Procedure*; 24915-OPS-5PR-00-00030, *Waste Shipping*; and related documents). After the containers are removed, a visual inspection of the areas will be conducted to verify that there are no signs of leaks or spills that would have allowed hazardous waste or hazardous constituents to reach the underlying surfaces or soils. Following this review or during progression of closure, it is possible that BGCAPP may discover an area having a probable release of a hazardous waste or hazardous constituent (i.e., an AOC) that needs to be investigated. In such an event, a remediation plan will be developed for KDEP approval which will address sampling and analysis for the investigation and remediation of the AOC. The remediation plan will draw upon the COPC lists, Closure Target Levels, and general sampling and analysis methodology contained in the SDC 2000 CVQAPP but will be prepared and submitted for approval independent of the CVQAPP.

The expectation at closure of the facility is to clean close the CAAs by verifying that container accumulation activities at BGCAPP did not result in contamination of the site.

7.2 Closure Performance Standards for Chemical Agent

401 KAR 39:090 Section 1; 40 CFR 264.111

This section defines the closure performance standards for chemical agent-contaminated SSCs that will ensure applicable HWMUs are closed in a manner that is protective of human health and the environment and eliminates the need for post-closure care. These closure performance standards are based on the RCRA industrial closure performance standards and the health-based criteria established in Department of the Army (DA) documents including *Implementation Guidance Policy for Revised Airborne Exposure Limits for GB, GA, GD, GF, VX, H, HD, and HT* (DA, 2004) and *Derivation of Health-Based Environmental Screening Levels for Chemical Warfare Agents* (U.S. Army Center for Health Promotion and Preventive Medicine,1999). The health-based criteria for chemical agent have been incorporated into DA Pamphlet (DA PAM) 385-61, *Toxic Chemical Agent Safety Standards*, and are applicable to the reuse and disposal of potentially contaminated facilities, items, and materials associated with chemical agent facilities and operations.

Agent-contaminated items that are considered for reuse are addressed by the BGCAPP EDP which has been approved by the KDEP Division of Waste Management. The EDP outlines agent decontamination criteria and monitoring levels for each applicable airborne exposure limit (AEL) that are protective of both human health and the environment such that agent-exposed materials may be safely reused. Release criteria for decontaminated facilities deemed appropriate for reuse after completion of closure are also addressed in the EDP. SSCs that are reused and satisfy the decontamination requirements of both DA PAM 385-61 and the EDP are considered clean closed for the purpose of meeting chemical agent closure performance standards. Reuse of potentially contaminated items is further discussed in Section 8.6.

The closure performance standard for chemical agent contamination is effective decontamination which is demonstrated with physical sampling and/or airborne agent monitoring to meet the appropriate AELs for the designated end state. The ECM, EB, and associated exhaust filtration systems will undergo decontamination and decommissioning followed by monitoring to the appropriate AEL for reuse or demolition. Prior to demolition, SSCs decontaminated for their agent contamination must be cleared to less than (<) 1 VSL screening criterion with headspace monitoring or UMT as described in Section 11.0. Demolition debris that has met the treatment standards in this plan (Section 7.4) and has been successfully verified to meet the UMT clearance criteria may be managed as non-hazardous debris and either disposed in a Subtitle D landfill or sent for resource recovery. Systems, structures, and components decontaminated for their agent contamination must be cleared to < 1 WPL for reuse by a government entity or < 1 GPL for reuse by the general public with headspace monitoring or UMT as described in Section 11.0.

7.3 Closure Performance Standards for TSCA

40 CFR 761.61, 761.65 and 761.79

The applicable requirements of 40 CFR 761.65(e) establish the closure performance standards for storage and processing units that are subject to the provisions of the TSCA Approval. The closure performance standards require permitted TSCA units to be closed in a manner that eliminates the potential for post-closure releases of PCBs which may present an unreasonable risk to human health or the environment. If any contaminated soils beneath the permitted TSCA units cannot be removed or decontaminated, then the owner or operator must close the unit and perform post-closure care. These standards will be met by:

- Removal of PCB bulk product waste and waste residues from TSCA permitted units and associated ancillary equipment

- Characterization and offsite disposal of all removed wastes as required by 40 CFR 761.62
- Performance of a contamination assessment of any units that may have been exposed to PCB bulk product waste
- Decontamination of PCB-contaminated items to meet PCB remediation waste cleanup levels for high-occupancy areas for items that are to be left in place
- Dismantlement of the storage and processing units and removal from site or industrial clean closure and left in place
- Performance of required closure verification sampling and analysis
- Placement of supporting documentation in the operating record for closure certification

Soils beneath the permitted TSCA units are not expected to be contaminated as a result of operations, and no post-closure care related to management of PCBs is anticipated. Containments for all TSCA units are maintained in good condition and are routinely inspected for defects in accordance with the requirements of the TSCA Approval and the RCRA Permit to prevent releases to the environment. The results of the inspections are maintained in the facility operating record and will be reviewed at closure along with performing a visual inspection of the containments to identify cracks, defects, or damage that would have allowed hazardous waste or hazardous constituents to reach the underlying soils if contaminated liquids had been present during the operating life of the facility. Following this review or during progression of closure, it is possible that BGCAPP may discover an area having a probable release of a hazardous waste or hazardous constituent (i.e., an AOC) that needs to be investigated. In such an event, a remediation plan will be developed for KDEP approval which will address sampling and analysis for the investigation and remediation of the AOC. The remediation plan will draw upon the COPC lists, Closure Target Levels, and general sampling and analysis methodology contained in the SDC 2000 CVQAPP but will be prepared and submitted for approval independent of the CVQAPP.

Descriptions of how TSCA-permitted units will be closed are discussed in Section 8.3.9.

7.4 Closure Performance Treatment Standards for Hazardous Debris

The closure performance treatment standards for hazardous debris are technology-specific standards which apply to solid materials that are intended to be discarded, and they are not applicable to SSCs that will be reused or remain in place following closure. The Project may utilize physical or chemical extraction technologies listed in 40 CFR 268.45, Table 1, Parts A.1 and A.2.a, to achieve the treatment standards for decontamination of hazardous debris. The extraction technologies that BGCAPP has selected for treating hazardous debris are summarized in Appendix B of this closure plan.

The physical extraction technologies include abrasive blasting, scarification, grinding, planing, spalling, vibratory finishing, and high-pressure steam/water sprays. For these technologies, the performance standards are based on removal of the contaminated layer of the debris. There are no restrictions on the type of contaminant being treated with these technologies because they are physically removed, and this separates the contaminated layer from the non-hazardous component of the debris. In addition, any debris type may be treated with these technologies provided that the contaminated layer is removed.

The chemical extraction technology selected by BGCAPP is water washing and spraying. The performance standards for this technology are based on dissolution of the contaminants into the cleaning solution and a clean debris surface. Complete removal of the outer debris layer is not intended with this technology, and it is most effective on non-porous debris. Water sprays or baths will effectively treat debris alone or when combined with caustic, surfactants, detergents, and/or other chemicals that enhance the effectiveness of the technique.

Hazardous debris that is successfully decontaminated with extraction technologies described in Appendix B of this closure plan may be excluded from Subtitle C regulation under the conditioned exclusion for treated debris at 40 CFR 268.45(c). Those items that are eligible for this exclusion may be recycled or disposed of in Subtitle D landfills provided that the treated debris also satisfies the applicable chemical agent and TSCA closure performance standards of Sections 7.2 and 7.3.

The specific application of the closure performance treatment standards for hazardous debris are described in the following sections.

7.4.1 Treatment Standards for Concrete Debris

In the event the SDC 2000 is demolished for off-site disposal, a significant quantity of the waste produced will be rubblized concrete and other obsolete structures associated with the management of hazardous waste. Based on routine operations, containment systems are not generally exposed to potential liquid agent contamination. Instead, liquid agent is effectively contained within the munitions until treatment within the detonation chamber. Concrete elements within the SDC 2000 that may be exposed to agent are covered with a protective coating that provides a barrier to prevent penetration of agent and other hazardous wastes into the concrete. Spills are cleaned up immediately in accordance with Project procedures (24915-OPS-5PR-80-00003, *SDC 2000 Environmental Inspections*; 24915-00-G01-GGPT-00005, *Attachment F – Procedures to Prevent Hazards*; and related documents), which prevents penetration of the concrete surfaces.

The hazardous debris treatment standards are technology-specific performance standards rather than numerical concentration performance standards. Thus, analysis of the treated debris for determining concentrations of hazardous constituents is generally not necessary. In the case of concrete that may have been exposed to liquid agent, the effectiveness of the extraction technologies will be verified with sampling and analysis as prescribed in the CVQAPP. Results of the sampling and analysis will be used to assist in determining how demolition debris will be managed. Although highly unlikely to occur at SDC 2000, liquid agent-contaminated concrete demolition debris that clears the non-hazardous waste control limits (NHWCL) for applicable chemical agent concentrations specified in U.S. Army Public Health Command (USAPHC) Chemical Agent Health Based Standards and Guidelines must also satisfy the closure performance standards of Section 7.2 and 7.3 and meet the agent screening criterion of < 1 VSL prior to disposal in a Subtitle D landfill. Eligible material from demolition of decontaminated SSCs that meet these closure performance standards may be sent offsite for concrete rubble recycling or scrap metal recovery.

The criteria for disposition of concrete debris as a recyclable material or disposal in a Subtitle D landfill is described in the following sections.

7.4.1.1 Concrete Exposed to Chemical Agent

Procedure 24915-OPS-5PR-80-00007, *SDC 2000 Procedure, Tracking Agent-Contaminated and Decontamination Areas*, establishes the method of tracking areas and equipment in the SDC 2000 that become contaminated with chemical agent during operations. The agent contamination history along with decontamination activities is captured in the facility operating record (e.g., 24915-TEMPLATE-02132, *SDC 2000 – Tracking Agent Contaminated and Decontaminated Areas Log Sheet*). The agent contamination history along with decontamination activities is captured in the facility operating record and the Health-Based Risk Assessment (HBRA) that is currently under development for closure of the SDC 2000. Documentation for decontamination, decontamination verification, and/or removal of agent-contaminated areas/equipment is maintained in the operating record and will be provided to support clean closure.

BGCAPP may decontaminate agent contaminated coatings and concrete surfaces with any of the methods described in Appendix A followed by treatment with one or more of the extraction technologies summarized in Appendix B to achieve the treatment standards for reuse or debris disposal in a Subtitle D landfill or resource recovery as recycled concrete. The hazardous debris performance standard for coated concrete is achieved when the upper surfaces are treated using any of the extraction technologies described in Appendix B, and the treatment results in a “clean debris surface” with agent screening to the appropriate screening level required for reuse or demolition. The concrete surfaces are equipped with chemical resistant coatings that are designed to provide a protective barrier for the concrete. If required to meet agent screening criteria, scabbling may be used to remove surfaces or layers of concrete. If scabbling is required to achieve agent screening success, at least ¼ inch of the surface layer will be removed. Treatment residuals from physical removal of the contaminated layer will be managed in accordance with Project procedures (24915-OPS-5PR-00-00023, *Hazardous Waste Management and Hazardous Material Reporting Procedure*; 24915-OPS-5PR-00-00030, *Waste Shipping*; and related documents).

Confirmation sampling and analysis will be conducted as prescribed in the CVQAPP along with headspace monitoring or UMTs to verify that agent-exposed concrete has been successfully decontaminated for disposal in a Subtitle D landfill. If the analytical results indicate that the clean closure thresholds are exceeded, the affected area may be decontaminated again until favorable results are attained, or the concrete may be disposed as hazardous waste in accordance with Project procedures (24915-OPS-5PR-00-00023, *Hazardous Waste Management and Hazardous Material Reporting Procedure*; 24915-OPS-5PR-00-00030, *Waste Shipping*; and related documents). The Subtitle D landfill disposal criteria and resource recovery criteria for treated concrete debris also requires that the debris satisfy the applicable closure performance standards of Sections 7.2 and 7.3.

7.4.1.2 Concrete that is Not Agent Contaminated

Concrete elements used for waste management (e.g., containments, floors, curbs, pads) that are not agent contaminated are sealed with protective coatings to prevent contamination from hazardous wastes. Waste containers and permitted Subpart J tanks in these areas are managed to prevent releases and the areas are routinely inspected for signs of leaks and spills. Spills and releases are cleaned up immediately in accordance with Project procedures (24915-OPS-5PR-80-00003, *SDC 2000 Environmental Inspections*), and no process related hazardous wastes are expected in these areas.

The concrete elements in these areas are not expected to be contaminated, but each area will be evaluated as closure progresses to identify potential contamination. If any of these concrete elements are determined to be contaminated with hazardous constituents, BGCAPP may decontaminate the areas with any of the methods described in Appendix A followed by treatment with appropriate extraction technologies in Appendix B to eliminate contamination prior to reuse or demolition. Treatment residuals will be managed in accordance with Project procedures (24915-OPS-5PR-00-00023, *Hazardous Waste Management and Hazardous Material Reporting Procedure* [CDRL D012]; 24915-OPS-5PR-00-00030, *Waste Shipping*; and related documents).

The Subtitle D landfill disposal and resource recovery criteria for treated concrete debris also requires that the treated debris satisfy the applicable closure performance standards of Sections 7.2 and 7.3 have been met. Eligible material from demolition of decontaminated SSCs may be shipped offsite as recycled concrete rubble or scrap metal.

7.4.2 Treatment Standards for Non-porous Debris

The hazardous debris treatment standard for non-porous materials is achieved when the upper surfaces are treated using any of the extraction technologies described in Appendix B and the treatment results in a “clean debris surface.” An effective extraction technology used for decontamination of non-porous components (e.g., carbon steel SSCs) involves the use of high-pressure steam and water sprays which is fully described in 40 CFR 268.45, Table 1, Part A.1.e, as the “Application of water or steam sprays of sufficient temperature, pressure, residence time, agitation, surfactants and detergents to remove hazardous contaminants from debris surfaces or to remove contaminated debris surface layers.” Other physical extraction technologies or the chemical extraction technology described below may also be used if high-pressure spray is not sufficient for cleaning non-porous surfaces. Treatment residuals will be managed in accordance with Project procedures (24915-OPS-5PR-00-00023, *Hazardous Waste Management and Hazardous Material Reporting Procedure* [CDRL D012]; 24915-OPS-5PR-00-00030, *Waste Shipping*; and related documents).

Process equipment and components will be disassembled as necessary to expose contaminated surfaces to high-pressure spray or other extraction technologies. Surfaces will be inspected to verify that the clean debris surface standard has been achieved. If the surfaces are determined to fail the clean debris surface standard, they may be subjected to additional high-pressure spray or other extraction technologies until compliance is achieved or, alternatively, the item may be shipped offsite to a permitted disposal facility in accordance with Project procedures (24915-OPS-5PR-00-00023, 24915-OPS-5PR-00-00030, and related documents).

Appendix B also describes the chemical extraction technology that has been considered for use during closure of the SDC 2000 facility. The technology is “water washing and spraying” which is described as the “Application of water sprays or water baths of sufficient temperature, pressure, residence time, agitation, surfactants, acids, bases, and detergents to remove hazardous contaminants from debris surfaces and surface pores or to remove contaminated debris surface layers” (40 CFR 268.45, Table 1, Part A.2.a). Treatment residuals generated from this extraction technology will be managed in accordance with Project procedures (24915-OPS-5PR-00-00023, 24915-OPS-5PR-00-00030, and related documents).

Decontamination of SSCs using the "water washing and spraying" extraction technology will be accomplished in open vessels within engineering controls if they are potentially contaminated with chemical agent. Any material decontaminated using this treatment technology will be in contact with the solution not less than 15 minutes before it is visually inspected. If the inspection indicates the item does not achieve the clean debris surface standard, it may be treated again or shipped offsite for disposal in accordance with Project procedures. Items that cannot be reasonably disassembled for decontamination and for inspection of the inner and outer surfaces to ensure that the clean debris surface standard has been achieved may be shipped offsite for disposal in accordance with Project procedures (24915-OPS-5PR-00-00023, 24915-OPS-5PR-00-00030, and related documents).

Confirmation sampling and analysis will be conducted as prescribed in the CVQAPP and through headspace monitoring or UMTs to verify non-porous debris has been successfully decontaminated for reuse or disposal in a Subtitle D landfill or resource recovery as recycled concrete. If the results indicate that clean closure thresholds are exceeded, the affected debris may be decontaminated again until favorable results are attained or the non-porous debris may be disposed as a hazardous waste in accordance with project procedures (24915-OPS-5PR-00-00023, 24915-OPS-5PR-00-00030, and related documents). The Subtitle D landfill disposal and resource recovery criteria for treated debris also requires that the debris satisfy the applicable closure performance standards of Sections 7.2 and 7.3.

7.4.3 Treatment Standards for Porous Debris

Porous materials are typically identified during the decontamination and decommissioning process and may be removed from SSCs and disposed prior to performing treatment of hazardous debris. All porous materials exposed to liquid agent or vapor agent greater than IDLH levels will be evaluated in a risk assessment and removed (as necessary) during initial closure activities. If there are cases where porous material must be treated to meet the disposal criteria for hazardous debris, the following requirements apply. Porous materials may be size reduced into manageable pieces (no more than ½ inch in one dimension) and decontaminated using the "water washing and spraying" technology described in Appendix B (40 CFR 268.45, Table 1, Part A.2.a). The decontaminated portion of the porous material will then be visually inspected to verify that it is reasonably free of particles and contaminants characteristic of the material in contact with the debris. If the porous material does not meet that requirement, it may be subjected to further decontamination until it does comply with that requirement or, alternatively, it may be shipped offsite as hazardous waste in accordance with Project procedures (24915-OPS-5PR-00-00023, *Hazardous Waste Management and Hazardous Material Reporting Procedure*; 24915-OPS-5PR-00-00030, *Waste Shipping*; and related documents).

Confirmation that the treatment is effective for decontamination of agent contaminated items will be performed with headspace monitoring or UMTs to verify that the porous debris has been successfully decontaminated for disposal in a Subtitle D landfill or for resource recovery. If the monitoring results indicate that agent vapor thresholds are exceeded, the affected area may be decontaminated again until favorable results are attained, or the debris may be disposed as a hazardous waste in accordance with project procedures (24915-OPS-5PR-00-00023, 24915-OPS-5PR-00-00030, and related documents). The Subtitle D landfill disposal and resource recovery criteria for porous debris also requires that the applicable closure performance standards of Sections 7.2 and 7.3 have been met.

7.5 Alternative Clean Closure Performance Standard

For any of the permitted units subject to closure, BGCAPP may choose to decommission the item and send all or part of it offsite for disposal as hazardous waste or hazardous debris or send eligible material offsite as recyclable resources in accordance with Section 8.6.8. Off-site disposition of permitted units or components may be selected as a clean closure performance standard instead of performing decontamination to satisfy the industrial closure performance standards described above. Notwithstanding industrial clean closure requirements applicable to any portion of the permitted unit that remains on site (e.g., containment systems), removal and proper offsite disposition (disposal or recycling) of all or part of the permitted unit constitutes clean closure of the item sent off site.

8.0 CLOSURE PLAN

401 KAR 39:090 Section 1; 40 CFR 264.112(a) and 761.65

This plan addresses the requirements for closure of RCRA- and TSCA-permitted units and supplemental equipment at the SDC 2000 with emphasis on units that have received and managed hazardous waste during the active life of the facility. Permitted units that have never received or managed hazardous waste are outside the scope of RCRA and TSCA closure and will be administratively closed as described in Section 5.3.

8.1 Content of Plan

401 KAR 39:090 Section 1; 40 CFR 264.112(b) and 761.65

In accordance with the requirements of 40 CFR 264.112(b), this closure plan identifies the steps necessary to perform partial and final closure of the RCRA-permitted units at any point during the active life of the facility. The active life is the period beginning with the initial receipt of hazardous waste at the facility and ending when the Director receives certification of final closure.

8.2 Closure Planning and Execution

401 KAR 39:090 Section 1; 40 CFR 264.112(b) and 761.65

The BGCAPP closure process is a systematic approach to closure that combines planning, implementation, and reporting activities to ensure that closure performance standards are met in a safe and efficient manner, and adequate documentation is available to support closure certification. This process utilizes Project-level documents and recordkeeping practices that are available for inspection by the Director.

8.2.1 Decontamination and Decommissioning Packages

Decontamination and decommissioning packages (DDPs) define the boundaries and scope of closure work to be performed for decontamination and decommissioning of permitted units. The DDPs identify the activities and steps required for decontamination and decommissioning of HWMUs and associated ancillary equipment described in this closure plan.

Because of the interdependence of many of the systems and structures within the SDC 2000 facility, DDP boundaries may be defined by system, room, or area as deemed necessary to maintain control of plant systems and configuration management. For example, ancillary equipment such as piping are spread throughout multiple areas of the facility and shared by multiple permitted units that require closure. These systems must remain operational until the last shared system is no longer needed to maintain safe configuration of the plant. One or more DDPs may be required to address complete closure of some permitted units. DDPs will be developed in accordance with 24915-GEN-5PR-00-00046, *Development of Decontamination and Decommissioning Packages*.

8.2.2 Closure Planning and Risk Assessment

An assessment of agent contamination will be performed for systems, areas, or rooms to support the DDP planning activities. The risk assessment considers historical information regarding the exposure of equipment to chemical agents and will reference the contamination history (where applicable), determine a contamination potential (liquid, vapor, or none), and establish a decontamination regimen and clearance monitoring requirements.

The risk assessment summarizes the process applied in determining decontamination and decontamination-verification release criteria of equipment and areas used to support agent operations with the potential for agent contamination. Areas that have no potential for agent contamination are not included. The risk assessments define the boundary for potential agent contamination and specify decontamination, decontamination-verification criteria, and disposition options in accordance with the EDP; 24915-OPS-5PR-00-00043, *Decontamination Process*; and 24915-OPS-5PR-00-00023, *Hazardous Waste Management and Hazardous Material Reporting Procedure* (CDRL D012).

For each area, this risk assessment provides the following:

- The tasks and activities performed in each area
- A summary of equipment and material included in each area
- The type and level of agent air monitoring performed within the area
- A listing of any liquid-agent spills that may have occurred or potential for liquid-agent contamination based on specific activities conducted within that area
- A summary of agent-vapor concentrations observed during operations
- Information on historical decontamination efforts conducted within that specific area

8.2.3 Engineering Design Change Documentation

Engineering will develop design change documents and other technical guidance to reflect the scope of work and required isolation/de-energization of equipment defined in the DDP. The design change documents will be the basis for developing work packages and work orders for executing closure work. As BGCAPP will remain an operating facility for much of closure, plant configuration management will be controlled as systems are incrementally removed from service during the decommissioning process. The BGCAPP configuration management process ensures that design changes to any portion of the facility are performed in a controlled manner to prevent disruption of systems that are required for continued safe operation of the plant. The design change packages associated with closure activities will be prepared and issued in accordance with the rigor described in Project configuration management protocols and procedures (24915-000-G01-GAM-00011, *Configuration Management Plan*; 24915-00-GPP-GAM-00006, *Configuration Management Process and Configuration Control Board*; and related documents). The design change process and the configuration management requirements are maintained at the Project document level (24915-SYS-5PR-00-00042, *System Change Request*).

Engineering design change documents for RCRA closure will be prepared under the System Change Request (SCR) process which throughout operations has generated numerous documents that became the basis for modifications to the RCRA and TSCA permits. During the facility closure period, the Director will be notified when a permitted HWMU is taken out of service and designated for closure in accordance with Section 17.0. At that time, the closure SCRs for that permitted HWMU can be implemented. The SCRs are Project-controlled documents (24915-GEN-5PR-00-00042) that will be distributed and archived by the Project Document Control Center (24915-000-2KP-A03-00001, *Records Management and Document Control*). Archived documents can be retrieved for closure certification purposes.

Once approved by BPBG Engineering, the closure SCRs are the authorizing documents for proceeding with changes to plant configuration to support decommissioning activities. It is anticipated that multiple SCRs will be issued for each DDP. All work performed under the SCRs will be recorded and archived in the operating record for future retrieval to support closure certification.

8.2.4 Work Orders

The DDPs and SCRs will be used as the planning documents that describe the field work to be performed on the various systems/rooms/areas/buildings undergoing closure. Work to be performed in the field will be executed under the direction of a work order. Work orders identify resources, work controls, tools, and equipment that is required for performing closure-related work. In addition to defining the steps associated with decontamination, disassembly, monitoring or sampling, closure work orders may include specific line items for collecting information to support closure certification.

Work controls specified within the work order address applicable workspace agent-vapor monitoring requirements in addition to other hazards, including hazardous energy control, hot work, confined space, scaffolding/work platforms, and hazardous materials control. Completed work orders contain a record of the work that was accomplished in the field as well as the as-left condition of the SSC that was being worked. Work orders and records of the work performed are Project-controlled documents (24915-WCG-5PR-00-00001, *Work Control, Work Order [WO] Process*) that are maintained in the operating record for future retrieval to support closure certification.

8.3 Description of How Each Permitted Unit will be Closed

401 KAR 39:090 Section 1; 40 CFR 264.112(b)(1) and (b)(2), 270.23(a)(2), 761.65(e)

This section provides a description of activities that will be performed at each area/unit. This information is reflected in DDPs which also define the boundaries and scope of closure work to be performed for decontamination and decommissioning of permitted units.

Engineering will develop design change documents and other technical guidance to reflect the scope of work and the required isolation/de-energization of equipment defined in the DDP. The DDPs and the design change documents will be the basis for developing work orders for executing closure work in the field. Because closure of each HWMU must ultimately be certified by a registered Professional Engineer at the conclusion of final closure activities, records pertaining to the disassembly, decontamination, treatment, and disposition of the HWMU will be retained in the facility operating record for future retrieval.

8.3.1 Closure of Subpart I Container Storage Areas

This section describes how the technical performance standards identified in Section 7.1.2.1 for closure of container storage areas will be achieved, and it addresses the permitted units that are identified in Table 1.

The SDC 2000 facility has five permitted Subpart I container storage areas: two areas inside the EB and three areas outside on the facility footprint. The two areas located inside the EB are the SDC storage area and the OTS storage area A. The three areas outside are the OTS storage area B, the earthen covered magazine, and the SDC debris area. The Subpart I container storage areas have been designed, constructed, and managed in accordance with applicable standards of 401 KAR 39:060, Section 5, and 401 KAR 39:090, Section 1.

Container storage areas are concrete slab-on-grade structures that are sealed with a protective coating that provides a barrier to prevent penetration of hazardous wastes into the concrete. Any wastes that include free liquids are stored in containers that are provided with integral or external secondary containment that meets the requirements of 40 CFR 264.175. The OTS storage area B utilizes two 18,000-gallon double-walled vessels that provide integral secondary containment for storage of OTS liquid waste, and all other containers with free liquids that are placed in storage areas are stored on spill pallets or other portable containments to prevent liquid spills from contacting concrete slabs in the storage areas.

When closure of an individual storage area commences, all containers of hazardous waste within the unit will be removed and shipped off site for disposal at a permitted disposal facility. Once a container storage area is emptied of containers, BGCAPP will remove or decontaminate waste residues (if present) for the area undergoing closure. Any of the decontamination methods described in Appendix A may be used singly or in combination to achieve the desired level of decontamination to meet the applicable closure performance standards.

8.3.1.1 Earthen Covered Magazine (ECM)

The ECM is a stand-alone structure that is fully enclosed to prevent runoff from the storage area to other areas of the facility or the environment. The ECM has a single entrance, and it is constructed with a reinforced concrete slab-on-grade floor, concrete walls, and oval arch roof covered by earthen fill. There is a concrete slab-on-grade apron outside the entrance of the ECM that slopes away from the structure to prevent run-on.

The permitted container storage area has a 3,000-gallon storage limit, and containers with free liquids are stored inside the ECM on secondary containment pallets with sufficient capacity to contain at least 10 percent of the volume of the containers and 100 percent of the largest container. Containers for munition items include Single Round Containers (SRCs) or Package In-transit Gas (PIG) shipping containers are that are used when overpacking and transporting complete rocket assemblies including the SFTs. Only containers that are in good condition are stored at the ECM, and weekly inspections of the containers are conducted to identify any deterioration or corrosion of containers, spills, or evidence of leakage. The results of the inspections are maintained in the operating record. The containers, containment pallets, SRCs, and PIGs prevent hazardous waste and PCBs from contacting the concrete slab inside the ECM. Because of the design and operating practices of the ECM, no hazardous waste contamination is expected in this area as closure of the unit commences.

The ECM is equipped with an IONEX 1000 CFM filter unit that consists of a pre-filter, a high efficiency particulate air (HEPA) filter, two charcoal filter beds in series, and a final HEPA filter. The filtration system maintains a negative pressure within the facility with respect to atmosphere and ensures that any potential agent vapors in the exhaust are captured by the carbon adsorber beds and not released to the environment. The filter mid-beds are continuously monitored for the presence of agent vapors using MINICAMS®. In addition, a DAAMS station is collocated at the filter mid-bed, and any confirmed detection of agent ≥ 0.5 VSL at the filter mid-bed will necessitate carbon adsorber bed replacement.

The interior of the ECM is continuously monitored for chemical agent and the monitoring results are maintained in the operating record. GB agent vapor was detected inside the ECM on 15 July 2024, and MINICAMS readings were confirmed by Depot Area Air Monitoring System (DAAMS) samples. The GB vapor source was determined to be a leaking CRW canister. Liquid GB was contained within the integrated secondary containment of the CRW skid and GB vapor was maintained within engineering controls as the leak was mitigated. Details of the event are provided in the HBRA. As closure progresses, agent monitoring records will be reviewed to verify that no other significant releases of chemical agent occurred during the operating life of the facility, and a chemical agent risk assessment will be performed to verify that the facility is uncontaminated for chemical agents.

As closure commences, a record review will be conducted along with a visual inspection to identify cracks or damage to the structure that would have allowed hazardous waste or hazardous constituents to reach the underlying soils if liquids had been present during the operating life of the facility. Following this review or during progression of closure, it is possible that BGCAPP may discover an area having a probable release of a hazardous waste or hazardous constituent (i.e., an AOC) that needs to be investigated. In such an event, a remediation plan will be developed for KDEP approval which will address sampling and analysis for the investigation and remediation of the AOC. The remediation plan will draw upon the COPC lists, Closure Target Levels, and general sampling and analysis methodology contained in the SDC 2000 CVQAPP but will be prepared and submitted for approval independent of the CVQAPP.

During closure of the ECM container storage area, wastes or residues remaining in the ECM will be cleaned as necessary with any of the decontamination methods described in Appendix A. The concrete floor of the ECM will be swept, wet mopped, and/or vacuumed using an industrial wet/dry vacuum equipped with a high-efficiency particulate air (HEPA) filter to achieve a clean surface and prevent the spread of contamination. Any wastes or residues that are collected will be managed in accordance with Project procedures (24915-OPS-5PR-00-00023, *Hazardous Waste Management and Hazardous Material Reporting Procedure*; 24915-OPS-5PR-00-00030, *Waste Shipping*; and related documents).

When no longer needed, carbon and other filter media will be removed from the IONEX filter and disposed of in accordance with Project waste management procedures (24915-OPS-5PR-00-00023, 24915-OPS-5PR-00-00030, and related documents). The ventilation duct and interior of the IONEX filter housing will be visually inspected after removal of the filter media, and any residues will be removed and managed in accordance with Project waste management procedures (24915-OPS-5PR-00-00023, 24915-OPS-5PR-00-00030, and related documents). Removal of loose residue may be accomplished by methods such as brushing, wiping, and vacuuming.

Successful closure of the ECM is decontamination and final disposition that satisfies the applicable closure performance standards of Sections 7.1 through 7.3. If the ECM is left in place for turnover to BGAD for future use, it will be considered clean closed when the industrial clean closure criteria defined in the CVQAPP are verified through sampling and analysis.

8.3.1.2 OTS Storage Area B

The OTS Storage Area B is designed primarily for storage of bulk liquid waste that is discharged from the OTS. The OTS liquid waste is stored in two 18,000-gallon double-walled frac tanks prior to loading into tankers for off-site disposal at a permitted TSDF. The liquid waste includes the OTS brine waste stream which is initially accumulated in the bleed water tank. Upon reaching a preset conductivity/salt concentration in the bleed water tank, the contents are pumped to the frac tanks for storage and sampling prior to off-site disposal. In addition, the Wet Electrostatic Precipitator generates spent flush water from periodic rinsing to remove particulate build-up in the unit. The flush water is pumped directly to the double-walled frac tanks through a common header with the bleed water tank discharge piping.

The double-wall design of the frac tanks provides secondary containment that meets the requirements of 40 CFR 264.175 and prevents hazardous waste from contacting the concrete slab in the storage area. Other waste containers that may be stored in the area are placed on secondary containment pallets or in hazardous material storage lockers with secondary containment designed to contain at least 10 percent of the volume of the containers or 100 percent of the volume of the largest container. The frac tanks and containers are maintained in good condition and weekly inspections are conducted to identify any deterioration or corrosion, spills, or evidence of leakage. The results of the inspections are maintained in the operating record. Because of the design and operating practices of OTS Storage Area B, no hazardous waste contamination is expected in this area as closure of the unit commences.

During closure of the OTS Storage Area B, all stored waste within the unit will be removed and shipped off site for disposal at a permitted disposal facility. Once the frac tanks have been drained, they may be shipped off site for reuse, scrap metal recovery or disposal at a permitted facility. Once the storage area is emptied of all containers, wastes or residues remaining in the unit will be cleaned as necessary with any of the decontamination methods described in Appendix A. The concrete pad will be swept, wet mopped, or vacuumed using an industrial wet/dry vacuum equipped with a high-efficiency particulate air (HEPA) filter to achieve a clean surface and prevent the spread of contamination. Any wastes or residues that are collected will be managed in accordance with Project procedures (24915-OPS-5PR-00-00023, *Hazardous Waste Management and Hazardous Material Reporting Procedure*; 24915-OPS-5PR-00-00030, *Waste Shipping*; and related documents).

As closure commences, a record review will be conducted along with a visual inspection to identify cracks or damage to the reinforced concrete slab that would have allowed hazardous waste or hazardous constituents to reach the underlying soils if liquids had been present during the operating life of the unit. Following this review or during progression of closure, it is possible that BGCAPP may discover an area having a probable release of a hazardous waste or hazardous constituent (i.e., an AOC) that needs to be investigated. In such an event, a remediation plan will be developed for KDEP approval which will address sampling and analysis requirements for the investigation and remediation of the AOC. The remediation plan will draw upon the COPC lists, Closure Target Levels, and general sampling and analysis methodology contained in the SDC 2000 CVQAPP but will be prepared and submitted for approval independent of the CVQAPP.

Successful closure of the OTM Storage Area B is decontamination and final disposition that satisfies the applicable closure performance standards of Sections 7.1 through 7.3, and the clean closure criteria of the CVQAPP.

8.3.1.3 EB Container Storage Areas

The permitted container storage areas within the EB include the SDC Storage Area and OTS Storage Area A. The EB is a fully enclosed structure which prevents runoff from the hazardous waste storage areas to other areas of the facility or the environment. The floor of the EB is constructed with a reinforced concrete slab-on-grade floor that includes a protective coating that provides a barrier to prevent penetration of agent and other hazardous wastes into the concrete.

The EB is also equipped with three IONEX 16,000 CFM filter units that maintain a negative building pressure with respect to atmosphere and ensure that any potential agent vapors in the exhaust are captured by the carbon absorber beds and not released to the environment. Each filter unit consists of a pre-filter, a high efficiency particulate air (HEPA) filter, two charcoal filter beds in series, and a final HEPA filter. The filter mid-beds are continuously monitored for the presence of agent vapors using MINICAMS. In addition, a DAAMS station is collocated at the filter mid-bed, and any confirmed detection of agent ≥ 0.5 VSL at the filter mid-bed will necessitate carbon adsorber bed replacement.

The interior of the EB is also continuously monitored for airborne chemical agent vapor and the monitoring results are maintained in the operating record. The combination of the air monitoring and carbon filtration provides engineering controls to protect human health and prevent agent vapor releases to the environment. As closure progresses, agent monitoring records will be reviewed to verify that no significant releases of chemical agent occurred during the operating life of the facility, and a risk assessment will be performed to verify that the facility is uncontaminated for chemical agents.

The SDC Storage Area is a 4,000-gallon capacity permitted container storage area located inside the EB in the SDC room and is primarily used for permitted storage of munitions prior to processing. This area is also used for storage of containers holding secondary waste generated from operation and maintenance activities. Secondary containment for hazardous waste containers in this storage area is provided by portable secondary containment units that is compatible with the materials being stored and of sufficient capacity to contain at least 10 percent of the volume of the containers or 100 percent of the volume of the largest container. Both >1 VSL and <1 VSL agent-contaminated waste may be stored in this area.

The OTS Storage Area A in the EB is a 3,500-gallon capacity permitted container storage area located inside the OTS room and is used for permitted storage of containers holding secondary wastes generated from operation and maintenance of the SDC facility. Secondary containment for hazardous waste containers in this storage area is provided by portable secondary containment units that are compatible with the materials being stored and of sufficient capacity to contain at least 10 percent of the volume of the containers or 100 percent of the volume of the largest container. Only <1 VSL agent-contaminated waste may be stored in this area.

No hazardous waste contamination is expected within the EB container storage areas as closure of the facility commences. Only containers that are in good condition are stored, and weekly inspections of the containers are conducted to identify any deterioration or corrosion of containers, spills or evidence of leakage. The storage areas are inspected weekly to identify spills and defects that require repair, and the documented results of the inspections are maintained in the operating record. A record review will be conducted along with a visual inspection to identify cracks or damage to the containment that would have allowed hazardous waste or hazardous constituents to reach the underlying soils if liquids had been present during the operating life of the facility. Following this review or during progression of closure, it is possible that BGCAPP may discover an area having a probable release of a hazardous waste or hazardous constituent (i.e., an AOC) that needs to be investigated. In such an event, a remediation plan will be developed for KDEP approval which will address sampling and analysis for the investigation and remediation of the AOC. The remediation plan will draw upon the COPC lists, Closure Target Levels, and general sampling and analysis methodology contained in the SDC 2000 CVQAPP but will be prepared and submitted for approval independent of the CVQAPP.

For facility closure, hazardous waste and hazardous waste residues will be removed from the EB storage areas once they are emptied of containers and portable spill containments. As closure proceeds, the concrete floors in the storage areas will be swept, wet mopped, or vacuumed using an industrial wet/dry vacuum equipped with a high-efficiency particulate air (HEPA) filter to achieve a clean surface and minimize the spread of contamination. Sweepings, wet mop rinsates, or vacuumed materials will be managed in accordance with Project waste management procedures (24915-OPS-5PR-00-00023, 24915-OPS-5PR-00-00030, and related documents).

When no longer needed, carbon and other filter media will be removed from the IONEX filters and disposed of in accordance with Project waste management procedures (24915-OPS-5PR-00-00023, 24915-OPS-5PR-00-00030, and related documents). The ventilation duct and interior of the IONEX filter housing will be visually inspected after removal of the filter media, and any residues will be removed and managed in accordance with Project waste management procedures (24915-OPS-5PR-00-00023, 24915-OPS-5PR-00-00030, and related documents). Removal of loose residue may be accomplished by methods such as brushing, wiping, and vacuuming. Successful closure is decontamination and final disposition that satisfies the applicable closure performance standards of Sections 7.1 through 7.3.

8.3.1.4 SDC Debris Area Container Storage

The SDC Debris Area is an outdoor storage area constructed with a reinforced concrete slab-on-grade mat that is sealed with a protective coating. The permitted container storage area has a 35,500-gallon storage limit that is primarily used to store non-liquid SDC solid residue (metal munition fragments and ash) in scrap bin containers. Containers holding liquid waste are not stored in the permitted unit.

No hazardous waste contamination is expected within the SDC Debris Area container storage unit as closure of the facility commences. Only containers (scrap bins) that are in good condition are stored, and weekly inspections of the containers are conducted to identify any deterioration or corrosion of containers, spills or evidence of leakage. Additionally, the lids must be latched at all times and the scrap bins are covered with tarps. The storage area is inspected weekly to identify spills and defects that require repair, and the documented results of the inspections are maintained in the operating record. A record review will be conducted along with a visual inspection to identify cracks or damage to the containment that would have allowed hazardous waste or hazardous constituents to reach the underlying soils if liquids had been present during the operating life of the facility. Following this review or during progression of closure, it is possible that BGCAPP may discover an area having a probable release of a hazardous waste or hazardous constituent (i.e., an AOC) that needs to be investigated. In such an event, a remediation plan will be developed for KDEP approval which will address sampling and analysis for the investigation and remediation of the AOC. The remediation plan will draw upon the COPC lists, Closure Target Levels, and general sampling and analysis methodology contained in the SDC 2000 CVQAPP but will be prepared and submitted for approval independent of the CVQAPP.

When no longer needed, scrap bins that have been placed into service will be dispositioned as PCB-contaminated waste or decontaminated and verified clean for future use or recycling. For facility closure, hazardous waste and hazardous waste residues will be removed from the SDC Debris Area container storage unit once the scrap bins have been removed. As closure proceeds, the concrete pad will be swept, wet mopped, and/or vacuumed using an industrial wet/dry vacuum equipped with a high-efficiency particulate air (HEPA) filter to achieve a clean surface and prevent the spread of contamination. Sweepings, wet mop rinsates, or vacuumed materials will be managed in accordance with Project waste management procedures (24915-OPS-5PR-00-00023, 24915-OPS-5PR-00-00030, and related documents).

Successful closure of the SDC Debris Area is decontamination and final disposition that satisfies the applicable closure performance standards of Sections 7.1 through 7.3. The container storage area will be considered clean closed when the industrial clean closure criteria defined in the CVQAPP are verified through sampling and analysis.

8.3.2 Closure of Subpart J Tanks

The Subpart J Tank System within the SDC 2000 is limited to the 500-gallon skid-mounted Bleed Water Tank (BWT) that receives liquid OTS Waste Streams for storage (Quench water, Neutral Scrubber water and Separator water). The BWT has been designed, constructed, and managed in accordance with all applicable standards of 401 KAR 39:060, Section 5, and 401 KAR 39:090, Section 1. As defined in 40 CFR 260.10, a tank system comprises a hazardous waste storage or treatment tank and its associated ancillary equipment and containment system. The BWT is fully enclosed by the OTS room, and the containment system is constructed of reinforced concrete that is sealed with a chemical resistant coating system that is sufficiently impervious to the type of liquid wastes that are managed in the tanks and will contain any leak or spill until it can be removed in accordance with 40 CFR 264.193.

The above ground portion of the tank system is inspected daily while in operation to ensure that there are no releases or equipment failures including the secondary containment system. The results of the inspections are documented and placed in the facility operating record.

When closure commences and the tank system is removed from service, BGCAPP will remove or decontaminate all waste residues, structures and equipment contaminated with hazardous waste from the tank. Methods for removal of waste from permitted tank systems that were employed during operation of the facility is expected to be effective during the closure phase. However, there may be some need to modify components or install temporary additional items such as piping, hoses, or valves to facilitate complete removal of the final volume of waste from tank system components. Such modifications to permitted units that are undergoing closure are expected for decommissioning of the facility and do not require a modification to the RCRA operating permit to implement since the unit is no longer configured in accordance with the permit to manage hazardous waste under the conditions set forth in the RCRA hazardous waste operating permit.

For facility closure, the tank and ancillary equipment are flushed and cleared of spent OTS solutions and residues after the tank is taken out of service. Flush liquids will be dispositioned in accordance with the Waste Analysis Plan.

After the tank has been flushed, the manway will be opened to inspect for sludge and residue in the bottom. The tank bottoms will be removed or flushed and shipped off-site for disposition followed by washdown with fresh water. Steam cleaning or high-pressure washing may be required to loosen and remove sludge and residuals that may be adhering to surfaces. Any wastes or residues that are collected will be managed in accordance with Project procedures or this closure plan (24915-OPS-5PR-00-00023, *Hazardous Waste Management and Hazardous Material Reporting Procedure*; 24915-OPS-5PR-00-00030, *Waste Shipping*, and related documents).

After flushing of the tank and blowdown of exterior transfer piping is complete, the pumps and piping will be dismantled as necessary, size-reduced, and managed for offsite disposal in accordance with Project procedures (24915-OPS-5PR-00-00023, 24915-OPS-5PR-00-00030, and related documents). The piping wall penetrations will be assessed and may be decontaminated and left in place if it is determined that they can be successfully cleared. A more aggressive approach for piping penetration removal will occur if necessary, but BGCAPP does not anticipate this will be required. Equipment removed will be managed for offsite disposal in accordance with Project procedures (24915-OPS-5PR-00-00023, 24915-OPS-5PR-00-00030, and related documents). Eligible material may be sent offsite as scrap metal as described in Section 8.5.9.

The decontaminated tank and ancillary equipment will be demolished and sent off site for disposal or scrap metal recovery. Alternatively, the tank and ancillary equipment may forgo decontamination to meet the applicable closure performance standards and may be size-reduced and treated with any of the methods shown in Appendix A and managed for offsite disposal in accordance with Project procedures (24915-OPS-5PR-00-00023, 24915-OPS-5PR-00-00030, and related documents).

After the tank system has been decontaminated, the secondary containment system will be cleaned to remove or decontaminate any remaining waste residues. Any of the decontamination methods described in Appendix A may be used singly or in combination to achieve the desired level of decontamination to meet the applicable closure performance standards.

After tank systems have been decontaminated and readied for disposition, BGCAPP personnel will conduct a physical inspection of the containment associated with the tanks system to identify potential contamination, cracks, or damage that would have allowed hazardous waste or hazardous constituents to reach the underlying soils. Following this review or during progression of closure, it is possible that BGCAPP may discover an area having a probable release of a hazardous waste or hazardous constituent (i.e., an AOC) that needs to be investigated. In such an event, a remediation plan will be developed for KDEP approval which will address sampling and analysis for the investigation and remediation of the AOC. The remediation plan will draw upon the COPC lists, Closure Target Levels, and general sampling and analysis methodology contained in the SDC 2000 CVQAPP but will be prepared and submitted for approval independent of the CVQAPP.

Successful closure of the tank system is decontamination and final disposition (disposal or recycling) that satisfies the applicable closure performance standards of Sections 7.1 through 7.4. If applicable, the closure performance standard for attaining a “clean debris surface” will be verified by visual inspection of the decontaminated surface, and the results will be documented and placed in the operating record. Since the tank will be dispositioned as either scrap metal, hazardous waste, or debris, performing closure verification sampling and analysis in accordance with the CVQAPP is not required.

8.3.3 Closure of Subpart X Miscellaneous Units

The SDC 2000 contains various permitted miscellaneous Subpart X units designed for demilitarization of munitions. This section describes how the technical performance standards identified in Section 7.1.2.3 for closure of miscellaneous units and associated equipment (e.g., two chamber loading system, detonation chamber, buffer tank, and scrap discharge system) will be achieved. These units are fully contained within the EB under engineering controls.

The Subpart X miscellaneous units have been designed, constructed, and managed in accordance with applicable standards of 401 KAR 39:060 Section 5 and 401 KAR 39:090 Section 1. The units are operated and maintained to prevent releases to the environment and will be closed in a manner that will ensure protection of human health and the environment.

When closure commences, BGCAPP will remove or decontaminate waste residues, structures and equipment contaminated with hazardous waste. The DDPs and the associated risk assessments identify the types of contamination associated with the miscellaneous units and the type of decontamination that is required for the unit(s) within that area. Permitted miscellaneous units will be decontaminated in accordance with the DDP and risk assessment requirements to achieve the designated physical end state of the facility. Any of the decontamination methods described in Appendix A may be used singly or in combination to achieve the desired level of decontamination.

Methods for removal of waste from permitted miscellaneous units that were employed during operation of the facility are expected to be effective during the closure phase. However, there may be some need to modify components to facilitate complete removal of waste from miscellaneous unit components. Such modifications to permitted units that are undergoing closure are expected and do not require a modification to the RCRA operating permit to implement since the units are no longer configured to manage hazardous waste under the conditions set forth in the RCRA hazardous waste operating permit.

After the miscellaneous units have been decontaminated and readied for disposition, BGCAPP personnel will conduct a physical inspection of the containment associated with the units to identify potential contamination, cracks, or damage that could have allowed hazardous waste or hazardous constituents to reach the underlying soils. Following this review or during progression of closure, it is unlikely, but possible that BGCAPP may discover an area having a probable release of a hazardous waste or hazardous constituent (i.e., an AOC) that needs to be investigated. In such an event, a remediation plan will be developed for KDEP approval which will address sampling and analysis for the investigation and remediation of the AOC. The remediation plan will draw upon the COPC lists, Closure Target Levels, and general sampling and analysis methodology contained in the SDC 2000 CVQAPP but will be prepared and submitted for approval independent of the CVQAPP.

The following closure milestones are anticipated:

- Following completion of operations, the DC will be maintained at normal operating temperature to provide thermal decontamination and air-washing for it and Loading Chamber 2. BGCAPP will perform final scrap removal and remove/process secondary waste contained within the EB in accordance with 24915-OPS-5PR-00-00023, *Hazardous Waste Management and Hazardous Material Reporting Procedure* (CDRL D012). These activities will ensure removal of recoverable agent to support a reduction in Surety and Security requirements and elimination of agent perimeter monitoring in accordance with 24915-00-9PL-00-00009, *Perimeter Monitoring Plan*.
- The DC and Thermal Oxidizer will be shutdown to allow for cleanout (residue removal) of the Loading Chamber 1, Loading Chamber 2, DC, offgas piping, and Buffer Tank with assessment and elimination of occluded spaces. These activities will allow each of these areas to achieve unventilated monitoring results to support the recycle or reuse criteria of Section 8.5.9. If debris removal or monitoring does not support release for recycle or reuse, the equipment will be size-reduced and dispositioned as hazardous waste in accordance with project procedures. As required, the DC and THO may be brought back up to temperature to support decontamination activities.
- Following verification of internal component decontamination, the DC and Buffer Tank enclosures, to include the Process Ventilation System (PVS), will be cleaned and decontaminated to achieve recycle or reuse criteria. Absorptive media will be removed and dispositioned in accordance with project procedures. If debris removal or final unventilated monitoring does not support release for recycle or reuse, the equipment will be size-reduced and dispositioned as hazardous waste in accordance with project procedures.
- Following successful unventilated monitoring or removal and disposition of potentially agent-contaminated equipment and areas, agent monitoring will be suspended from the corresponding buildings/areas upon concurrence from KDEP.

8.3.3.1 Two Chamber Loading System, Detonation Chamber and Buffer Tank

The two chamber loading system consists of Loading Chamber 1 (LC1) and Loading Chamber 2 (LC2), and the system is equipped with two loading gates to isolate the chambers between transfers. Loading Chamber 1 serves as an airlock to receive feed boxes from the feed conveyor system and LC2 receives the feed boxes and conveys them to the DC for thermal treatment. The DC is continuously fed with sweep air which exhausts gases to the Buffer Tank. Sweep air and gases resulting from destruction of munitions or treatment of miscellaneous waste are exhausted from the Buffer Tank to the Off-gas Treatment System (OTS).

As closure commences, the loading chambers, detonation chamber and buffer tank components and associated equipment will be decontaminated as necessary. Connecting piping systems may be dismantled, size-reduced, and managed for offsite disposal in accordance with Project procedures (24915-OPS-5PR-00-00023, 24915-OPS-5PR-00-00030, and related documents). If the units are to be left in place, each will be cleaned to meet the applicable closure performance standards of Section 7.0. Alternatively, the units may forgo decontamination to meet closure performance standards and may be size-reduced and managed for offsite disposition in accordance with Project procedures (24915-OPS-5PR-00-00023, 24915-OPS-5PR-00-00030, and related documents).

Successful closure of the loading chambers, detonation chamber and buffer tank components and associated equipment consists of decontamination and final disposition (disposal or recycling) that satisfies the applicable closure performance standards of Sections 7.0. If applicable, the closure performance standard for attaining a “clean debris surface” will be verified by visual inspection of the decontaminated surface, and the results will be documented and placed in the operating record. Since these components will be dispositioned as either scrap metal, hazardous waste, or debris, performing closure verification sampling and analysis in accordance with the CVQAPP is not required.

8.3.3.2 Scrap Discharge System

The Scrap Discharge System consists of the scrap funnel, scrap chute and scrap bin. Solid residue that accumulates in the DC following treatment of munitions and miscellaneous waste is emptied at regular intervals by rotating the DC to allow the material to fall down a scrap funnel onto a scrap chute that directs the solid residue to a scrap bin.

At closure, the scrap discharge system will be dismantled and sent offsite for final disposition in accordance with Project procedures (24915-OPS-5PR-00-00023, 24915-OPS-5PR-00-00030, and related documents). Equipment that is to be reused may be decontaminated for agent as required by the EDP. If the equipment is left in place for demolition or released for resource recovery, it will be decontaminated to meet the applicable closure performance standards of Section 7.0.

Successful closure of the scrap discharge system is decontamination and final disposition (disposal or recycling) that satisfies the applicable closure performance standards of Section 7.0. If applicable, the closure performance standard for attaining a “clean debris surface” will be verified by visual inspection of the decontaminated surface, and the results will be documented and placed in the operating record. Since the equipment will be dispositioned as either scrap metal, hazardous waste, or debris, performing closure verification sampling and analysis is not required.

8.3.4 Closure of the Conveyor System

The conveyor system is located in the SDC room, and it transfers munitions feed boxes from the input conveyor on the first floor to a position outside LC1. The input conveyor transfers feed boxes to the elevator which raises the feed box to the upper level outside LC1. At this point, the feed box is in position for Loading Pusher 1 to push the munitions feed box into LC1.

The conveyor system is expected to be minimally contaminated at closure. A review of the operational and monitoring history of the conveyor system and the SDC room will be performed prior to the start of closure and the results will be documented in the SDC 2000 Health-Based Risk Assessment.

At closure, the conveyor system will be decontaminated as necessary with any of the decontamination methods described in Appendix A, dismantled and sent offsite for final disposition in accordance with Project procedures (24915-OPS-5PR-00-00023, 24915-OPS-5PR-00-00030, and related documents). Equipment that is to be reused may be decontaminated for agent as required by the EDP. If the equipment is left in place for demolition or released for resource recovery, it will be decontaminated to meet the applicable closure performance standards of Section 7.0.

Alternatively, the conveyor system may forgo decontamination for meeting closure performance standards and may be size-reduced and managed for offsite disposal in accordance with Project procedures (24915-OPS-5PR-00-00023, 24915-OPS-5PR-00-00030, and related documents).

Successful closure of the conveyor system consists of decontamination and/or final disposition (disposal or recycling) that satisfies the applicable closure performance standards of Section 7.0. If applicable, the closure performance standard for attaining a “clean debris surface” will be verified by visual inspection of the decontaminated surface, and the results will be documented and placed in the operating record. Since the equipment will be dispositioned as either scrap metal, hazardous waste, or debris, performing closure verification sampling and analysis is not required.

8.3.5 Closure of SDC 2000 Secondary Containment Systems

The SDC 2000 has been designed and constructed to prevent migration of chemical agent and wastes into the environment. The design includes secondary containments which are supported by a reinforced concrete mat foundation sealed with a chemical resistant coating system that is sufficiently impervious to the type of liquid wastes that are managed at the facility.

The BWT secondary containment system includes a containment pan within the OTS room to contain potential releases from the tank. The OTS room floor is also sealed with an alkali-resistant coating system that is sufficiently impervious to the type of liquid wastes managed in the BWT and will contain any leak or spill until it can be removed in accordance with 40 CFR 264.193. Concrete curbing is also included in the design of the containment system to ensure the containment provides adequate volume for worst case scenarios of ruptured storage tank.

The RCRA Permit condition S.III.J.(3)(c) requires the coating system for the BWT secondary containment pan and the coatings provided on the OTS room floor to be:

- Free of cracks and gaps
- Adhered to the structure beneath the coating
- Inspected in accordance with the inspection plan

Inspection of the coating systems during closure will continue while the BWT is still in operation to identify defects that would allow liquid to contact the underlying concrete. As closure proceeds, decommissioning and dismantlement of the SSCs in the SDC 2000 will require personnel and equipment movement throughout the facility, and these activities may cause minor damage to the coating system. In areas where liquid waste is managed, a chemical resistant, adhesive tape (e.g., waterproof anti-slip tape) or other sealant may be applied to coatings that are cracked or damaged to minimize or prevent permeation of liquid into the concrete. Large areas of defective coatings may be isolated from liquid exposure with temporary spill containment berms (e.g., flexible polyurethane or similar material). Tape and temporary berms will be inspected daily to ensure integrity of the temporary liquid barriers, and the materials will be replaced if they are worn or damaged.

Smaller volumes of liquid waste from localized decontamination efforts may be wiped up with absorbent material or mopped to prevent prolonged contact with the coated floor and minimize the spread of liquid and potential contamination. Liquids and absorbents will be managed in accordance with Project procedures (24915-OPS-5PR-00-00023, *Hazardous Waste Management and Hazardous Material Reporting Procedure*; 24915-OPS-5PR-00-00030, *Waste Shipping*; and related documents).

The primary consideration for closure is that the SDC 2000 containment system in its entirety remains capable of collecting and holding accumulated liquid wastes. Once liquids have been eliminated from the OTS, secondary containment is no longer essential. The concrete mat foundation of the SDC 2000 will continue to provide secondary containment during closure to capture any spillage of hazardous waste and/or industrial waste.

As closure commences, BGCAPP will remove or decontaminate waste residues from the containment system. Any of the decontamination methods described in Appendix A may be used singly or in combination to achieve the desired level of decontamination. The closure DDP and the associated risk assessment identify the types of contamination associated with the containment system and the type of decontamination that is required for the units within that area, while the step-by-step details will be addressed within specific work orders for field execution.

The containment is inspected daily to identify signs of spills and defects that require repair, and the documented results of the inspections are maintained in the operating record. A record review will be conducted along with a visual inspection to identify cracks or damage to the containment that would have allowed hazardous waste or hazardous constituents to reach the underlying soils. Following this review or during progression of closure, it is possible that BGCAPP may discover an area having a probable release of a hazardous waste or hazardous constituent (i.e., an AOC) that needs to be investigated. In such an event, a remediation plan will be developed for KDEP approval which will address sampling and analysis for the investigation and remediation of the AOC. The remediation plan will draw upon the COPC lists, Closure Target Levels, and general sampling and analysis methodology contained in the SDC 2000 CVQAPP but will be prepared and submitted for approval independent of the CVQAPP.

Successful closure of the containment is decontamination that satisfies the applicable closure performance standards of Sections 7.0. If applicable, the closure performance standard for attaining a “clean debris surface” will be verified by visual inspection of the decontaminated surface, and the results will be documented and placed in the operating record. Closure verification sampling and analysis will be performed as described in the CVQAPP in addition to meeting the applicable closure performance standards of Section 7.0.

8.3.6 Closure of the OTS

In accordance with RCRA permit condition S.III.A.(2), the OTS is an air pollution control device that is designed to receive and treat the off-gas from the SDC 2000 Detonation Chamber (DC) and Buffer Tank (BT). The major components of the OTS include the THO, Quench, Droplet Separator, Neutral Scrubber, Wet Electrostatic Precipitator, Heat Exchanger, Separator, Air Reheater, ID Fans and Ionex 4K Filter. The OTS Room houses the various components of the OTS excluding the THO, which is situated in the SDC Room, and the IONEX 4K filter unit and exhaust stack receiver which are located outside the Enclosure Building (EB).

The THO is operated under the BGCAPP Title V Air Permit, and it receives off gas from the DC and Buffer Tank where it is heated to >2,012 °F for a minimum of two seconds. In combination, the DC, BT and THO provide at least a 99.9999% destruction and removal efficiency for chemical agent, and components downstream of the Thermal Oxidizer (THO) are not expected to be contaminated with agent.

At this time, the equipment/areas downstream of the THO have not been exposed to an agent liquid or vapor environment based on operational history and knowledge of agent destruction kinetics along with the permit required THO temperature and residence time conditions. Prior to the start of closure, agent contamination of the OTS will be assessed and documented in 24915-GEN-5PL-80-0000X, *Health-Based Risk Assessment* (under development).

The OTS Room was designed and has been operated as a Ventilation Category D area, which is maintained at atmospheric pressure. Therefore, agent monitoring is not performed in the OTS Room and there is no agent monitoring history for the OTS equipment in this room. The IONEX 4K filter unit is continuously monitored between the first and second carbon beds by AMS station 80-AMS-AIT5020 (SDC720).

Following decontamination of the loading chamber system, detonation chamber, and buffer tank, the THO will be shut down and OTS cleaning activities will commence. The off-gas piping from the DC and LC2 will be disconnected from the THO connections will be sealed with blind flanges as required. The THO ring distributer and off-gas lances will be removed and managed as hazardous waste in accordance with project procedures (24915-OPS-5PR-00-00023, Hazardous Waste Management and Hazardous Material Reporting Procedure; 24915-OPS-5PR-00-00030, Waste Shipping; and related documents). The THO natural gas igniter and burner will be isolated from the natural gas supply, and the primary and secondary combustion air intakes will be sealed shut to prevent airflow into the combustion chamber. All other utilities (plant air, electrical, etc.) will be disconnected and the unit will be isolated.

If the THO is left in place for demolition, it will be dismantled and decontaminated to meet the applicable closure performance standards of Section 7.0. Any of the decontamination methods described in Appendix A may be used, and they may be used singly or in combination. Any residues that are collected will be managed as waste in accordance with Project procedures (24915-OPS-5PR-00-00023, *Hazardous Waste Management and Hazardous Material Reporting Procedure*; 24915-OPS-5PR-00-00030, *Waste Shipping*; and related documents). Alternatively, the THO may be size reduced, containerized, and shipped offsite as scrap metal or for disposal in accordance with Project procedures (24915-OPS-5PR-00-00023, 24915-OPS-5PR-00-00030, and related documents).

The OTS Quench, Neutral Scrubber, Wet Electrostatic Precipitator, BWT and associated piping will be flushed with fresh water and drained to remove processing residue. After flushing and draining is complete, the tank system and ancillary equipment (e.g., pipes, pumps, valves) may be left in place for demolition. If the system is left in place for demolition, it will be dismantled and decontaminated to meet the applicable closure performance standards of Section 7.0. Any of the decontamination methods described in Appendix A may be used, and they may be used singly or in combination. Any residues that are collected from the decontamination effort will be managed as waste in accordance with Project procedures (24915-OPS-5PR-00-00023, 24915-OPS-5PR-00-00030, and related documents). Alternatively, the units may be size reduced, containerized, and shipped offsite as scrap metal or for disposal in accordance with Project procedures (24915-OPS-5PR-00-00023, *Hazardous Waste Management and Hazardous Material Reporting Procedure*; 24915-OPS-5PR-00-00030, *Waste Shipping*; and related documents).

Decontaminated OTS equipment may be left in place for demolition or released for scrap metal and will be decontaminated to meet the applicable closure performance standards of Section 7.0. Alternatively, the OTS equipment may forgo decontamination as provided by Section 7.5 to meet those closure performance standards and may be size-reduced and treated with any of the methods shown in Appendix A and managed for offsite disposal in accordance with Project procedures (24915-OPS-5PR-00-00023, 24915-OPS-5PR-00-00030, and related documents).

Successful closure of the OTS equipment is decontamination and final disposition (disposal or recycling) that satisfies the applicable closure performance standards of Sections 7.1 through 7.5. If applicable, the closure performance standard for attaining a “clean debris surface” will be verified by visual inspection of the decontaminated surface, and the results will be documented and placed in the operating record. Since the OTS equipment will be dispositioned as either scrap metal, hazardous waste, or debris, performing closure verification sampling and analysis is not required. If equipment is left in place for reuse, closure verification sampling and analysis will be performed in accordance with the CVQAPP.

The pre-filter, HEPA filter, and carbon filters within the 4K unit will be removed and dispositioned in accordance with project procedures (24915-OPS-5PR-00-00023, 24915-OPS-5PR-00-00030, and related documents). The remaining ductwork and filter plenum will be cleaned as required to satisfy the applicable closure performance standards of Section 7.0. If applicable, the closure performance standard for attaining a “clean debris surface” will be verified by visual inspection of the decontaminated surface, and the results will be documented and placed in the operating record. If the ductwork/plenum is dispositioned as either scrap metal, hazardous waste, or debris, performing closure verification sampling and analysis is not required. If left in place for reuse, closure verification sampling and analysis will be performed in accordance with the CVQAPP.

8.3.7 Closure of the SDC 2000 Filtration Exhaust Systems

The EB HVAC system is designed to provide spatial heating and cooling and airflow through the building that maintains negative pressure relative to atmosphere to prevent a release of agent to the environment. The SDC 2000 exhaust filtration systems are regulated as air pollution control equipment that is operated under the BGCAPP Title V Air Permit, and are required for chemical agent waste storage and treatment operations in accordance with RCRA Permit Condition S.III.I.(13) and S.III.X.(2). The EB airflow is exhausted through ductwork to the IONEX filter system containing HEPA and carbon filter media. The system is designed to remove 99.7% of particles greater than 0.3 microns in size. At closure a risk assessment will be performed to determine if exhaust ductwork and ancillary components (e.g., valves and dampers) have been agent contaminated.

The ECM utilizes an IONEX Model CD1000 filter system which provides up to 1000 cfm air flow and consists of a pre-filter, a HEPA filter, a charcoal filter and a test section (referred to as the ‘mid-bed’). From this point, the filter train continues with a second charcoal filter followed by another HEPA filter. The exhaust filtration unit is connected to the ECM in such a fashion as to provide negative pressure within the facility with respect to the air outside the facility. MINICAMS and DAAMS monitoring locations points are located within the ECM, at the filter mid-bed and at the ECM filter stack. The combination of the air monitoring and IONEX Model CD1000 filter unit provides engineering controls to prevent agent releases from the magazine into the environment.

Critical operating parameters for HVAC airflow were established for chemical agent operations and will not be applicable during closure after chemical agent operations are complete, and gross decontamination is completed. As decontamination and decommissioning activities progress within the SDC 2000 following operations, it may be necessary to modify or reduce the HVAC ventilation airflow to facilitate closure activities and prevent adverse changes in pressure and airflow patterns.

Decommissioning of the HVAC systems will be accomplished through internal duct/component decommissioning, external duct/component decommissioning, and filtration unit/component decommissioning. It is anticipated that the interior of the ductwork and filter housings will not exhibit agent contamination > 1 VSL because of the airflow velocity and continuous airwashing in the ducts. In the unlikely event that ductwork contamination levels exceed the 1 VSL criteria to leave in place for dismantlement by demolition personnel, the specific ductwork may be isolated with a tented enclosure, dismantled and decontaminated, or sized for disposition in accordance with Project waste management procedures.

As closure proceeds, exhaust ductwork will be addressed for decontamination and decommissioning and will be evaluated for contamination and decontamination requirements. The upstream sections of filter housings will be evaluated for agent contamination after the pre filters, HEPA filters, and contaminated carbon adsorber beds have been removed. Based on mid-bed agent monitoring performed during agent operations, no agent contamination occurred beyond the first charcoal bank, and only the upstream section of the filter housings will be headspace monitored to verify that the <1 VSL criteria has been met. If risk assessment requires monitoring after the upstream portion of the filter plenum is cleared, the remaining carbon banks may be removed and disposed of in accordance with Project procedures (24915-OPS-5PR-00-00023, *Hazardous Waste Management and Hazardous Material Reporting Procedure* [CDRL D012]; 24915-OPS-5PR-00-00030, *Waste Shipping*; and related documents). Filter units may be placed online without carbon adsorber beds to provide cooling ventilation. Stack monitoring for chemical agent will be discontinued under KDEP approval once decontamination verification demonstrates no credible source of VSL-level agent remains.

The ventilation duct and interior of filter housings will be visually inspected after removal of the filter media, and any residues will be removed and managed in accordance with Project waste management procedures (24915-OPS-5PR-00-00023, 24915-OPS-5PR-00-00030, and related documents). Removal of loose residue may be accomplished by methods such as brushing, wiping, and vacuuming.

The HVAC exhaust system components and associated ductwork may be left in place for demolition or released for scrap metal recovery and will be decontaminated to meet the applicable closure performance standards of Section 7.0. Alternatively, the HVAC exhaust system components and associated ductwork may forgo decontamination as provided by Section 7.4 to meet those closure performance standards and may be size-reduced and treated with any of the methods shown in Appendix A and managed for offsite disposal in accordance with Project procedures (24915-OPS-5PR-00-00023, 24915-OPS-5PR-00-00030, and related documents).

Successful closure of the HVAC exhaust system components is decontamination and final disposition (disposal or recycling) that satisfies the applicable closure performance standards of Section 7.0. If applicable, the closure performance standard for attaining a “clean debris surface” will be verified by visual inspection of the decontaminated surface, and the results will be documented and placed in the operating record. If HVAC exhaust system components are dispositioned as either scrap metal, hazardous waste, or debris, performing closure verification sampling and analysis is not required. If left in place for reuse, closure verification sampling and analysis will be performed in accordance with the CVQAPP.

8.3.8 Closure of the Process Ventilation System

The Process Ventilation System (PVS) maintains a negative pressure with respect to atmosphere inside the SDC enclosure, Buffer Tank enclosure and Scrap Handling System. The PVS consists of cyclone, filter unit and ventilation fan. The ventilation fan provides a motive force for the PVS, and the cyclone and filter remove particles and dust from the ventilation exhaust.

As closure commences, the PVS will be decontaminated and sent offsite for final disposition in accordance with Project procedures (24915-OPS-5PR-00-00023, 24915-OPS-5PR-00-00030, and related documents). Filter media will be removed and disposed along with the cyclone collection drum at a permitted TSDF. If the equipment is left in place for demolition or released for resource recovery, it will be decontaminated to meet the applicable closure performance standards of Section 7.0. If applicable, the closure performance standard for attaining a "clean debris surface" will be verified by visual inspection of the decontaminated surface, and the results will be documented and placed in the operating record.

The decontaminated units will be considered clean closed following decontamination and final disposition (disposal or recycling) that satisfies the applicable closure performance standards of Sections 7.0. Alternatively, the units may forgo decontamination to meet closure performance standards of Sections 7.1 through 7.3 and may be size-reduced and sent offsite as a hazardous waste, in accordance with Project procedures (24915-OPS-5PR-00-00023, 24915-OPS-5PR-00-00030, and related documents). Since these components will be dispositioned as either scrap metal, hazardous waste, or debris, performing closure verification sampling and analysis in accordance with the CVQAPP is not required.

8.3.9 Closure of TSCA Permitted Units

Closure of permitted TSCA units will occur in conjunction with the RCRA closure activities described in this closure plan, and the same general principles and methods that are used for decontamination and disposition of RCRA-permitted units will apply to TSCA closure activities. This approach ensures that the closure performance standards of Section 7.3 will be achieved.

As closure commences, it is expected that only residual quantities of PCB contamination will remain in the facility (processing of PCB-contaminated items ceased early in 2023). To the extent practical, potentially contaminated residues will be removed from units undergoing closure and shipped offsite for disposal at a TSCA- and RCRA-approved treatment, storage, and disposal facility. In accordance with 40 CFR 761.65(e)(1)(iii), a list of the subcontract treatment/disposal facilities that have agreed to accept TSCA PCB wastes from BGCAPP has been provided to US EPA Region IV as a TSCA Approval Condition. The list was included with the submittal of SDN 24915-00-GPE-GGPT-00388, *Request for Approval for Additional Treatment, Storage, and Disposal of Polychlorinated Biphenyl (PCB) Bulk Product Wastes.*

As required by the TSCA Approval, PCB markings that are posted immediately adjacent to all approved storage and processing areas must remain in place until the area is decontaminated in accordance with the approved facility closure plan. The criterion for removal of PCB markings for facility areas and/or equipment is PCB decontamination followed by wipe sample results < 10 µg per 100 cm^2 for facility or equipment surfaces. Standard wipe tests will be performed as outlined in 40 CFR 761.123 to demonstrate the decontamination criterion for removal of PCB markings, and the results will be placed in the facility operating record.

Since only non-liquid PCB bulk product wastes were managed at the SDC 2000 facility, walls and ceilings of the PCB processing and storage areas will not be impacted by PCB contamination in processing and storage areas. Therefore, PCB decontamination efforts will focus on removal of PCB residues from floors in the permitted storage and processing areas. Concrete surfaces in processing areas have been treated with sealants or protective floor-coating systems to prevent permeation of non-liquid PCBs into the immediate surface. Therefore, concrete coatings and surfaces will be treated as non-porous surfaces for the purposes of TSCA closure activities.

The PCB-contaminated SSCs may undergo decontamination in accordance with any of the methods described in Appendix A of this closure plan or any of the 40 CFR 268.45 alternative treatment standards for hazardous debris described in Section 7.4 of this closure plan. Permitted units and PCB-contaminated SSCs may be dismantled and disposed of as PCB-contaminated hazardous waste or hazardous debris at an appropriately permitted TSDF instead of performing decontamination or if decontamination efforts are not sufficient to satisfy the applicable closure performance standards of this closure plan. Decommissioned components suitable for recycling may be sent offsite for resource recovery as scrap metal or recycled concrete as described in Section 8.5.9. Notwithstanding industrial clean closure requirements applicable to any portion of the permitted unit that remains on site (e.g., containment systems), removal and proper offsite disposition (disposal or recycling) of all or part of the permitted unit constitutes clean closure of the item sent off site.

Successful closure of the TSCA permitted units is decontamination and final disposition (disposal or recycling) that satisfies the applicable closure performance standards of Section 7.0. If applicable, the closure performance standard for attaining a “clean debris surface” will be verified by visual inspection of the decontaminated surface, and the results will be documented and placed in the operating record. Closure verification sampling and analysis is not required unless contamination of soil outside of secondary containment is suspected or confirmed.

8.4 Decontamination of Equipment and Structures – 401 KAR 39:090 Section 1, 40 CFR 264.112(b)(4)

This section describes the methodology to decontaminate SSCs for safer handling of materials during decommissioning or to achieve the closure performance standards identified in Section 7.0. The decision to decontaminate, and to what degree, will be evaluated throughout the closure process. As part of the closure strategy, contaminated SSCs and soil that do not meet the RCRA and TSCA closure performance standards without additional decontamination may be removed from the facility and disposed at permitted offsite disposal facilities.

The primary methods of decontamination for equipment and structures are chemical and mechanical. Chemical decontamination deactivates the contaminants by chemical reaction, and mechanical decontamination uses techniques to physically remove the contaminants. Appendix A describes the various methods that may be employed for decontamination of chemical agent and other types of contamination found on SSCs.

The selection of decontamination methods will be based on the conditions resulting in the contamination, the level of contamination, the type and configuration of the material to be decontaminated, and knowledge obtained from proven decontamination operations at former chemical demilitarization facilities.

Factors for determining the most appropriate decontamination approach include, but are not limited to:

- Reducing and/or eliminating the potential exposure to, and release of, hazardous constituents
- Evaluating the exposure risk to determine the appropriate level of PPE and the level of administrative and engineering controls for decommissioning, dismantlement, and demolition
- Salvaging equipment and materials for reuse, recycling, or alternative lower cost disposal options

Decontamination techniques selected by BGCAPP may be effective for either agent, non-agent, or both agent and non-agent contamination. Any non-agent hazardous waste may be completely or partially removed using the same decontamination technique(s) used for agent. All hazardous waste or hazardous waste residues removed during decontamination activities will be characterized and managed as newly generated hazardous waste.

Specific details associated with decontamination of SSCs will be captured in work orders issued to the field for execution. These work orders are tracked to completion and closed out with the work order control process using the Project work order process (24915-WCG-5PR-00-00001, *Work Control, Work Order [WO] Process*). Work orders and records of the work performed are Project-controlled documents that are maintained in the operating record (24915-000-2KP-A03-00001, *Records Management and Document Control*) for future retrieval to support closure certification.

8.4.1 Agent Contaminated SSCs

Based on the operating record to date, agent-contaminated SSCs are located within the SDC Room and ECM and the associated ventilation filtration systems. Initial decontamination efforts will be focused on agent hazard reduction to reduce exposure hazards to workers.

8.4.1.1 Decontamination Requirements

Potentially agent-contaminated SSCs will be decontaminated for safer handling of materials during decommissioning or to achieve the closure performance standards identified in Section 7.0. Decontamination of permitted units and supplemental equipment in agent-related areas that are under engineering controls will occur using a systematic approach to reduce and remove agent contamination from equipment and areas. The selection of decontamination methods will be based on the conditions resulting in the contamination, the level of contamination, the type and configuration of the material to be decontaminated, and knowledge obtained from proven decontamination operations at former chemical demilitarization facilities.

Contaminated equipment and material may be dismantled and decontaminated using any of the methods described in Appendix A. Effective decontamination of chemical agent will be verified with headspace monitoring or UMT to demonstrate that the chemical agent closure performance standards have been met. If effective agent decontamination cannot be achieved, the equipment and/or structure may be removed and disposed of in accordance with Project procedures (24915 OPS 5PR 00 00023, Hazardous Waste Management and Hazardous Material Reporting Procedure [CDRL D012]; 24915-OPS-5PR-00-00030, Waste Shipping; and related documents).

The minimum decontamination requirements are as follows:

- The SSCs that have been potentially exposed to agent-contaminated liquids and aerosol agent may be decontaminated with heat or approved decontamination solutions listed in Appendix A. Occluded spaces (see Section 8.4.1.2) must be identified and mitigated to ensure there are no opportunities for entrapping agent, and soft or porous materials (see Section 8.4.1.3) must be addressed on a case-by-case basis to determine the affinity for chemical agent. The process for decontamination is to ensure contact with the decontamination solution on agent exposed surfaces. Alternatively, the item may be disposed of in accordance with Project procedures (24915-OPS-5PR-00-00023, *Hazardous Waste Management and Hazardous Material Reporting Procedure* [CDRL D012]; 24915-OPS-5PR-00-00030, *Waste Shipping*; and related documents).

- The SSCs determined to be vapor agent contaminated may be decontaminated with air (air washing). Headspace clearance monitoring is required for items removed from engineering controls prior to area clearance by unventilated monitoring. If the item does not clear headspace monitoring, then other approved decontamination methods in Appendix A can be applied, or the item may be disposed of as contaminated material in accordance with site waste management procedures (24915-OPS-5PR-00-00023, 24915-OPS-5PR-00-00030, and related documents).

Decontaminated equipment, process systems, and areas are specifically defined as not being able to entrap and then release hazardous amounts of agent vapor or pose a contact hazard. Items such as agent-exposed carbon media that can trap and release agent vapor upon increased temperature are excluded from this definition. Also excluded are items that contain cavities that have been exposed to liquid agent and do not have pathways for monitoring or cannot otherwise be characterized. These cavities are occluded spaces. Excluded items will be disposed of in accordance with Project procedures (24915-OPS-5PR-00-00023, 24915-OPS-5PR-00-00030, and related documents).

8.4.1.2 Occluded Spaces

Occluded spaces are confined volumes that can (1) potentially trap liquid agent, (2) prevent contact with a decontamination solution, and/or (3) prevent agent vapors from trapped liquid agent from being detected during headspace/unventilated monitoring. If potential spaces were exposed to liquid agent, then the spaces will be opened, decontaminated with a proper decontamination solution, and wedged or supported to allow verification of decontamination by headspace monitoring.

To complete agent decontamination of SSCs, occluded spaces must be identified and mitigated to ensure there are no opportunities for entrapping agent that may otherwise go undetected during air monitoring test evolutions. Occluded spaces can be identified by reviewing Project design drawings and by performing a physical inspection of an area or item during an occluded space survey (OSS) walkdown. This survey is typically performed by a team that is specially trained and assigned this responsibility. The OSS is used to identify confined areas within equipment, building surfaces, and structures that were exposed, or potentially exposed, to liquid or aerosol agent and that have (or have had) the potential to contain liquid agent. Each survey will consider operational knowledge as well as information gathered through site walkdowns and/or facility drawing reviews. If the survey reveals that occluded spaces exist, steps such as equipment disassembly will be taken to reveal these spaces for decontamination. Headspace monitoring will then be used to ensure adequate decontamination.

8.4.1.3 Soft or Porous Materials

Headspace monitoring for clearance of items relies on the principle that agent contamination will be available for monitoring. Soft or porous surfaces may absorb liquid agent, and monitoring may not be representative of potential internal agent contamination within those materials (e.g., insulation, rubber hose, and gaskets, wood and similar materials). When these materials are encountered during decommissioning, they must be specifically addressed on a case-by-case basis to determine the affinity for chemical agent and the effectiveness of decontamination methods applied. Porous materials exposed to liquid agent or agent vapors >1 IDLH levels will be removed or assessed during initial decontamination activities and therefore will not require consideration during the OSS.

8.4.2 SSCs Without Agent Contamination

The OTS equipment downstream of the thermal oxidizer (THO) ring assembly is not agent or PCB contaminated. Cleanout of this equipment can be conducted in parallel with or after completion of EB monitoring. Equipment will be drained and cleaned to remove residues and achieve applicable closure performance standards defined in Section 7.0. Waste generated during OTS flushes will be sampled and characterized in accordance with the Waste Analysis Plan. Any of the decontamination methods in Appendix A may be used singly or in combination to achieve the desired level of decontamination.

Container storage areas in the OTS room, OTS Storage Area B and SDC Debris Storage Area are not agent contaminated, and other types of non-agent contamination outside of the EB and ECM are predicted to be minimal. Several techniques may be employed to decontaminate non-agent-contaminated equipment or structures prior to final disposition. The simplest approach is removal of loose dirt, dust, or residues using sweeping, washing with water, vacuuming, or a combination thereof. This approach is expected to be all that is required to decontaminate the Subpart I container storage areas for closure of the units. If more aggressive decontamination techniques (e.g., steam cleaning, pressure washing) are required for the container storage areas, existing or temporary containments, berms, or adsorbent materials will be used to capture liquids for characterization and disposal.

Any wastes or residues that are collected from decontamination of these SSCs will be managed in accordance with Project procedures (24915-OPS-5PR-00-00023, 24915-OPS-5PR-00-00030, and related documents).

8.4.3 SSCs With PCB Contamination

Following completion of the SDC 2000 activities, processing equipment and storage areas that managed SFTs or PCB-contaminated residues will be cleaned and closed in accordance with the applicable requirements of 40 CFR 761.65(e) and this closure plan. The TSCA closure activities will utilize the same principles and methods that are used for decontamination and closure of chemical agent processing areas and will occur in conjunction with the RCRA closure. All secondary containment areas, storage areas, loading areas and processing areas that were exposed to PCB bulk product waste will be inspected and decontaminated to remove any visible PCB residues, and the waste will be managed in accordance with the Project procedures (24915-OPS-5PR-00-00023, *Hazardous Waste Management and Hazardous Material Reporting* Procedure; 24915-OPS-5PR-00-00030, *Waste Shipping*; and related documents).

Due to the solid nature of the PCBs in the SFT residue, mechanical decontamination by wiping, pressure washing, water flushing, steam cleaning, or vacuuming with a high-efficiency particulate air filtration vacuum is appropriate. These methods of decontamination or other methods described in Appendix A will be used to meet the performance standards of Section 7.3.

The Subpart X miscellaneous units and associated equipment (i.e., two chamber loading system, detonation chamber, buffer tank, and scrap discharge system) received and processed PCB articles during SDC 2000 operations. Contaminated equipment and material may be dismantled and decontaminated using any of the methods described in Appendix A. Effective decontamination will be verified as non-contaminated for PCBs in accordance with the CVQAPP.

As closure commences, all PCB articles and bulk product waste will be removed from the EB and SDC 2000 Subpart I container storage areas, and PCB decontamination efforts will focus on areas where PCB articles were processed and stored. Walls and ceilings of the PCB storage areas are not likely to be contaminated by PCB residues, and decontamination efforts will focus on floors in the permitted storage and processing areas, and surfaces of SFT handling equipment.

Since BGCAPP demonstrated that PCBs were destroyed in the THO (24915-SYS-5PL-80-00001, *Static Detonation Chamber (SDC) 2000 Surrogate Demonstration Test Plan*), PCBs are not expected to be found in OTS equipment downstream of the THO ring assembly. This equipment will be verified as non-contaminated for PCBs in accordance with the CVQAPP. Concrete surfaces in storage and processing areas have been treated with sealants or protective floor-coating systems to prevent permeation of non-liquid PCBs into the immediate surface. Therefore, concrete coatings and surfaces will be treated as non-porous surfaces for the purposes of TSCA closure activities.

8.5 Management of Closure Waste

401 KAR 39:090 Section 1, 40 CFR 264.114

This section describes the practices that will be utilized for managing closure-generated wastes transported offsite for disposal and management of demolition debris prior to industrial clean closure certification.

8.5.1 Newly Generated Closure Waste

Throughout closure, BGCAPP will continue to be a generator of hazardous wastes subject to the applicable requirements of 40 CFR Sections 261 and 262 with respect to identification, accumulation, labeling, packaging, and manifesting of wastes for offsite treatment and/or disposal and the use and management of containers. Secondary wastes generated during the closure period will be characterized in accordance with the applicable requirements of 40 CFR 262.11, the RCRA Part B Permit Waste Analysis Plan (WAP), and site procedures that are currently in place (24915-OPS-5PR-00-00023, *Hazardous Waste Management and Hazardous Material Reporting Procedure*, and related documents) to support facility operations. These wastes may include agent-contaminated or agent-derived wastes as well as wastes that are not agent-related or that are considered hazardous due to either a hazardous waste characteristic or listing. Wastes that are produced from continued operations by permitted treatment and storage activities at BGCAPP are subject to the waste management provisions contained in the WAP.

Characterization of the waste determines the hazards, applicable waste codes, and whether further treatment is required before disposal in accordance with Land Disposal Restrictions (LDR) standards. Closure wastes that are not treated onsite to meet LDR standards may be sent offsite to a permitted TSDF and will be fully characterized by the receiving TSDF as necessary to support LDR disposal requirements.

8.5.2 Kentucky Listed Wastes

Agent-bearing or agent-contaminated wastes carry the applicable, agent-specific Kentucky listed waste codes N001 and N002 in addition to other applicable waste codes. The treatment residues from the demilitarization of listed chemical agents N001 and N002 are considered agent-derived wastes that are defined as listed hazardous wastes in accordance with 401 KAR 39:060 Section 3, and they include agent-specific wastes codes for RM and SFT parts, SDC residue, lab wastes, and offgas treatment system liquids and residues. A recent addition to this list includes codes for waste items that were contaminated with agent and have been decontaminated to a level such that they are no longer acutely hazardous:

> N1001: GB contaminated waste equipment, tools, and construction materials that have been decontaminated in accordance with United States Army Guidelines and have been determined to be safe for storage or transport and approved by the Cabinet as no longer acutely hazardous
>
> N1002: VX contaminated waste equipment, tools, and construction materials that have been decontaminated in accordance with United States Army Guidelines and have been determined to be safe for storage or transport and approved by the Cabinet as no longer acutely hazardous

These decontamination waste codes (N1001 and N1002) provide an important distinction from the agent waste codes N001, N002, offering relief from the more stringent application of the federal RCRA “derived-from” rule (40 CFR 261.3, Definition of Hazardous Waste). The derived-from rule states that any waste derived from the treatment, storage, or disposal of a listed hazardous waste is itself a hazardous waste. Under this rule, a waste may still be classified as hazardous although it has little or no remaining amounts of hazardous constituents. Under federal rules, these derived-from wastes also carry the same hazardous waste code for which they were listed before treatment, storage, or disposal.

If the more stringent federal derived-from rule were applied to decontamination waste streams, those waste streams would continue to carry the applicable Kentucky agent waste codes N001 and/or N002, designating them as agent-contaminated regardless of the amount of remaining residual agent. Since the Kentucky-specific listed hazardous waste codes are not recognized at the federal level, Kentucky has the statutory authority to reclassify any residues of agent demilitarization processes (secondary waste) in accordance with Subsection 7 of KRS 224.50-130. Under this authority, Kentucky has reclassified agent-contaminated waste streams that have been demilitarized (treatment or decontamination) with the non-agent waste codes N1001 and N1002 specified in 401 KAR 39:060 Section 3, Subsection 4.

8.5.3 PCB Wastes

Prior to beginning closure, all SFTs and containerized PCB wastes will be removed from the SDC 2000 facilities. Any remaining bulk product waste residues are not debris and will be characterized and managed in accordance with Project procedures (24915-OPS-5PR-00-00023, *Hazardous Waste Management and Hazardous Material Reporting Procedure*; 24915-OPS-5PR-00-00030, *Waste Shipping;* and related documents). Any materials containing regulated concentrations of PCBs are subject to applicable TSCA disposal requirements at 40 CFR 761.62. In some cases, wastes containing PCB residues may be characterized with generator knowledge. Subsection 4.

8.5.4 Decontamination Liquids

Bulk liquid wastes generated during the closure period (e.g., system flushing fluids, spent decontamination solution) will be transferred to DOT containers, intermediate bulk containers (totes), frac tanks, International Organization for Standardization tank containers (ISOtainers), or tanker trucks prior to shipment offsite for treatment and disposal. Decontamination liquid wastes will be removed from SSCs prior to their release to demolition subcontractors or turnover to BGAD for future use

8.5.5 Demolition Debris

An intact, standing building, structure, or piece of equipment that continues to perform its essential function is not considered to be discarded until it is intentionally dismantled or destroyed for disposal. Such in-use material is not a solid waste because it has not been discarded, or intended for discard, as these terms are used in RCRA. Structures and equipment that are still in use or will continue to be used following closure are not wastes and are exempt from LDR treatment standards.

Hazardous waste management units that are designated for demolition or reuse are subject to the applicable closure performance standards in Section 7.0. The Project may use the conditioned exclusion of treated debris (40 CFR 268.45[c]) for decontaminated items that meet the hazardous debris treatment standards summarized in Appendix B (40 CFR 268.45, Table 1). Items that meet the closure performance standards and the debris treatment standards for the SSC undergoing closure are considered nonhazardous once the building and equipment components are demolished and become debris. This is a self-implementing “no-longer-contains” determination, and the Federal and Commonwealth of Kentucky derived-from listed waste codes no longer apply to the debris (40 CFR 261.3[f][2]). Residuals generated from the treatment of hazardous debris will be separated from the treated debris and managed in accordance with the applicable requirements of 40 CFR 262.11, the RCRA Part B Permit WAP, and Project procedures (24915-OPS-5PR-00-00023, 24915-OPS-5PR-00-00030, and related documents).

Demolition debris from HWMUs that has been treated using one or more of the specified extraction technologies specified in Appendix B and does not exhibit a characteristic of hazardous waste identified under Subpart C of 40 CFR Part 261 after treatment will not be regulated as a hazardous waste and need not be managed in a Subtitle C facility (e.g., BGCAPP may ship treated demolition debris to an offsite Subtitle D landfill or resource recovery facility).

8.5.6 Demolition Waste Management

Once all SDC 2000 areas and equipment have been decontaminated or treated to meet the closure performance standards of Section 7.0 and the UMT has been completed, the SDC 2000 will be demolished. The UMT is final verification that agent hazards have been mitigated, and agent vapor containment is no longer required. For the purposes of this closure plan, wastes generated from demolition of HWMUs will be containerized as soon as practicable after demolition has occurred and managed as either nonhazardous demolition debris or newly generated waste upon containerization. Nonhazardous demolition debris is the demolition waste stream that is not contaminated or that which has been treated to meet the applicable chemical agent closure performance standards of Sections 7.1 through 7.3 and the applicable treatment standards for hazardous debris described in Section 7.4. Nonhazardous demolition debris will be containerized as soon as practicable to minimize the spread of wind- or water-borne dust and particles from the demolition site. Silt fences and similar control measures will also be in place during demolition.

Newly generated hazardous waste and hazardous debris resulting from demolition of SSCs will be containerized as soon as practicable and will be considered properly containerized when placed in waste hauling equipment, rolloffs, waste bins, or DOT containers. Intact portions of the equipment, building, or structures undergoing closure will not be declared waste or debris until the item is demolished, and the material has been containerized for transportation.

Demolition waste pre-shipment activities include segregation of waste to recover recyclable materials and size reduction of large pieces of rubble and debris prior to containerization. Should segregation and size reduction be unnecessary, demolition waste may be loaded directly into waste hauling equipment or containers without segregation. Relocation of waste and debris materials within the site boundaries for additional segregation to recover recyclable materials or additional size reduction will be permissible provided that dust control and wind-driven material mitigation measures are employed as described in Sections 8.5.8 and 8.5.10.

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8.5.7 Timely Containerization of Waste

Once demolition has commenced, newly generated hazardous waste or hazardous debris will be placed into approved DOT containers or transportation equipment (e.g., rolloffs, end-dumps) in as timely a manner as demolition and size reduction activities allow. Hazardous wastes or hazardous debris that are susceptible to wind-driven dispersion (in spite of any dampening applied) will be containerized prior to the end-of-shift each day.

Equipment and items that are dismantled during closure and demolition activities will be subject to the hazardous waste generator requirements of 40 CFR 262.17 when the equipment is removed from the building that it was housed in. Once generated, hazardous debris becomes subject to the applicable pre-transport requirements (e.g., packaging, labeling, marking, placarding, accumulation time) of 40 CFR 262. The basis of characterizing newly-generated hazardous waste or hazardous debris will generally be based on generator knowledge in accordance with 40 CFR 262.11(c)(2).

8.5.8 Size Reduction

Size-reduction techniques are used to make items easier and safer to handle and to facilitate packaging for transportation or to prepare items for subsequent treatment. Dismantling SSCs during closure involves operations typically used for construction or demolition with additional constraints for controlling spread of contamination. The Project may use a number of mechanical or high-temperature size-reduction methods and equipment during closure (e.g., circular saws, shears, power nibblers, orbital cutters, abrasive cutters, milling, shredding chipping hammers, paving breakers, abrasive water jets, expansive grout, plasma arc, torch, thermal lance, contact arc, arc saws).

The tool(s) or techniques that will be used for size-reduction will be specified in the individual work packages/work orders that are sent to the field for implementation prior to demolition. Demolition subcontractors are not subject to the BGCAPP work control/work order process, and they may use any size reduction techniques that are within the scope of their work.

Building components and equipment requiring size-reduction (e.g., sized to fit into waste hauling equipment or rolloff containers) will be handled with the following considerations:

- Size-reduction items may be placed upon concrete slabs, asphalt, or soil that will be removed during demolition for offsite disposal under BGCAPP closure activities.
- Soil, concrete slabs, and asphalt may remain in place following demolition provided that the location is verified to be clear of demolition debris prior to final demobilization.

8.5.9 Recycling/Reclamation of Metal Components and Concrete

Metal equipment and building pieces that are recyclable by reclamation (e.g., recovery of the metal content) are exempted from RCRA Subtitle C hazardous waste regulation per 40 CFR 261.6(a)(3)(ii).

In order for the scrap metal to be recycled, all of the following requirements will be met:

- The scrap metal shall have met the requirements of this closure plan.
- BGCAPP shall evaluate the potential for personnel exposure to any agent hazards in accordance with the EDP.
- BGCAPP will demonstrate a known market for the scrap metal.
- BGCAPP will possess a contract with a legitimate recycler for receipt of scrap metal including provisions for assurance of reclamation.

Building components and equipment in need of size reduction (e.g., sized to fit into rolloff containers) may be placed upon the following:

- Concrete slabs that are themselves destined for demolition and disposal under BGCAPP closure
- Concrete slabs, asphalt, or soil to remain in place following demolition, provided that the location is verified to be clear of demolition debris prior to final demobilization

Eligible material from demolition of decontaminated SSCs may also be sent offsite as recycled concrete rubble. Recycled concrete may be recovered from nonhazarous debris and converted to construction aggregate and raw material for new concrete or other uses as appropriate.

8.5.10 Dust Suppression and Mitigation of Wind-Driven Materials – 401 KAR 63:010

Dust suppression during demolition and size-reduction activities will be performed as necessary with the use of water sprays applied sparingly so as to avoid or minimize run-off from debris management areas. Run-off from dust suppression water will be controlled and contained with temporary berms to prevent it from entering site drainage features and bermed areas will be recorded in the facility operating record. Affected soils in the bermed areas will be removed with the demolition debris.

The soft or friable materials in the debris piles will be dampened with water as necessary to prevent or minimize particulates from becoming wind-driven insofar as practicable. Efforts will be made during segregation and size-reduction of recyclable/recoverable materials to minimize dust generation with dampening performed as necessary.

The following control measures will be used as necessary during the closure period to minimize windblown dust from demolition areas:

- When dust is first seen rising and is easily observed, water is sprayed to maintain compliance with the conditions of Kentucky Pollutant Discharge Elimination System (KPDES) Permit No. KY0020737.
- All unpaved roads and other disturbed-surface areas onsite are watered frequently to minimize off-property transport of visible fugitive particulates.
- Covering open-bodied trucks at all times while in motion during transportation of materials likely to become airborne significantly reduces dust.
- Vehicle speed on all unpaved roads and disturbed areas is reduced. Speed limits will be posted and enforced.
- Maintenance of paved roadways in a clean condition limits demolition dust.

These measures will satisfy the requirements of 401 KAR 63:010 during demolitions of structures at the facility.

8.6 Reuse of Structures and Equipment

Due to the intrinsic value of some material, it is cost effective for certain items to be returned to usable service rather than discarded as waste. Items that are destined for reuse are not considered to be wastes, and any potential agent hazards will be evaluated through the EDP and other applicable Project procedures (e.g., 24915-SAF-5PR-00-00023, *Toxic Chemical Agent Safety*, and related procedures). The EDP describes agent decontamination criteria and action levels for release of contaminated items for reuse. Consequently, equipment and areas may be decontaminated, verified as decontaminated, and released for reuse based on selected health-based criteria for the anticipated use environment. The EDP identifies the allowable reuse environments in terms of the chemical agent unventilated monitoring thresholds:

- Facilities/items screened to less than the VSL are available for restricted release to agent workers only. Maintenance or disassembly of such items will only be performed by personnel knowledgeable in agent symptoms and characteristics and within facilities equipped with appropriate safeguards to control potential hazards.
- Facilities/items screened to less than the WPL concentration are available for restricted release to non-agent workers. Items or facilities screened to this level must remain under Government control and should not be modified or disassembled. If maintenance or disassembly of such items is necessary, it will be accomplished by personnel knowledgeable in agent symptomatology and characteristics and in facilities equipped with appropriate safeguards to control potential hazards.
- Facilities/items screened to less than the GPL concentration are available for unrestricted release to non-agent workers and the general public.

Systems, structures, and equipment that are still in use or will continue to be used are not subject to LDR treatment standards for final closure. Such in-use materials are not solid wastes because they are not discarded or intended for discard as defined in 40 CFR 261.2. However, permitted units, ancillary equipment and other appurtenances that will continue to be used after final closure of the facility will be decontaminated and closed in accordance with the closure standards identified in the EDP.

9.0 DISPOSAL OR DECONTAMINATION OF EQUIPMENT, STRUCTURES AND SOILS

401 KAR 39:090 Section 1; 40 CFR 264.114 and 761.65

During partial and final closure activities, all contaminated equipment, structures, and soils will be decontaminated or removed in accordance with this closure plan, and all waste items will be disposed of properly.

Any remaining inventory of hazardous waste in the permitted units and associated ancillary equipment will be removed and shipped to a permitted TSDF that is approved to receive these wastes. Facilities and equipment that are closed in accordance with this closure plan may be turned over to BGAD or demolished for off-site dispostion.

Due to the intrinsic value of some material, it may be cost effective for certain items to be returned to usable service rather than discarded as waste. Items that are destined for reuse are not considered to be wastes, and any potential health hazards will be evaluated through existing Project procedures (e.g., 24915-SAF-5PR-00-00023, *Toxic Chemical Agent Safety*, and related procedures).

10.0 CLOSURE SAMPLING

401 KAR 39:090 Section 1; 40 CFR 264.112(b)(5)

Closure Sampling may include both in-progress decommissioning sampling (IPDS) (Section 10.1) and Closure Verification Sampling (Section 10.2) or simply Closure Verification Sampling to demonstrate clean closure criteria as defined in the CVQAPP have been achieved.

10.1 In-Progress Decommissioning Sampling

In-progress decommissioning sampling (IPDS) will be performed during the decommissioning phase to demonstrate demolition will be accomplished in a safe and environmentally compliant manner. A combination of physical sampling and air monitoring may be used to evaluate cleanliness of equipment and the underlying protective barriers where hazardous waste was processed. The sampling methodology and data quality requirements for sample collection and analysis to screen areas for the presence or absence of contamination and the designated action levels will be incorporated into an independent IPDS Plan or will be included in the CVQAPP for the SDC 2000. The IPDS and CVQAPP sampling strategies are under development.

If required, the IPDS Plan will be developed as a Project-level document that is independent of this Closure Plan, and it will provide the necessary flexibility to execute decommissioning activities efficiently and ensure protection of workers, the public, and the environment. The IPDSP will be provided to the Director as supplemental information in support of the Closure Plan.

The CVQAPP is an integral component of the RCRA closure plan, and it will be submitted to the Director for review and approval.

10.2 Closure Verification

401 KAR 39:090 Section 1; 40 CFR 264.112(b)(4) and 761.65(e)

Final Closure verification sampling and analysis provides confirmation that the industrial clean closure criteria defined in the CVQAPP have been satisfied, and the surrounding environment has not been contaminated by BGCAPP operations. In addition to the industrial clean closure criteria, the CVQAPP defines the field sampling design, the sample analyses that will be performed, and the Quality Assurance/Quality Control requirements which ensure that the data accurately reflect conditions of the site as configured for final RCRA and TSCA closure. If the industrial clean closure criteria are confirmed, BGCAPP will proceed with closure certification in accordance with 40 CFR 264.115 and 761.65. If not, additional decontamination and/or removal activities will be performed. If decontamination or removal efforts are unsuccessful or impractical, a site-specific risk assessment or alternative remediation plan will be developed and submitted for KDEP approval.

Closure verification sampling and analysis will take place after potentially contaminated waste, debris, and soils have been removed and transported offsite for disposal. The industrial clean closure criteria defined in the CVQAPP are applicable to the final physical configuration of the facility which includes permitted units that will be clean-closed and left in place for turnover to BGAD for future use and to the environmental media where HWMUs or structures that housed HWMUs are demolished. Hazardous wastes, closure wastes and demolition debris sent offsite for disposal prior to final closure are not subject to the industrial clean closure criteria and will be handled in accordance with the Waste Analysis Plan.

Data obtained from closure verification sampling and analysis will be provided to KDEP for final closure certification and provide the basis for either accepting or rejecting the facility's claim that contamination has been removed in accordance with the approved closure plan. Demonstration that the industrial clean closure criteria have been met will allow BGCAPP to close without the need for further maintenance or controls (post-closure care).

11.0 CLOSURE MONITORING FOR AGENT

401 KAR 39:090 Section 1; 40 CFR 264.114

Following completion of chemical weapon destruction activities at the SDC 2000 facility, agent vapor concentrations in the EB will decline as decontamination of systems, structures, and equipment proceeds. Chemical agent air monitoring will continue to be used during closure for safety and compliance purposes and also for clearing items for transfer from the EB for reuse or disposal. The requirements for monitoring will be reduced as closure progresses through the completion of UMTs, and all agent monitoring will be suspended when engineering controls are no longer needed.

11.1 Point Source Monitoring

Point source monitoring uses near-real-time (NRT) agent monitors in ventilated areas to identify agent emission sources and is distinct from area monitoring and headspace monitoring. Point source monitoring is an adaptive method of monitoring that may be part of a graded approach to ensure successive decontamination efforts are effective, or it may be used to locate a known or suspected area of contamination on an item or within a room that is under engineering controls. This type of monitoring may also be used to support a targeted approach for verifying that a specific level of decontamination has been achieved (e.g., < 1 VSL) in preparation for follow-on work activities or monitoring tests. Point source monitoring may be either judgmental or systematic in nature.

11.2 Clearance Monitoring

There are two methods of air monitoring that will be used during closure to verify that equipment, areas, and structures meet designated agent screening criteria: 1) headspace monitoring and 2) unventilated monitoring. Headspace monitoring is generally used to verify agent levels for waste clearance, and unventilated monitoring is used to verify the effectiveness of the agent decontamination effort before releasing agent-contaminated structures for reuse or to the mass demolition contractor.

11.2.1 Headspace Monitoring

Headspace monitoring is used to determine operational constraints, PPE requirements, decontamination levels, and waste characterization. Either NRT monitoring or DAAMS methods may be used for headspace monitoring to clear items for removal from the EB based on approved methods and the monitoring application. Headspace monitoring is performed at the required screening level on items that are bagged or contained in an enclosure of sufficient volume that allows for a representative vapor sample to be collected while minimizing dilution with incoming air.

For agent decontaminated items that will be reused, headspace monitoring will be conducted to demonstrate that agent vapor concentrations do not exceed the monitoring level for the reuse environments described in Section 8.6. Monitoring will be performed in accordance with 24915-00-9PL-00-00001, *Laboratory Analysis and Monitoring Plan*, and 24915-GEN-5PL-00-00006, *Equipment Decontamination Plan*.

Waste items will be screened to 1 VSL with an action level of 0.7 VSL. Items above the action level may be further decontaminated or packaged and shipped as >1 VSL waste in accordance with the Bounding Transportation Risk Assessment (BTRA). Waste items that are screened to less than the 0.7 VSL action level may be left in place for demolition or placed in containers, in flexible intermediate bulk containers (FIBCs, a.k.a. Super sacks) on pallets, or transferred out of the EB and placed in rolloffs. Rolloffs will be managed onsite in accordance with Project procedures (24915-OPS-5PR-00-00023, *Hazardous Waste Management and Hazardous Material Reporting Procedure*) and shipped offsite for final disposition in accordance with Project procedures (24915-OPS-5PR-00-00023; 24915-OPS-5PR-00-00030, *Waste Shipping*; and related documents).

11.2.2 Unventilated Monitoring

The final requirement to verify the effectiveness of the agent decontamination effort before releasing agent-contaminated structures for demolition is to conduct a UMT. Unventilated monitoring detects low-level agent vapor emissions that may be diluted to less-than-detectable concentrations by the ventilation airflow. A UMT is performed in all areas deemed to be potentially agent-contaminated in the *SDC 2000 Health-Based Risk Assessment* (HBRA, under development; see Section 6.3) as determined by a review of operational and monitoring history. The UMT is the final verification that agent hazards have been mitigated and the facility is ready for final disposition.

Agent-contaminated SSCs will be decontaminated, decommissioned, and prepared for demolition and disposal after the completion of agent operations. The project level document, 24915-CL-5PL-80-00002, *Unventilated Monitoring Test Plan* (under development), provides the information, guidance, and requirements to prepare for and execute UMTs of contaminated SDC 2000 areas identified in in the HBRA. The UMT results will be provided to the Division for review and approval before demolition of the EB begins.

11.3 Agent Monitoring Reduction

Agent monitoring in SDC 2000 facilities may be suspended or terminated based on project needs and closure progression. The SDC 2000 configuration is such that all of the air in the EB, to include the exhaust from the off-gas treatment units, is routed through the HVAC IONEX carbon filter units. Cessation of monitoring of the filter mid-beds and stacks/exhaust ducts for previously processed agents will not occur until all potentially contaminated carbon filter banks have been removed.

Agent monitoring reduction will be conducted in accordance with the applicable BPBG plans and procedures. Prior to Termination of Engineering Controls (see Section 12.0), agent monitoring reductions will be implemented with KDEP concurrence following submittals of appropriate permit modification requests.

12.0 TERMINATION OF ENGINEERING CONTROLS

401 KAR 39:090 Section 1; 40 CFR 264.112(b)(5)

Engineering controls function to protect workers and the environment from agent exposure. The HVAC system establishes and directs a cascading airflow from areas with the least probability of agent contamination toward areas with the highest probability of agent contamination and exhausts to the atmosphere through a charcoal filter system. Prior to removal of engineering controls, UMTs will be conducted in discreet areas as determined by risk assessment. When the criteria for termination of engineering controls have been met, all ventilation systems and chemical agent monitoring may be suspended.

13.0 DETAILED DESCRIPTION OF OTHER NECESSARY ACTIVITIES

401 KAR 39:090 Section 1; 40 CFR 264.112(b)(5)

This section of the closure plan provides a description of activities necessary for closure of the SDC 2000 facility that are not addressed elsewhere in the plan.

13.1 Proper Operation and Maintenance

The RCRA Permit Condition S.II.D.(6) requires BGCAPP to properly operate and maintain all active permitted hazardous waste facilities and systems. When a permitted system or component is no longer required, it may be shut down or removed to reduce maintenance requirements and prevent accidental initiation of a system during the constantly changing closure environment. Systems that are removed from service will be maintained to prevent unplanned releases to the environment, but the maintenance activities that were required for an operational unit may be suspended, including the requirements for operational backup or auxiliary facilities, equipment, or similar systems.

13.2 Termination of Inspections, Testing, Monitoring, and Maintenance

401 KAR 39:090 Section 1; 40 CFR 264.112(b)(5), 264.31, 264.33, 264.15

Inspections, calibrations, monitoring, and required testing may be suspended for HWMUs and support systems identified in the SDC 2000 RCRA Part B Permit when an item is removed from service for closure, and all hazardous waste has been removed (if present) from the permitted unit undergoing closure. Activities that will be suspended as closure proceeds include, but may not be limited to, the following:

- Inspections
- Logbooks and Recordkeeping
- Required training
- Floor coating systems
- Agent monitoring equipment and instrument calibrations
- Emergency equipment inventory, testing, and maintenance
- Security requirements
- Warning signs

As permitted units are taken out of service, specifically after hazardous wastes have been removed from the units as part of the closure process, the basis for conducting inspections and maintenance no longer exists. At that time, BGCAPP will place a final entry in the inspection and maintenance records for the unit stating that hazardous wastes have been removed from the unit, and the unit has been taken out of service as part of closure. The RCRA inspections and maintenance activities for permitted units cease with that entry into the operating record. Inspections required for large quantity generators will continue in accordance with 40 CFR 262.17, and BGCAPP will continue to comply with the applicable large quantity generator standards of 40 CFR 262 Subpart M until all hazardous waste has been removed from the site.

The Director will be notified in writing when any inspection, calibration, monitoring, testing or maintenance requirement listed in the RCRA Part B Permit or its Attachments F and G is suspended for closure. In addition, logbooks will no longer be required to be maintained or kept at locations identified in the Permit or its Attachments F and G once the item is removed from service for closure. A notation will be made in the associated inspection form or logbook that the item is undergoing closure when it is removed from service for closure, and a notice will be placed in the operating record.

13.3 Deviations from Container Management Practices in the SDC 2000 During Closure

401 KAR 39:090 Section 1; 40 CFR 264.112(b)(5)

As equipment inside the SDC 2000 is disassembled during closure, it may not be practical to promptly containerize all of the dismantled, disassembled, and/or segmented components into containers prior to demolition. As large pieces of equipment (such as pumps, piping, or valves, etc.) are dismantled, it may be necessary to lay these segments on the floor or other working surface so that additional size-reduction can be performed or to transfer the components using hoists and overhead cranes. In such instances, BGCAPP may lay items down directly onto the building floors without being required to observe normal labeling and container management practices.

SSCs will be dismantled and prepared for size-reduction and decontamination using any of the decontamination methods described in Appendix A prior to release of the SDC 2000 for demolition or reuse. The decontamination methods may be used singly or in combination. Any residues that are removed by decontamination will be collected and managed as waste in accordance with Project procedures (24915-OPS-5PR-00-00023, *Hazardous Waste Management and Hazardous Material Reporting Procedure* [CDRL D012]; 24915-OPS-5PR-00-00030, *Waste Shipping*; and related documents). As pieces of equipment are dismantled, it may be necessary to place these items on the floor or other working surface so that additional decontamination, size-reduction, segregation, and headspace monitoring can be performed to segregate and characterize the items for containerization without being required to observe normal labeling and container management practices. The purpose of size-reduction, segregation and characterization of closure wastes is to comply with the waste container restrictions imposed by the authorized TSDF. Once the items are size-reduced, segregated and characterized, they will be containerized and managed in accordance with project procedures (24915-OPS-5PR-00-00023, 24915-OPS-5PR-00-00030, and related documents).

Care will be taken to avoid damaging floor coatings; when the risk to floor coatings is determined to be excessive, protective floor liners will be used to ensure free liquids remain contained. Any uncoated concrete floors used for placement of items that potentially contain liquids will be protected with temporary containments and protective floor liners, and any liquids emitted from a dismantled component will be transferred to a container or an in-service process tank from an operable sump.

Outside of the EB, it is much more practical to bring a bulk collection container (e.g., hopper or rolloff) into the vicinity of any dismantling operation and transfer waste and decontaminated debris directly into the container. However, even in these areas it may be necessary to temporarily lay equipment on concrete pads or in secondary containment areas until transfers to bulk collection containers can be accomplished.

13.4 Run-on and Run-Off Control

401 KAR 39:090 Section 1; 40 CFR 264.112(b)(5)

Run-on and run-off control practices will continue during closure through the maintenance of site grading, storm drains, and the use of containment structures. Grading and containments prevent run on of uncontaminated stormwater and runoff of potentially contaminated stormwater.

Waste handling generally takes place in enclosed buildings which will have secondary containment for permitted units as required by the RCRA Pert B permit. During facility decommissioning activities, containment systems for permitted waste management areas will remain intact until hazardous wastes have been removed from the HWMU and containment system, and temporary berms may be used as the need arises during the decommissioning and demolition phases to control run-off.

The requirements of 24915-00-G01-GGEN-00002, *Storm Water Management Plan*, will continue to be applicable during closure as required by Kentucky Pollutant Discharge Elimination System (KPDES) Permit No. KY0020737. In accordance with the Storm Water Management Plan, silt fencing or equivalent material will be installed as necessary during demolition to capture silt and debris that may be entrained in runoff. Storm drain inlets will be protected by use of silt fences, earthen dikes, drainage swales, sediment traps, check dams, reinforced soil retaining systems, sediment basins or other appropriate measures. Soils in low spots where runoff carrying silt and debris may have accumulated during demolition will be excavated and disposed with other demolition debris.

These measures will prevent contamination from being inadvertently spread to the surrounding environment during closure.

13.5 Preparedness and Prevention

401 KAR 39:090 Section 1; 40 CFR 264.32(c) and (d), KRS 224.46-530

Emergency equipment and systems identified in Attachment F, Procedures to Prevent Hazards, and Attachment G, Contingency Plan and Emergency Procedures, of the RCRA Part B Permit may be removed or decommissioned as facility closure progresses. Emergency equipment and systems will be maintained during closure as long as they are required by building and safety codes.

The BGCAPP Engineering, Emergency Response, and Safety and Health personnel will evaluate fire protection systems and other safety systems for removal from service as part of the decommissioning and closure process. For example, fire extinguishers, fire suppression systems, and spill kits will be removed or isolated as closure proceeds, and the impact of equipment removal, system removal, or isolations will be evaluated through adherence to currently established engineering, safety, and emergency response Project procedures and plans in order to maintain the safety of personnel and the facility. Other systems and equipment identified as emergency or preparedness and prevention items, including warning signs, spill kits, and other emergency response equipment will be removed when it is safe to do so.

As part of the overall closure process, it will also become necessary to disable and remove alarm systems. As permitted units are taken out of service, specifically after hazardous wastes have been removed from the unit as part of the closure process, the alarm systems associated with those systems are no longer maintained and are dismantled and removed.

The Director will be notified when any emergency equipment or systems identified in Attachment F or Attachment G of the RCRA Part B Permit are anticipated to be removed or decommissioned as the result of facility closure, and a notice will be placed in the facility operating record that identifies the affected equipment or systems. Quarterly updates describing decommissioning and/or removal of emergency systems and equipment identified in Attachment F, Procedures to Prevent Hazards, and Attachment G, Contingency Plan and Emergency Procedures, of the RCRA Part B Permit will be provided to the Director no later than 45 days after the end of each calendar quarter. The Project will continue to comply with the applicable large quantity generator standards of 40 CFR 262 Subpart M until all hazardous waste has been removed from the BGCAPP site or control of the site is turned over to BGAD.

13.6 Removal of Communications Equipment

401 KAR 39:090 Section 1; 40 CFR 264.32(a) and (b)

Project subject matter experts in Engineering, Emergency Response, and Safety and Health will evaluate communication systems and other safety systems for shutdown as part of the decommissioning and closure process. Safety systems will be maintained in service as long as they are required by the RCRA Part B Permit and by building and safety codes. When a system or component is no longer required, it may be shut down or removed to reduce maintenance requirements and prevent accidental initiation of an alarm system during the constantly changing closure environment. Planning, notifications and execution of these activities will be completed in accordance with the RCRA Permit and applicable codes and regulations.

The Project maintains an internal communications system consisting of telephones, two-way handheld radios, cellular phones, a public address system, visual signals and audible signals. These devices provide a combination of voice and signal information throughout the facility to BGCAPP personnel and BGAD Security. The Project also maintains an external communications system consisting of telephones, two-way handheld radios, and cellular phones. These devices provide redundant communication channels to summon security, and emergency response from the BGAD emergency operations center (EOC) as needed.

As part of the overall closure process, it will become necessary to disable and remove some communications and safety equipment. As permitted units are taken out of service, specifically after hazardous wastes have been removed from the unit as part of the closure process, the communications and safety equipment associated with those systems may be reduced, disabled, or removed.

The Director will be notified when any communications/safety equipment or systems identified in Attachment F, Procedures to Prevent Hazards, and Attachment G, Contingency Plan and Emergency Procedures, of the RCRA Permit are to be removed or decommissioned as the result of facility closure, and a notice will be placed in the facility operating record that identifies the affected equipment or systems. Quarterly updates describing decommissioning and/or removal of communications/safety equipment identified in Attachment F and Attachment G of the RCRA Permit will be provided to the Director no later than 45 days after the end of each calendar quarter. The Project will continue to comply with the applicable large quantity generator standards of 40 CFR 262 Subpart M until all hazardous waste has been removed from the site.

13.7 Revisions to the RCRA Contingency Plan

401 KAR 39:090 Section 1; 40 CFR 264.54

The Contingency Plan will remain in effect during closure of the facility, and it will be updated as closure proceeds to reflect the status of the facility through closure. Information contained within the facility's RCRA Contingency Plan covers several subjects (e.g., alarm systems, evacuation routes, communications equipment, spill response equipment) and changes to that plan are subject to the requirements of 40 CFR 264.54 and the RCRA Permit requirements of S.III.D.(4).

As part of the overall closure process, spill response equipment will be removed when it is no longer required. As permitted units are taken out of service and hazardous wastes have been removed, emergency equipment specified in the contingency plan for that area is no longer required to be present or maintained. Work plans for these areas will identify hazards and will include a list of emergency equipment required for the closure activities being performed.

During the closure period, BGCAPP will keep current copies of all agreements with local authorities for hazardous waste emergency response assistance at an onsite location. If, at any time, the Permittee terminates an agreement with an off-post responder listed in the RCRA Contingency Plan or does not renew an agreement with an off-post responder listed in the RCRA Contingency Plan, then the Permittee will notify the Director.

Administrative updates and/or changes made to the RCRA Contingency Plan during closure to keep the plan current with existing conditions may not warrant a permit modification. These updates shall be submitted to the Director for determination in accordance with 401 KAR 39:060, Section 5. The Project will continue to comply with the applicable large quantity generator standards of 40 CFR 262 Subpart M until all hazardous waste has been removed from the site.

13.8 Security

401 KAR 39:090 Section 1; 40 CFR 264.14

The BGAD restricted area is separated from the administrative area and the public by fences and security checkpoints. There are specific entry procedures established, and all entrants must obtain clearance to enter or be escorted by an individual with clearance authorization.

The CLA, which is fully contained within the BGAD restricted area, is a secure area, and access requires special procedures. Visitors requesting access to the CLA must first comply with health test, security, and safety procedure requirements. The CLA visitors are provided an escort while inside the CLA. Armed security personnel patrol and control/limit access to the area 24/7.

When all recoverable chemical agent has been removed from the CLA, security measures may be revised, but the area will be off limits to unauthorized individuals and armed security personnel will continue to patrol and control/limit access to the area. These measures will continue to prevent unknowing entry and minimize the possibility for unauthorized entry of persons or livestock onto the active portion of the facility.

13.9 Revisions to the Training Plan

401 KAR 39:090 Section 1; 40 CFR 264.16

As permitted HWMUs are taken out of service, the training requirements will be revised to reflect the job functions of affected personnel without the need to formally modify the RCRA Part B permit. Training requirements will be reduced and modified as closure proceeds, but BGCAPP will continue to comply with the applicable large quantity generator requirements of 40 CFR 262.17(a)(7) for personnel training until all hazardous waste has been removed from the site. These measures will ensure that facility personnel are able to respond effectively to emergencies by familiarizing them with emergency procedures, emergency equipment, and emergency systems.

The Project will maintain training records in accordance with BPBG Training Procedures, 401 Kentucky Administrative Regulation (KAR) 34.020, General Facility Standards, Section 7, and 40 CFR 264.16(d) and (e). The Project will include documentation of training requirements, student performance, and course data as required by regulations and accepted operating practices.

13.10 Configuration Management and Permit Drawings

401 KAR 39:090 Section 1; 40 CFR 264.31, 264.601 and 270.30(l)

Maintaining configuration control during the closure period is necessary to ensure systems that are essential to safe operation of the facility continue to function in a reliable manner, and configuration management will be maintained for any system in operational standing during closure. Once a HWMU is designated for decommissioning, hazardous waste will be removed, and it will be permanently taken out of service and decommissioned in accordance with the associated DDP(s) and SCRs.

Once a RCRA-permitted unit, system, or piece of equipment has been permanently removed from service and designated for closure, configuration control with respect to the RCRA operating permit will no longer be required. A permit modification to update the RCRA Part A application indicating the HWMU is no longer operational will be submitted to KDEP to update the status of the permitted item.

Once a permitted unit or system is taken out of service for decommissioning, configuration control for that system and all applicable RCRA Part B Permit controlled documents (e.g., drawings, calculations, procedures) can be removed from the configuration management program. RCRA Part B Permit controlled items associated with the unit that is taken out of service will no longer updated or modified for the permit. Corresponding modifications to the Environmental permit drawing list will be initiated, and affected drawings/procedures will no longer be managed as RCRA Permit controlled items; all applicable procedural flags will be removed.

Since dismantlement and disassembly of an HWMU pursuant to closure does not constitute a modification of the HWMU with the intent to commence storage, treatment, or disposal of hazardous waste within the HWMU, FCCs will not be required. Therefore, RCRA Permit Condition S.II.D.(9) will not apply when modifying the configuration of any HWMU pursuant to closure unless the HWMU is intended for continued hazardous waste storage or treatment.

14.0 CORRECTIVE ACTION

401 KAR 39:090 Section 8; 40 CFR 264.100

Currently, there are no corrective action sites at BGCAPP. The RCRA closure applies to all permitted HWMUs and spills or releases to the environment that are reported per the RCRA Permit. One-time accidental spills are not considered to be SWMUs. However, BGCAPP's spill history must be reviewed to determine if there are areas of concern that warrant sampling during closure to ensure that there are no hazardous constituents that are above the defined closure screening levels.

Based upon the current operating history of the facility, there is no reason to expect that the surrounding environment (e.g., soil, groundwater, and surface water) has been contaminated as a result of BGCAPP operations, and the facility is expected to achieve industrial clean closure after operations are complete. If operations result in contamination that cannot be effectively cleaned up during the closure phase, a post-closure plan may be necessary, but BGCAPP does not anticipate performing corrective action or post-closure care.

15.0 MAXIMUM WASTE INVENTORY

401 KAR 39:090 Section 1; 40 CFR 264.112(b)(3)

The inventory of hazardous wastes at BGCAPP will be managed in accordance with RCRA and TSCA requirements for facilities undergoing closure. At the time an HWMU is closed, there will be no remaining inventory of hazardous waste present. However, 40 CFR 264.112(b)(3) requires that a closure plan provide an "estimate of the maximum inventory of hazardous wastes ever onsite over the active life of the facility." A conservative estimate of the maximum waste inventory onsite at the start of closure would be the total volume of wastes stored in containers and tanks regardless of whether they were ever operated in that manner.

As a result of this conservative approach, the volumes of ancillary piping and equipment are not considered in the estimate of the total maximum inventory of waste. Additionally, newly-generated hazardous wastes were accumulated onsite in multiple CAAs (<90-day) under the provisions of 40 CFR 262.17 throughout the operating history of BGCAPP. As closure proceeds, additional <90-day areas may be established for waste collection. However, the volume of hazardous wastes contained in these <90-day accumulation areas is not included in the estimate.

Appendix C provides the maximum waste inventory based on permitted capacities of Subpart J Tanks and Subpart I container storage areas at the SDC 2000 when closure begins. Permitted Subpart X treatment units are not included in the estimate.

Any RCRA and TSCA wastes that are removed from the site during closure are expected to be shipped offsite in accordance with existing Project procedures that are currently in place to support facility operations (24915-OPS-5PR-00-00023, *Hazardous Waste Management and Hazardous Material Reporting Procedure*; 24915-OPS-5PR-00-00030, *Waste Shipping*; and related documents). Much of the waste generated during the closure period will be treated onsite or stored in existing CAAs or permitted storage units and moved between units using the same equipment employed during operations. As decontamination and decommissioning of SSCs proceeds, systems will be removed from service and bulk liquids may be diverted from their normal flow path and transferred to intermediate bulk containers (totes), intermodal containers built to International Organization for Standardization specifications (ISOtainers) or tank trucks prior to shipment offsite for treatment and disposal. No liquid wastes will remain in SSCs upon release to demolition subcontractors or turnover to BGAD for future use.

Bulk solids may be placed in rolloff containers or commercial waste hauler equipment such as dump trucks or semi-tractor trailers provided by contracted waste disposal companies.

16.0 AMENDMENT OF PLAN

401 KAR 39:090 Section 1; 40 CFR 264.112(c)

A copy of the approved closure plan will be maintained at the facility. The Project will submit a written notification of, or request for, a permit modification whenever any of the following occur:

(i) Changes in operating plans or facility design affect the closure plan

(ii) There is a change in the expected year of closure, if applicable

(iii) In conducting partial or final closure activities, unexpected events require a modification of the approved closure plan

(iv) BGCAPP requests the Director to apply alternative requirements to a regulated unit under 40 CFR 264.90(f), 264.110(c), and/or 264.140(d)

The Project will submit a written request for a permit modification including a copy of the amended closure plan for approval at least 60 days prior to the proposed change in facility design or operation or no later than 60 days after an unexpected event has occurred which has affected the closure plan. If an unexpected event occurs during the partial or final closure period, the Project will request a permit modification no later than 30 days after the unexpected event [40 CFR 264.112(c)(4)].

17.0 NOTIFICATION OF PARTIAL CLOSURE AND FINAL CLOSURE

401 KAR 39:090 Section 1; 40 CFR 264.112(d)

The Project will notify the Director in writing at least 45 days prior to the anticipated date on which partial or final closure is expected to begin. Final closure of the SDC 2000 facility must begin no later than 30 days after the date which the facility receives the known final volume of hazardous wastes.

18.0 SCHEDULE FOR CLOSURE

401 KAR 39:090 Sections 1 and 8(8); 40 CFR 264.112(b)(6)

Upon completion of its mission to destroy the stockpile of chemical weapons, BGCAPP will close the SDC 2000 according to the requirements of the approved closure plan. Final closure of the facility includes decontamination, decommissioning, and demolition or re-use of equipment and facilities to satisfy the physical end-state condition as directed by the U.S. Army. Successfully achieving final closure will include decontamination and/or removal of hazardous waste or hazardous constituents at concentrations that may be harmful to human health or the environment.

The closure sequence and schedule will continue to be refined as the closure planning strategy is negotiated and approved. Closure schedule updates will be provided to the Director as information becomes available.

18.1 Closure Activities and Milestones

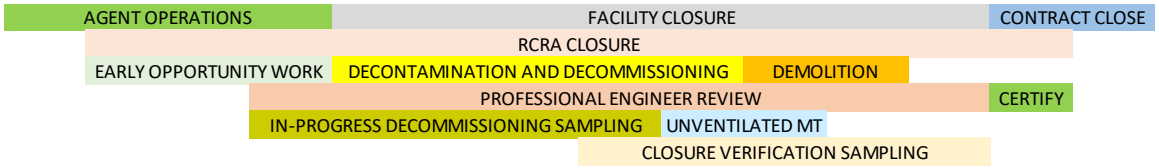
NOTE

Section 18.1 will be revised when a closure schedule is developed.

Milestone activities for SDC 2000 closure include the following:

- End of chemical agent processing
- Termination of surety status
- Initial decontamination complete for reduced PPE
- Decontamination and decommissioning complete
- Unventilated monitoring testing complete
- Demolition and facility disposition complete
- Closure verification sampling and data validation complete
- PE certifies RCRA closure
- Administrative close-out of BGCAPP contract

The general milestone relationships are shown below:



18.2 Time Allowed for Closure

401 KAR 39:090 Section 1; 40 CFR 264.113(b)

The Project anticipates that it will take longer than 180 days specified in 40 CFR 264.113(b). It is estimated that approximately two years will be required for complete closure of the SDC 2000 facility. The Project therefore requests KDEP approve a closure schedule of two years. The Project will request an extension of this schedule if the closure requires additional time.

During the closure of the facility, BGCAPP will continue to take all steps necessary to prevent threats to human health and the environment from non-operating hazardous waste management units that have not yet been closed. Approval and issuance of the permit and this closure plan will satisfy the requirements under 40 CFR 264.113(c) to formally request an extension to the 180-day deadline of 40 CFR 264.113(b). No further approval of the closure schedule will be required unless an extension to the current schedule is needed. 40 CFR 264.113(d) and 264.113(e) are not applicable to BGCAPP closure activities.

18.3 Extension for Closure Period

401 KAR 39:090 Section 1; 40 CFR 264.113(b)(1)(i)

If required, any request for an extension to the closure period will be made in accordance with the requirements of 401 KAR 39:090 Section 1 and 40 CFR 264.113.

19.0 PARTIAL CLOSURE

401 KAR 39:090 Section 1; 40 CFR 264.112

The Project expects to begin final closure after the chemical weapons stockpile has been destroyed and does not anticipate partial closure of individual units. If a permitted unit is designated for complete decommissioning and removal prior to final closure, partial closure will be performed in accordance with the approved closure plan. If deviations from the approved closure plan are required for partial closure of a permitted unit, a partial closure plan will be prepared in accordance with 401 KAR 39:090 Section 1, 40 CFR 264.112(c), and 40 CFR 270.42.

20.0 POST-CLOSURE PLAN

401 KAR 39:090 Section 1 and Section 8; 40 CFR 264.90, 264.112(b)(8) and 264.118

Based upon the operating history of the facility, there is no reason to expect that there will be any releases from Solid Waste Management Units or that the surrounding environment has been contaminated as a result of BGCAPP operations. Therefore, the facility is expected to achieve industrial clean closure after operations and closure activities are complete. If hazardous waste operations result in contamination of soil, surface water, or groundwater that cannot be effectively cleaned up during the closure phase, a post-closure plan may be necessary, but BGCAPP does not anticipate performing corrective action or post-closure care.

21.0 CLOSURE COST ESTIMATE

401 KAR 39:090 Section 1; 40 CFR 264.142

Not applicable. The owner of the BGCAPP is the U.S. Federal Government, which is not required to provide financial assurances or a closure cost estimate.

22.0 FINANCIAL ASSURANCE MECHANISM FOR CLOSURE

401 KAR 39:090 Section 7; 40 CFR 264.143

Not applicable. The owner of the BGCAPP is the U.S. Federal Government, which is exempted as a Federal facility from providing financial assurances or a closure cost estimate in accordance with 40 CFR 264.140(c) and as outlined in Kentucky Revised Statute (KRS) 224.40-110. Note that unclosed portions of the facility [40 CFR 264.112(b)(2)] will only be operated during the closure period to support closure activities as necessary (e.g., permitted container storage areas).

23.0 FINAL CLOSURE CERTIFICATION

401 KAR 39:090 Section 1; 40 CFR 264.115 and 761.65

Final closure means the closure of all permitted units at the facility in accordance with the approved closure plan so that hazardous waste management activities under parts 40 CFR 264 and 265 are no longer conducted. Completion of facility closure will be certified by the Permittee and a Professional Engineer (PE). Within 60 calendar days of completion of final closure, the BGCAPP will submit to KDEP, and EPA Region IV, by registered mail, a certification that the facility has been closed in accordance with the specifications in the approved closure plan.

The certification will be signed by the Permittee and by a PE.

Because closure of the permitted units must ultimately be certified by a PE at the conclusion of final closure activities, all records pertaining to the decontamination, disassembly, treatment and disposal of the HWMU, including ancillary equipment, will be retained in the facility Operating Record for future retrieval. Documentation supporting the PE's certification will be furnished to KDEP or EPA Region IV upon request.

Upon certification that the industrial clean closure standards have been met, all SDC 2000 permitted units will be considered clean closed and deemed free of PCBs, hazardous wastes, and/or residues. Hazardous waste codes will not be attached to any of the clean-closed SSCs or environmental media within the contiguous SDC 2000 permitted area. The BGCAPP SDC 2000 RCRA Permit will be terminated following acceptance of the industrial clean closure certification by KDEP, and the BGCAPP TSCA Approval will be terminated following acceptance of the industrial clean closure certification by EPA Region IV. Permitted items that are left in place for future use or those that will be reused, but not discarded, will exit the SDC 2000 RCRA permit and TSCA Approval when closed in accordance with this closure plan.

24.0 REFERENCES

- 24915-000-2KP-A03-00001, *Records Management and Document Control*
- 24915-000-G01-GAM-00011, *Configuration Management Plan (CDRL B011)*
- 24915-000-GPP-GEG-00007, *Engineering Drawings*
- 24915-000-GPP-GPX-00101, *Disposal of Government Property*
- 24915-00-G01-GGPT-00005, *Attachment F – Procedures to Prevent Hazards (CDRL A019)*
- 24915-00-GPE-GGPT-00388, *Request for Approval for Additional Treatment, Storage, and Disposal of Polychlorinated Biphenyl (PCB) Bulk Product Wastes*
- 24915-00-GPP-GAM-00006, *Configuration Management Process and Configuration Control*

Board

- 24915-00-LBG-GGPT-00022, *Demonstration Approval for Storage and Treatment of Polychlorinated Biphenyl (PCB) Bulk Product Waste, Blue Grass Chemical Agent-Destruction Pilot Plant (BGCAPP)*, Blue Grass Army Depot (BGAD), Richmond, Kentucky, EPA ID No. KY8 213 820 105
- 24915-SYS-5PL-80-00001, *Static Detonation Chamber (SDC) 2000 Surrogate Demonstration Test Plan*
- 24915-CL-5PL-00-00006, *Main Plant Closure Progression Monitoring Plan*
- 24915-CL-5PL-80-00001, *SDC 2000 Closure Verification Sampling and Analysis Quality Assurance Project Plan*
- 24915-CL-5PL-80-00002, *SDC 2000 Unventilated Monitoring Plan*
- 24915-GEN-5PL-00-00006, *Equipment Decontamination Plan*
- 24915-GEN-5PL-80-00001, *SDC 2000 Closure Verification Sampling and Analysis Quality Assurance Project Plan*
- 24915-GEN-5PR-00-00018, *Emergency Response Procedure – Blue Grass Chemical Agent-Destruction Pilot Plant*
- 24915-GEN-5PR-00-00046, *Development of Decontamination and Decommissioning Packages*
- 24915-OPS-5PR-00-00023, *Hazardous Waste Management and Hazardous Material Reporting Procedure* (CDRL D012)
- 24915-OPS-5PR-00-00026, *Waste Characterization and Environmental Sampling*
- 24915-OPS-5PR-80-00003, *SDC 2000 Environmental Inspections*
- 24915-OPS-5PR-00-00030, *Waste Shipping (CDRL D013)*
- 24915-OPS-5PR-00-00040, *Chemical Agent Spill Tracking*
- 24915-OPS-5PR-00-00043, *Decontamination Process*
- 24915-SAF-5PR-00-00023, *Toxic Chemical Agent Safety*
- 24915-GEN-5PR-00-00042, *System Change Request*
- 24915-TEMPLATE-01841, *Contaminated Area/Equipment Identification Form*
- 24915-WCG-5PR-00-00001, *Work Control, Work Order (WO) Process*
- 24915-00-G01-GGEN-00002, *Storm Water Management Plan*
- 401 KAR, *Kentucky Administrative Regulations*
- 68 Federal Register, 58394 *Final Recommendations for Protecting Human Health from Potential Adverse Effects of Exposure to Agents GA (Tabun), GB (Sarin), and VX* (October 9, 2003).
- Code of Federal Regulations, Title 40, *Protection of Environment*
- DA Pamphlet (DA PAM) 385-61, *Toxic Chemical Agent Safety Standards*
- Department of the Army (DA). 2004. *Implementation guidance policy for revised airborne exposure limits for GB, GA, GD, GF, VX, H, HD, and HT.* Office of the Assistant Secretary (Installations and Environment), Department of the Army, Washington, D.C. (9 June).
- Kentucky Administrative Regulation, Title 401, *Energy and Environment Cabinet Department for Environmental Protection*
- *Land Disposal Restrictions for Newly Listed Wastes and Hazardous Debris*, 57 Federal Register, 37194 (August 18, 1992).

- US Army. 2011. *Chemical Agent Health-Based Standards and Guidelines*, Summary Table 2: “Criteria for Water, Soil, Waste,” as of July 2011, PHN No: 0711-03. Report, U.S. Army Public Health Command.
- USACHPPM (U.S. Army Center for Health Promotion and Preventive Medicine). 1999. *Derivation of Health-based Environmental Screening Levels for Chemical Warfare Agents, A Technical Evaluation*. U.S. Army CHPPM, Aberdeen Proving Ground, MD (March 1999)

Appendix A – Decontamination Methods

This section describes the various methods that may be employed for decontamination of chemical agent and other types of contamination found on SSCs. The methods may be employed, either singularly or in combination, to decontaminate the equipment or structure. Any wastes produced from decontamination activities (e.g., spent decontamination solution, rinsate, PPE) will be managed in accordance with applicable requirements of the RCRA WAP and Project procedures (24915-OPS-5PR-00-00023, *Hazardous Waste Management and Hazardous Material Reporting Procedure*; 24915-OPS-5PR-00-00030, *Waste Shipping*; and related documents].
All chemical-based decontamination solutions will be tested for potential agent monitoring interferences before first use, and high-foaming surfactants that could be directed toward sumps should be avoided to prevent potential foaming in the neutralization reactors.

Water or Steam Cleaning

Water and/or steam washing has both chemical and mechanical decontamination properties. This technique involves pressure washing or steam cleaning a surface with water (typically hot) or steam. The water or steam removes the contaminants, and the resulting wastewater is collected for treatment or disposal. Pressure washing includes low-pressure, high-pressure, or ultra high-pressure (e.g., hydro blaster, water jet) equipment that may use specialized pumps to intensify water pressure. This technique may be used with detergents or other chemicals that enhance the effectiveness of the technique. Steam cleaning may be used to physically extract contamination from building and equipment surfaces. This technique combines the solvent action of water with the kinetic energy effect of blasting and elevated temperature. Effectiveness of steam cleaning as a decontamination method for agent is further increased by localized hydrolysis of the residual agent. The steam may be applied using hand-held wands or automated systems, and the condensate is collected in room trenches for disposal.

Chemical Decontamination Solutions

Sodium hydroxide (NaOH, caustic) solution is recognized as an effective decontamination solution for agent decontamination. An acidified trisodium phosphate formulation may be used for equipment and metal surfaces, while a non-acidified phosphate solution may be used for nonmetallic surfaces and surfaces covered in inorganic contaminants, such as toxic metals contained in salt compounds. Bleach or other commercial chemical products are candidates for effective agent decontamination, as well. The chemical decontamination technique involves the application of caustic or other similar solutions to the contaminated surface. The surface may be scrubbed with the solutions and/or allowed to stand for a specified minimum period of time and then flushed thoroughly with water. These solutions may also be used in combination with detergents and surfactants.

Detergents and Surfactants

Most commercial detergents are formulations of a detergent (sodium laurel sulfate, sodium oleate, alkyl aryl sulphonate) that also act as a wetting agent or surfactant, a phosphorous or carbonate salt (Na_3PO_4, Na_2CO_3), a thickening agent (carboxyl methyl cellulose), and other fillers. Unlike the decontamination solutions described above that effectively destroy the agent contamination, detergents are used in decontamination to physically remove surface contaminants (e.g., agent) and capture them in the resulting spent solution. Surfactants work by lowering liquid surface tension and providing better contact between the surface and the liquid.

Detergents are effective, mild, all-purpose cleaners for all facility surfaces and equipment. They can be used to increase the effect of water, steam, and solvents, and their effectiveness is increased by mechanical agitation. Detergents may not be effective on metal corrosion and long standing contamination.

Foam Decontamination

Foam, such as that produced by detergents and wetting agents, can be used as a carrier mechanism for chemical decontamination agents. They can be applied in different depths and surface orientations. The foam decontamination method can effectively decontaminate metallic walls and parts of complex components. Surfactants in the foaming agent can enhance the effect by increasing contact with the surface. The primary mode of action of the decontaminant is based on oxidizing properties of hydrogen peroxide. A surfactant and an accelerant increase the rate of peroxide activity and allow the decontaminant to be applied as stable foam.

Physical and Mechanical Scrubbing

Physical/mechanical scrubbing with brushes or other devices was found to be extremely beneficial and most likely necessary in the decontamination of other demilitarization sites. Combining scrubbing of surfaces with the appropriate decontamination solution increases the efficiency of the decontamination solution in removing and destroying residual agent by enhancing contact between the solution and the residual agent.

Dry Ice Blasting

Dry ice and dry ice blasting may be used to physically remove contaminated surfaces. Blasting utilizes compressed air to accelerate frozen carbon dioxide (CO2) pellets, at supersonic speeds, towards a surface. The impact of the CO2 pellets results in the lifting/removal of the topmost layer of a substrate. Dry ice blasting is a non-abrasive, nonflammable, and nonconductive cleaning method which generates no secondary contaminants, such as solvents or grit media, because the CO2 quickly sublimes into a non-flammable gas. The method allows most items to be cleaned in place and can be used without damaging active electrical or mechanical parts or creating fire hazards. Additionally, CO2 blasting can be used to remove production residues, release agents, contaminants, paints, oils and biofilms from surfaces. Dry ice without blasting may also be used to remove substrate material, making use of the thermal contraction and cracking/lifting that occurs when the substrate encounters the cryogenic temperature of the dry ice.

Mechanical Surface Removal

Mechanical surface removal, such as grinding, scraping, planning, or scarifying is a decontamination option to physically remove contaminated surfaces. These techniques may be used to decontaminate areas intended for reuse or to achieve a prerequisite condition to support removal of protective containment boundaries. Surface removal may also be used to reduce the volume of hazardous waste by removing only the contaminated fraction and allowing disposal of the uncontaminated substrate as non-hazardous waste or leaving the uncontaminated substrate in place. Grinding with grinding wheels or surfacing discs removes thin layers of surface contamination from concrete where contamination is limited to the coating or sealant finish. Scarifiers (scabblers) physically abrade both coated and uncoated concrete and steel surfaces. The scarification process removes the top layers of contaminated surfaces down to the depth of sound, uncontaminated surfaces. Scabbling is a scarification process used to remove concrete

surfaces. Needle scaling is a scarification process for both concrete and steel surface removal. The removed surface material is then collected by sweeping or use of a vacuum system for disposal.

Thermal Decontamination and Desorption

Contaminated equipment and material may be thermally decontaminated in the Detonation Chamber (DC) in accordance with the RCRA Permit and WAP. Items processed through the DC are heated to a minimum of 1,000°F for a minimum of 15 minutes to destroy chemical agent. Metal that is thermally decontaminated in the DC may be managed as scrap metal under the scrap metal exemption at 40 CFR 261.6(a)(3)(ii) for scrap metal being recycled if it is demonstrated to contain less than 1 ppm PCBs.

Thermal blankets, heat trace, forced hot air, or other heat sources may also be used for thermal desorption and decontamination of equipment and areas that are under engineering controls.

Air Wash Decontamination

Air washing extracts volatile hazardous contaminants (e.g., agent) from contaminated surfaces which are captured in the HVAC exhaust filtration system. Decontamination by air washing is the result of mass transfer by evaporation of agent from surfaces to the surrounding air and is not necessarily effective for materials such as bare concrete, wood, or materials possessing occluded spaces. Air washing is not an efficient means to decontaminate liquid- or aerosol-contaminated surfaces.

Commercially Available Products

Commercial formulations of surfactants, chelates, and wetting agents containing the following:

- Acetic acid ethenyl ester, polymer with ethanol
- Sodium dodecyl sulphate
- N-carboxymethyliminobis(ethylenenitrilo)tetra(acetic acid)
- N-methyl-2-pyrrolidone
- (R)-p-mentha-1,8-diene

Other products include the following:

- Isopropyl alcohol wipes
- Oxone (potassium peroxomonosulfate)
- Commercially formulated decontamination solution (propylene glycol n-propyl ether and hydrogen peroxide mixture)

Appendix B – Treatment Standards for Hazardous Debris

This table provides a summary of the 40 CFR 268.45 Alternative Treatment Standards for Hazardous Debris that may be used at BGCAPP to achieve the closure performance standards for hazardous debris described in Section 7.4.

SUMMARY OF EXTRACTION TECHNOLGIES[1]		
Technology	**Performance Standard**	**Contaminant Restriction**
Physical Extraction: includes abrasive blasting; scarification, grinding, and planing; spalling; vibratory finishing; and high-pressure steam and water sprays.	***Glass, metal, plastic, rubber:*** Treat to clean debris surface.[2] ***Brick, cloth, concrete[3], paper, pavement, rock, wood:*** Remove at least 0.6 cm of the surface layer and treat to a clean debris surface.[2]	***All debris:*** None[3].
Chemical Extraction: Water washing and spraying. This technology may be used with detergents or other chemicals that enhance the effectiveness of the technique.	***All debris:*** Treat to a clean debris surface.[2] ***Brick, cloth, concrete, paper, pavement, rock, wood:*** Debris must be no more than 1.2 cm in one dimension, except that this thickness limit may be waived under an "Equivalent Technology" approval Debris surfaces must be in contact with the water solution for at least 15 minutes.	***Brick, cloth, concrete, paper, pavement, rock, wood:*** Contaminant must be soluble to at least 5% by weight in water solution or by 5% by weight in emulsion.

Notes:

1. Full descriptions of the extraction technologies may be found in 40 CFR 268.45 Table 1 – Alternative Treatment Standards for Hazardous Debris and *Land Disposal Restrictions for Newly Listed Wastes and Hazardous Debris*, 57 Federal Register, 37194 (August 18, 1992).
2. "Clean debris surface" means the surface, when viewed without magnification, shall be free of all visible contaminated soil and hazardous waste except that residual staining from soil and waste consisting of light shadows, slight streaks, or minor discolorations, and soil and waste in cracks, crevices, and pits may be present provided that such staining and waste and soil in cracks, crevices, and pits shall be limited to no more than 5% of each square inch of surface area."
3. Any contaminant subject to hazardous debris treatment standards may be treated by these technologies because the contaminants are physically removed as residue. The residues are subject to the treatment standards for non-debris waste.

Appendix C – Maximum Inventory of Wastes at Beginning of Closure

S.III.I.(9) – Subpart I Container Storage Areas		
Hazardous Waste Management Unit	**Location/ Room #**	**Maximum Inventory**
Earthen Covered Magazine (ECM)	NA	16,000 gallons
SDC Storage Area	SDC Room	4,000 gallons
OTS Storage Area A	OTS Room	3,500 gallons
OTS Storage Area B	NA	40,000 gallons
SDC Debris Area	NA	35,500 gallons
Total Estimated Volume for Subpart I Containers	**--**	**99,000[2]**

S.III.J.(8) – Subpart J Tank Systems		
Hazardous Waste Management Unit	**Location/ Room #**	**Maximum Inventory**
Bleed Water Tank	OTS Room	476 gallons
Total Estimated Volume for Subpart J Tank Units	**--**	**476 gallons**

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