Blue Grass Chemical Agent-Destruction Pilot Plant

Resource Conservation and Recovery Act

Research, Development and Demonstration Permit Application

Submitted To:

The Kentucky Department for Environmental Protection,
Division of Waste Management
14 Reilly Road
Frankfort, Kentucky 40601

Submitted By:

Blue Grass Army Depot
2091 Kingston Highway
Richmond, Kentucky 40475-5001
and
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Prepared By:

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June 2007
Revision 4

This document has been reviewed for OPSEC, and no OPSEC sensitive information was found.

Volume I

VOLUME I

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Appendices

Note: There have been no changes to Volume II of the RD&D Permit Application, Revision 3 as a result of the responses to the KDEP Notice of Deficiency. The most current version of Volume II of the RD&D Permit Application is Revision 3 dated September 2006.

DEPARTMENT OF THE ARMY
BLUE GRASS ARMY DEPOT
2091 KINGSTON HIGHWAY
RICHMOND, KENTUCKY 40475-5060

REPLY TO
ATTENTION OF:

June 18, 2007

Environmental Office

Commonwealth of Kentucky
Department for Environmental Protection
Division of Waste Management
ATTN: Mrs. April Webb, P.E.
Frankfort Office Park
14 Reilly Road
Frankfort, Kentucky 40601-1190

Subject: Response to Notice of Deficiency
Blue Grass Chemical Agent-Destruction Pilot Plant (BGCAPP)
Research, Development, and Demonstration Permit Application, Revision 3
Blue Grass Army Depot, Richmond, Kentucky
EPA ID # KY8-213-820-105, AI 2805

Dear Mrs. Webb:

On March 27, 2007 Blue Grass Army Depot (BGAD) and Bechtel Parsons Blue Grass Joint Venture (BPBG) received the Notice of Deficiency (NOD) on the Research, Development, and Demonstration (RD&D) Permit Application, Revision 3 for the Blue Grass Chemical Agent-Destruction Pilot Plant (BGCAPP) facility. This NOD was provided by the Kentucky Department for Environmental Protection (KDEP), Division of Waste Management (DWM) upon review of the permit application. KDEP requested a response within 45 days for which BGAD / BPBG requested an additional 45 day extension in order to prepare the responses to NOD comments, revised application, and perform detailed reviews. BGAD / BPBG appreciates favorable consideration of the request by DWM and granting extension until June 25, 2007 to re-submit the application.

Enclosed is the response to the NOD and three copies of Revision 4 of the RD&D Permit Application, Volume I, as requested by KDEP, DWM. Based on recent discussions with KDEP, DWM, only Volume I of the revised RD&D Permit Application is being submitted as there have been no changes to Volume II. The most current version of Volume II of the RD&D Permit Application is Revision 3 dated September 2006.

The responses to the NOD comments that required changes to the permit application are **bolded** in the permit application for easy identification. A revised Part A is also included as part of the permit application.

BGAD and BPBG look forward to meeting with KDEP-DWM on July 10, 2007 to discuss this response. If you have any questions or require additional information, please do not hesitate to contact Mr. Todd Williams, BGAD Environmental Coordinator at (859) 779-6280 or Tom Kurkjy, BPBG Environmental Manager at (859) 625-1285.

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Sincerely,

Mark H. Seely, P.E.
General Manager
Bechtel Parsons Blue Grass JV
BGCAPP Operator

Richard J. Mason Jr
Colonel, U.S. Army
Commanding Officer
BGCAPP Owner

Enclosure

Copy Furnished:

John Jump, DWM
Eric Ringo, DWM
James A. Fritsche, PM-ACWA
Thomas A. Kurkjy, BPBG

1 Part A, page 3. Explain why the CHB capacity increased from 6,500 to 9,500 gallons and 13 EONC's, in a facility with reduced capacity.

Response: The CHB was originally permitted to hold 36 EONC's each holding a maximum of 30 rockets. The original storage capacity of the CHB assumed deliveries of munitions to the BGCAPP four days a week. This delivery schedule did not assume any delivery days would be lost due to holidays or severe weather. Based on this fact and as the design matured, Operations determined that storage capacity for 53 EONCs would be required to store enough munitions to permit 24 hour/7 day per week operation at full rate processing during the VX campaign.

2 Part A, page 3-5. Explain why it is necessary to have so many additional container storage areas and capacity holding "various secondary wastes". The explanation should include a detailed description of each proposed waste, descriptions of the waste containers, storage time, explanation for increased capacity (if applicable), and waste tracking system.

Response: The majority of the additional container storage area capacity was added to address container storage requirements during closure of the facility. BPBG and the BGAD have removed the container storage area volumes that were added to support closure activities only. The required closure container storage area volumes will be included with the submittal of the Closure Plan in accordance with Compliance Schedule Item # 28. Based on removing the closure related container storage volumes from the Part A, the difference in the requested total container storage areas in the RD&D Permit Application Revision 3, as compared to the Part A in the approved RD&D Permit Application, Revision 2 has increased by 5,440 gallons, approximately a 7% increase.

Listed below under each description of the storage areas, is an explanation of the storage requirements (whether increased or decreased). Additionally, a general description of the waste to be stored is presented. Detailed descriptions of each proposed waste, waste storage containers, storage times and waste tracking system are not currently available and will be provided in accordance with the BGCAPP RD&D Permit. Detailed information regarding container management areas will be submitted to KDEP 36 months prior to receipt of hazardous waste in the facility in accordance with Compliance Schedule items 10 & 11. Containers and the management of those containers will be in accordance with Permit Condition T-63 through T-76. Additionally, BGCAPP will manage waste in accordance with the storage duration limits outlined in Permit Conditions T-138 through T-140. Detailed descriptions of the wastes to be managed will be submitted to KDEP in the Waste Analysis Plan no later than 18 months prior to the receipt of hazardous waste in accordance with Compliance Schedule item 18. Container waste tracking is discussed in general terms in Attachment 7 of the RD&D Permit Application. The waste tracking system that will be used will comply with the requirements of 401 KAR 34.290.

a. Agent Neutralization System (ANS) Storage Area- 2,750 gallons. New

i) Describe the "contingency storage for the SDS" scenario.

Response: It is possible that during certain times such as changeover or other shutdowns that the SDS tanks will be unable to accept additional agent contaminated spent decon solution. In this event, spent decon solution that is generated during personnel decontamination and other essential operations will be stored in up to 20 55-gallon polyethylene drums until the SDS tank system is able to accept additional spent decon solution.

b. Tray/Container Transfer Room- 5,500 gallons. New.

Response: Storage is provided for up to10 drums (550 gallons) of various wastes generated during maintenance and operations entries. This waste may consist of items such as used equipment parts, pipes, valves, pumps and secondary wastes generated during maintenance operations. The additional storage volume is needed to allow a sufficient quantity of waste to be accumulated for sorting, decontamination and more efficient loading of trays going to the MPT while minimizing the number of personnel entries required.

The remainder of the requested volume was to be used during closure. BPBG has removed this 4,950 gallons from this revision and request additional storage capacity for use during closure with the Closure Plan (Compliance Schedule Item #28.)

c. Munitions Washout System (MWS) Storage Area- 5,500 gallons. New

Response: The additional requested volume will be used during closure. BPBG has removed this 5,500 gallons from this revision and request additional storage capacity for use during closure with the submittal of the Closure Plan (Compliance Schedule Item #28).

d. Explosive Containment Vestibule (ECV) Storage Areas (2) - 500 gallons ea. New

Response: The 500 gallons listed in the Part A is the total storage capacity for both ECV's. Revision 2 of the RD&D Permit Application, which is incorporated into the RD&D Permit, only has one ECV with a container storage area capacity of 600 gallons. Based on discussions with Operations and the design maturation, this total storage volume has been decreased by 100 gallons in Revision 3. These areas will be used to store waste munitions, various secondary waste and equipment waiting for maintenance.

e. Unpack Area (UPA) - increased from 1,000 to 9,800 gallons.

Response: 4800 gallons of the storage capacity in the two UPAs, included in Revision 3 of the RD&D Permit Application, is required for operations. In the current MDB design, one UPA is designed to store approximately 150 M55 rockets and the other UPA is designed to store approximately 144 GB 8" projectiles. The remainder of the storage capacity is for drummed secondary waste. The increased capacity covers storage required during operations and storage required during the closure process.

The remaining 5,000 gallons of UPA container storage is proposed for use during closure. This storage capacity has been removed from the Part A that will be submitted with this RD&D Permit revision. The additional storage capacity for use during closure will be submitted with the Closure Plan (Compliance Schedule Item #28.)

f. EBH Neutralization System (ENS) Storage Area — 550 gallons. New

Response: BPBG assumes this comment is referring to the EBH offgas treatment system (OTE) storage area. This additional storage area will be used only during closure. BPBG has removed this 550 gallons container storage area from the Part A that will be submitted in this RD&D Permit revision and will request the additional storage capacity for use during closure with the Closure Plan (Compliance Schedule Item #28.)

g. Energetics Neutralization System (ENS) Storage Area- *550* gallons. New

Response: The additional storage area will be used only during closure. BPBG has removed this 550 gallons container storage area from the Part A that will be submitted in the RD&D Permit revision and will request the additional storage capacity for use during closure with the Closure Plan (Compliance Schedule Item #28.)

h. Energetic Batch Hydrolyzer (EBH) Storage Area- 550 gallons. New

Response: The additional storage area will be used only during closure. BPBG has removed this 550 gallons container storage area from the Part A that will be submitted in the RD&D Permit revision and will request the additional storage capacity for use during closure with the Closure Plan (Compliance Schedule Item #28).

i. Explosive Containment Rooms (2) - increased from 30 gallons to 2, 1,200 gallons.

Response: The additional requested volume will be used only during closure. BPBG has removed the additional 1,170 gallons of container storage capacity from the Part A that will be submitted in the RD&D Permit revision. The additional storage capacity for closure will be requested with the Closure Plan (Compliance Schedule Item #28).

j. Metal Parts Treater Offgas Treatment System (OTM) Storage Area. *550* gallons. New

Response: The additional storage area will be used only during closure. BPBG has removed this 550 gallons container storage area from the Part A that will be submitted in this RD&D Permit revision and will request the additional storage capacity for use during closure with the Closure Plan (Compliance Schedule Item #28.)

k. SCWO Processing Building (SPB) Storage Area. 8,550 gallons. New

Response: This area is used to store aluminum filter cake and secondary waste prior to offsite shipment. The waste aluminum filter cake will be stored in two 20 cubic yard roll-off bins. Secondary waste will be stored in up to ten 55 gallon drums.

l. Waste Storage Area (WSA) — 5,000 gallons. New

Response: This container storage area will be used to store miscellaneous non-agent or cleared wastes in drums, roll-off bins and other containers prior to shipment offsite.

3 Part A, page 4. Describe the hazards associated with storage of rocket motors in boxes and what procedures will be in place to prevent ignition and projected conflagration.

Response: The potential hazard associated with storage of non-contaminated rocket motors (NCRMs) in boxes, is the ignition of one of the motors; however, this is an extremely unlikely event and the storage of just the NCRMs substantially reduces the risk to human health and the environment. This statement is supported by the following facts:

1. The RCM reduces the risk to human health and the environment. Removing the rocket warhead from the NCRMs isolates the propellant from the agent. Separating the warhead from the NCRMs reduces the risk to human health and the environment in the unlikely event of an ignition.

2. The RCM does not remove the NCRM from its half of the SFT. Prior to storing the NCRMs in the MDB storage areas, the NCRM and the SFT will be placed in a box which is being designed for this specific application by the Defense Ammunition Center. The longer term storage of the NCRMs will occur elsewhere on the BGAD until the treatment of the NCRMs takes place. The NCRMs will be stored in a similar configuration to the M55 rockets currently being safely stored at the BGAD.

3. In the unlikely event that a rocket motor was to ignite, the fire protection system, which will be installed in the NCRM storage areas in the MDB, is designed to minimize the potential for other motors to ignite. Once the NCRM is placed in the storage box, ignition is an extremely unlikely event because of the type of propellant, the storage history and the lack of ignition sources in the storage areas.

The Procedures to Prevent Hazards that will be submitted as required by the RD&D Permit Compliance Schedule, Item #16, will describe the procedures and the precautions that will be used to prevent an NCRM ignition. In addition, the Contingency Plan that will be submitted as required by the RD&D Permit Compliance Schedule, Item #13, will address the procedures to be used in the event of the ignition of a rocket motor.

4 **Part A, page *5.* SCWO Tank Area (STA). Will RCRA Air Emission Standards apply to any of the 7 tanks?**

Response: The SCWO Tank Area (STA) tanks contains less than 100 ppm of organic compounds and are therefore not subject to any of the air emission standards found in 401 KAR 34:275, 34:280, and 34:281, which incorporate by reference 40 CFR §264.1030 through §264.1090, Subparts AA, BB, and CC. This conclusion is based on the following facts:

Subpart AA

The STA does not include any of the processes that are subject to Subpart AA (distillation, fractionation, thin-film evaporation, solvent extraction, or air or steam stripping operations) and therefore the STA is not subject to these regulations.

Subpart BB

Subpart BB would be applicable to the STA if the organic weight percent in the waste were greater than 10%. Since all of the waste liquids being stored in the STA are after treatment in the SCWO units, the water contains insignificant quantities of organic compounds (<100 ppm, which corresponds to <0.01%) and thus Subpart BB regulations do not apply.

Subpart CC

Subpart CC is not applicable to the tanks in the STA because 40 CFR §264.1082(c)(1) exempts tanks, surface impoundments or containers from the standards if the hazardous waste entering the unit has an average Volatile Organic (VO) concentration of less than 500 ppm. All of the waste liquids being stored in the STA contain less than 100 ppm of volatile organic compounds and therefore the standard does not apply.

This evaluation is based on the currently available information on the BGCAPP waste streams based on the material balances. BGAD and BPBG will provide additional information concerning these requirements as it becomes available.

What about during startup and "upset conditions?

Response: No agent or energetics hydrolysate is processed through the SCWO during startup. As discussed in Attachment 4, page 4-21, Lines 13 through 20, hydrolysate feed does not commence until the SCWO reactor has been brought up to its full operating temperature and flows using heat and isopropyl alcohol (IPA).

During upset conditions the SCWO effluent is diverted to the Off-Spec Effluent Tank

(MV-SCWO-0041), and not to the tanks in the STA. The Off-Spec Effluent tanks are located in the SPB and are vented to the SPB HVAC system. This is shown in PFD 24915-10-M5-SCWO-00001, Sheet 1.

5 **Part A, page 5. Spent Decon System (SDS).**

a. Explain why the number of tanks increased from 2 to 3, with an increase in capacity from 20,000 to 30,000 gallons per day in a facility with reduced capacity?

Response: PFD 24915-07-M5-SDS-00001, Sheet 1 in appendix C of revision 2 of the RD&D permit application shows 3 SDS tanks. One of the tanks was inadvertently left out of the Part A and this change is to correct that error. The three tanks have a capacity of 10,000 gallons each with a total capacity of 30,000 gallons.

b. Will RCRA Air Emission Standards apply?

Response: 401 KAR.275 which incorporates 40 CFR §264.1030, Subpart AA, does not apply to the SDS system. Subpart AA applies only to evaporators and distillation columns, which do not apply to the SDS system.
401 KAR 34:280 which incorporates 40 CFR §264.1050, Subpart BB (equipment leaks) and 401 KAR 34:281 which incorporates 40 CFR §264.1080, Subpart CC (Tanks, surface impoundments and containers) are also not expected to apply. As shown in the M&EB 24917-07-M5-SDS-00001, Stream #313, does not contain measurable volatile organic compounds (VOCs). §264.1050(b) exempts equipment containing less than 10% by weight organics concentration from Subpart BB. The SDS system is exempted from Subpart CC by §264.1080(b) (7). The SDS system is contained inside the MDB, which is completely vented through the MDB HVAC filters and qualifies as "an enclosure, as opposed to a cover. The SDS system, therefore, is in compliance with the enclosure and control device requirements of § 264.1084(i)." except as provided in § 264.1082(c)(5).

c. Justify the process code change from S02 to T01. Explain how adding decontamination solution constitutes treatment and not dilution, considering that the primary hydrolysis occurs in a reactor.

Response: Operational experience at the other chemical demilitarization facilities has proven that decontamination solution will react with the agent without the elevated temperature used in the agent neutralization reactors (ANRs). The decontamination solution is not added in a large enough quantity to be considered dilution; in this situation, the SDS tanks can also be used to treat residual agent in the SDS, if present above the target release level. Based on this, the SDS tanks may be used as treatment tanks in addition to being storage tanks.

The decontamination solution used during the GB and H campaign is sodium hydroxide solution, which is also the reagent used to neutralize the GB in the ANS. A 5.5% solution of sodium hypochlorite (bleach) in water may be used during the VX campaign instead of sodium hydroxide. Hypochlorite is a strong oxidizing agent, which decontaminates the surfaces by chemically oxidizing the agents. A final decision on the VX decontamination solution will not be made until after additional operational experience is obtained at the chemical demilitarization facilities that are using sodium hydroxide in the VX campaign.

The SDS tanks are equipped with agitators and recirculation lines, which ensure that adequate mixing will occur to destroy the agent. PFD 24915-07—M5-SDS-00001 shows, the SDS tanks are configured to allow the direct addition of caustic. If the target release level is not achieved through the addition of sodium hydroxide solution, then the contents of the tank will be transferred to one of the ANRs for further treatment. This approach constitutes a redundant method for providing protection of health and of the environment.

6 Part A, page 6. Agent Neutralization System (ANS).

a. Explain why the number of tanks increased from 4 to 5, with an increase in capacity from 1,500 to 7,300 pounds per hour in a facility with reduced capacity?

Response: In the Revision 1 & Revision 2 of the RD&D Permit Application, there were four ANRs listed in the Part A. There were also four Hydrolysate Sampling Tanks listed in the Part A with a storage capacity of 160,000 gallons. Thus, in Revision 1 & Revision 2 of the RD&D Permit Application, there were a total of 4 ANRs and 4 Hydrolysate Sampling Tanks used in the agent neutralization process. The processing rate estimate for the ANS in Revision 1 was based on treating approximately 10,524 lbs of waste per batch with a 14 hour batch cycle. This equates to approximately 1,500 lbs per hour. However, as the design progressed and M&EBs became more mature, the process rates were revised based on additional data. In the Revision 2 of the RD&D Permit Application, M&EB 24915-07-M5-ANS-00001 was used to calculate the processing rate for GB, with the peak processing rate of 4,321 lbs per hour included in the Part A.

In Revision 3 of the application, the ANRs and the agent Hydrolysate Sampling Tanks were combined into one line item on the Part A with a total of 5 tanks (2 ANRs and 3 Hydrolysate Sampling Tanks). The tanks were combined on one line item based on the fact that in the event a batch fails to meet the target release level, additional reaction time can occur in the Hydrolysate Sampling Tanks. The processing rates for the ANS in Rev 3 of the application was based on information available on all three agents, not just GB. The processing rate included in the Part A in Revision 3 of the RD&D Permit Application represents the peak processing rate for the H campaign of 7,300 lbs/hr.

b. Justify the process code T01 in the non-reactor tanks.

Response: Chemical reactions can occur in the Hydrolysate Sampling Tanks if the agent concentration is found to be above the target release level. The hydrolysate, which has a high alkalinity, will be recirculated and mixed using the tank agitator in order to continue the reaction in the sampling tank. Based on this, the Hydrolysate Sampling Tanks may be used as treatment tanks in addition to being storage tanks.

c. **Explain how adding decontamination solution constitutes treatment and not dilution, considering that the primary hydrolysis occurs in a reactor.**

Response: No additional decontamination solution or sodium hydroxide is added to the Hydrolysate Sampling Tanks. Additional reaction time and mixing will be used to further destroy the agent. If this is not successful, the hydrolysate will be transferred back to one of the ANRs for further treatment.

7 **Part A, page 6. Energetics Neutralization System (ENS).**
a. **Justify the process code T01 in the non-reactor tanks.**

Response: As shown on PFD 24915-07-M5-ENS-00001, sheet 1 in appendix C, the only treatment units in the ENS are MV-ENS-0101/0102/0103, which are the energetics neutralization reactors.

b. **Explain how adding decontamination solution constitutes treatment and not dilution, considering that the primary hydrolysis occurs in a reactor.**

Response: As discussed in the response to 7a, all of the tanks in the ENS are reactors.

8 **Part A, page 6. Munitions Washout System (MWS). Explain the dramatic reduction in capacity from 24,000 to 871 pounds per hour.**

Response: In Revision 1 of the RD&D Permit Application submitted in March 2004, the maximum throughput rate for the MWS was established at 40 GB 8" projectiles per hour per MWS. In calculating this rate, the weight of the munition body was included with the weight of the waste. This resulted in a maximum processing rate of 24,000 lbs per hour. In Revision 2 of the RD&D Permit Application which is incorporated by reference into the RD&D Permit, the weight of the munition body was removed from the calculation (only the weight of the waste was included in the calculation) and the throughput was reduced from 40 GB 8" projectiles per hour to 20 GB 8" projectiles per hour. This resulted in a maximum throughput of 871 lbs per hour. This rate did not change from Revision 2 to Revision 3 of the RD&D Permit Application.

9 **Part A, page 6. Nose Closure Removal System (NCRS). Explain the dramatic reduction in capacity from 16,000 to 581 pounds per hour.**

Response: Revision 1 of the RD&D Permit Application submitted in March 2004, the maximum through put rate for the NCRS was established at 40 GB 8" projectiles an hour per NCRS. In calculating this rate, the weight of the munition body was included with the weight of the waste. This resulted in a maximum processing rate of 16,000 lbs per hour. In Revision 2 of the RD&D Permit Application which is incorporated by reference into the RD&D Permit, the weight of the munition body was removed from the calculation (only the weight of the waste was included in the calculation) and the throughput was reduced from 40 GB 8" projectiles per hour to 20 GB 8" projectiles per hour. This resulted in a maximum throughput of 581 lbs per hour. This rate did not change from Revision 2 to Revision 3 of the RD&D Permit Application.

10 Part A, page 6. Projectile Mortar Disassembly Machine (PMD). Explain the dramatic reduction in capacity from 8,000 to 410 pounds per hour.

Response: In Revision 1 of the RD&D Permit Application, the maximum through put rate for the PMD was established at 40 GB 8" projectiles an hour. In calculating this rate the weight of the munition body was included with the weight of the waste. This resulted in a peak processing rate of 8,000 lbs per hour. Revision 2 of the RD&D Permit Application which is incorporated by reference into the RD&D Permit, the weight of the munition body was removed from the calculation (only the waste is now included in the calculation). Since only H projectiles are processed in the PMD, the throughput was reduced from 40 GB 8" projectiles per hour to 26 H 155 mm projectiles per hour, resulting in peak processing rate of 410 lbs/hr in Revision 3 of the RD&D Permit Application.

11 Part A, page 6 Rocket Shear Machine (RSM). Explain the reduction in capacity from 7,300 to 3,900 pounds per hour.

Response: In Revision 1 of the RD&D Permit Application, the maximum throughput rate for the RSM was established at 50 rockets per hour per RSM. In calculating this rate the weight of only the energetics and agent was used (33.6 lbs). This resulted in a peak processing rate of 7,300 lbs per hour. In Revision 2 of the RD&D Permit Application which is incorporated by reference into the RD&D Permit, the maximum daily processing rate of 39,860 lb per day was converted to the hourly rate of 1,661 lb per hour. In Revision 3 of the RD&D Permit Application, this processing rate was calculated based on a peak throughput rate of 26 rockets per RSM counting the weight of a complete rocket and SFT (73.8 lbs). This resulted in a peak processing rate of 3,900 lb per hour for 2 RSMs.

12 Part A, page 7 Energetics Batch Hydrolyzer (EBH).

a. Explain why the capacity changed from 7,300 pounds per hour to 10,100 pounds per hour in a facility with reduced capacity, while the number of units decreased from 18 to 6.

Response: In Revision 1 of the RD&D Permit Application, the peak throughput rate for the EBH was established at 100 rockets per hour for all EBHs. In calculating this rate the total weight of the rocket and SFT less the drained agent was used (66.4 lbs). This resulted in a peak processing rate of 7,300 lbs per hour. In Revision 2 and Revision 3 of the RD&D Permit Applications, the Part A included both the waste volume and the caustic reagent volume. The Part A has been revised to include only the peak waste throughput rate for the EBHs based on 26 rockets per hour per EBH. In calculating this rate, the total weight of the rocket and SFT less the drained agent was used (66.4 lbs). This results in a peak processing rate of 5,180 lbs per hour for 3 EBHs.

b. **Describe why the process code changed from T01 to X99.**

Response: As the design matured and the exact configuration of the EBH became better defined, BPBG determined that the EBH was more appropriately described as an X99 unit as opposed to a T01 unit. This change was made with the submittal of the Revision 2 of the RD&D Permit Application which is incorporated by reference into the RD&D Permit.

13 Part A, page 7 Water Recovery System.

a. **Justify the use of D (short tons per hour) instead of E (gallons per hour) or U (gallons per day), and restate using gallons if appropriate.**

Response: BPBG has restated the WRS processing rate using U (gallons per day). The value will be shown as 146,063 gallons/day.

b. **How much effluent is produced from each SCWO in gallons per hour?**

Response: Each SCWO produces approximately 510 gallons per hour of effluent on average. This information is presented in Appendix C on PFD 24915-10-SCWO-00001 sheet 4, stream 670.

14 Part A, page 8 What density is used for waste stream 3, SCWO effluent?

Response: The density of the SCWO effluent is 60.45 lb/ft3. This information is presented in Appendix C, 24915-10-SCWO-00001 sheet 4, stream 670.

15 Part A, page 8 If waste stream 10 (HSA) — 9,000 tons) consists of waste streams: Waste Stream 9 (Agent Treatment) — 3,000 tons. Waste Stream 8 (Energetic Treatment) — 3,600 tons. Waste Stream 11 (SDS) — 2,500 tons.

a. **Waste streams 8, 9, and 11 equal 9,100 tons. Explain the unaccounted for 100 tons.**

Response: These quantities are estimates and were not properly reconciled. Waste stream 10 has been adjusted to be 9,100 tons.

b. **Adjust the figures so that they balance.**

Response: BPBG will adjust the waste stream estimate for waste stream 10 to be 9,100 tons.

16 Part A, page 8 What density is used for waste stream 8, Energetics Treatment?

Response: The density of the energetics hydrolysate is 73.80 lb/ft3. This information is presented in Appendix C, PFD 24915-11-HSS-00002 sheet 2, stream 546.

17 Part A, page 8 What density is used for waste stream 9, Agent Treatment?

Response: The density of the agent hydrolysate is 63.25 lb/ft^3. This information is presented in Appendix C, PFD 24915-11-HSS-00001 sheet 2, stream 634.

18 Part A, page 8 What density is used for waste stream 10, HSA?

Response: Each of the densities of the waste streams that feed into the HSA varies. The estimate for Waste Stream 10 was generated by simply adding the estimates for Waste Streams 8(Energetics Treatment), 9 (Agent Treatment) & 11 (SDS).

19 Part A, page 9 What density is used for waste stream 11, SDS?

Response: The density of the SDS is approximately 62.53 lb/ft^3 for the GB campaign. The SDS density is presented in Appendix C PFD 24915-07-SDS-00001 sheet 2, stream 313.

Please note that SDS is generated by non-process events such as the number of personnel entries requiring decontamination of PPE, equipment decontamination events, etc. The annual quantity of SDS was estimated from operations experience at other chemical demilitarization sites. The density of the Spent Decontamination Solution was not used to develop the SDS estimate.

20 Part A, page 9 Waste Stream 14.
a. What is the average weight of a NCRM?

Response: The weight of a NCRM, including the SFT and the end cap is approximately 44.8 lbs.

b. 840 tons appears to be less than the maximum process rate for rockets. How was the estimated annual amount determined? Correct the estimate if appropriate.

Response: The estimate was arrived at by using 44.8 lb per NCRM based on a 20 months of operation for the BGCAPP. In the first year, BGCAPP expects to generate approximately 41,550 NCRMs. The unit of measure used was long tons (2200 lb/ton) instead of short tons (2000 lb/ton). The correct estimate is 931 tons. This has been corrected in the Part A.

21 Page 3-1, 3.1.1.3 Overpacked Leaker Projectiles. Says that they will be processed the same as non-leakers once removed from their overpacks.
a. Will they be surface decontaminated first?

Response: The overpacked leaker projectiles will not be surface decontaminated prior to processing.

b. Will they be processed the same if they have liquid leaks?

Response: After the projectile has been removed from its overpack, it will be processed through the same equipment as the non-leaker projectiles, specifically the MWS for GB and VX projectiles, the PMD and the MWS for H projectiles. The overpack containers will be either chemically decontaminated or thermally decontaminated in the MPT prior to offsite recycling or disposal.

The following paragraph has been added to the end of Section 4.3.1.1:

"The overpacked GB and VX projectiles will be removed from the EONC in the UPA and transferred to the TMA where they will be manually unpacked and placed on a tray on the conveyor system for processing through the MWS. The overpacked H projectiles will be removed from the EONC in the UPA and transferred to the ECV where they will be manually unpacked and the projectiles placed on the conveyor system for processing in the PMD. The overpack containers will be taken to the TMA. The empty overpack container will be chemically decontaminated or thermally decontaminated in the MPT prior to offsite recycling or disposal at a permitted TSDF."

In addition, the following sentence has been added to Section 3.1.1 on line 22:

"The projectile processing sequence is discussed in more detail in Sections 4.3.1, 4.5 and 4.6."

22 Page 3-2, 3.1.2.2 Overpacked Leaker M55 Rockets. Describe any special handling that they will get.

Response: This is discussed in Section 4.3.1.2.2. For clarification, the following text has been added to Page 3-2, at the end of line 30:

> "as discussed in Section 4.3.1.2.2."

23 Page 3-3, 3.1.5.4 Agent Contaminated Spent Activated Carbon. Spent Carbon from the HVAC filters should be in a category by itself and not mixed with other carbon streams, particularly PPE. Discuss these items separately.

Response: The reference to "gas mask carbon filters" has been removed from Section 3.1.5.4 and has been added to Section 3.1.5.2, Agent Contaminated Plastic and Personnel Protective Equipment.

The last sentence in Section 3.1.5.2 has been replaced with the following:

> "Plastic and PPE (plastic, rubber and gas mask carbon filters) are assumed to be contaminated if they have been exposed to agent; they will be processed as

described in Attachment 4, Section 4.3."

24 Page 3-3, 3.1.5.6 Reverse Osmosis (RO) Brine Solution. What are the anticipated % solids (by weight) in the reject water?

Response: The RO Brine (or reject) solution has a percent solids content of 3.9 percent for the GB scenario. See Appendix C PFDs & M&EBs 24915-11-RO-00001 and -00002 for the composition of all of the Reverse Osmosis streams under each operating scenario, stream #1060. The M&EB presents the lb/hr flow of each constituent. The percent solids can be computed by dividing the sum of the flow of the dissolved constituents by the "Total Peak Mass Flow" line of the stream.

25 Page 3-3, 3.1.5.7 Other Secondary Waste. There is an incomplete sentence. "Either" should be proceeded by an "or". Clarify this sentence.

Response: The sentence has been changed to state the following:

"If they are contaminated with agent, either the wastes will be treated at BGCAPP through the appropriate waste handling system, or decontaminated and shipped off site for disposal at a permitted treatment, storage, and disposal facility (TSDF).

26 Page 3-3 Add non-contaminated rocket motors to the list of expected secondary waste.

Response: The non-contaminated rocket motors (NCRMs) are primary wastes and not secondary wastes and therefore are not listed here.

27 Page 3-3 Add removed aluminum to the list on expected secondary waste.

Response: Aluminum is not an expected secondary waste. Aluminum is a component of the M55 rockets and M56 warheads and it does not need to be called out individually. The aluminum compounds produced in the APS/AFS are included in the wastes that are produced by the BGCAPP and are identified in Section 3.3

28 Page 3-3 3.2 8" GB projectiles have the lowest daily process rate (Table 3-2).
a. Explain why this is lower than burstered H- projectiles.

Response: GB projectiles processing rate is based on the MPT. The GB projectiles have a much greater metal mass than the 155mm projectiles, fewer projectiles can be treated per tray in the MPT and thus, the processing rate is lower.

b. Add this to the critical path if appropriate.

Response: Due the relative small number of GB projectiles, their treatment is not the critical path during the GB campaign.

29 Page 3-4, 3.3 3.

a. **If recovered RO water is recycled back into the MWS, ENS, and/or ANS, state that instead of being recycled "back into the SCWO process".**

   Response: The text as written is correct. The RO permeate water is only recycled back into the SCWO process and not used elsewhere. This is shown in Appendix C, PFD 24915-10-M5-RO-00002, stream 1409, the RO permeate only goes to SCW0-00001 (Shown on Sheet 2 of 24915-10-M5-SCWO-00001, Sheet 2) as stream 655, which enters the SCWO reactor.

b. **Describe how the SCWO process uses "makeup water".**

   Response: The following text has been added to Section 4.15 on page 4-21 after Line 20 to describe how the SCWO process uses "make-up water":

   "RO permeate is introduced into the SCWO reactor near the bottom to reduce the SCWO effluent's temperature to below the critical point and results in the re-solution of the inorganic constituents facilitating their discharge from the reactor."

30 Page 3.4, 3.3 Distinguish the difference between step 1 and 3.

Response: Page 3-4, Section 3.3 identifies wastes produced and does not identify any steps.

Item 1 refers to the solid residue from the EBH, which is further processed in the MPT; hence, the source of this waste stream is the EBH. Item 3 is the RO reject brine solution, which is an entirely different waste stream.

31 Page 3.4, Section 3.1.5 list six major secondary waste stream (add 2 see Comment 26 and 27). Section 3.3. lists 4 secondary waste streams. Table 3.2 lists 3 secondary waste streams. KDEP counts 8 major secondary waste streams. Clarify by addressing the inconsistencies.

Response: Section 3.1.5 describes the secondary wastes that are produced and are either recycled into the process, treated in the BGCAPP, or disposed of off-site. Section 3.3 identifies the wastes that are actually shipped out of the BGCAPP for disposal. For example, although Section 3.1.5.5 identifies SDS, this material is treated either by hydrolysis followed by SCWO or directly by SCWO (depending on its agent concentration). It is shipped offsite for disposal as part of the RO reject waste stream, which is identified in Section 3.3.

32 Page 3.9, Table 3-2 Daily Design Capacity.

a. **Explain why there are different rates for each projectile.**

Response: Each type of projectile has a different processing rate based on the individual sizes and characteristics.

b. **Describe the limiting factor for each projectile.**

Response: The limiting factor for the 8" GB projectiles is the rate at which they can be processed through the MPT. The 8" GB projectiles have a much greater mass of metal to be thermally treated than either the 155 mm VX or H projectiles.

The limiting factor for the 155mm VX projectiles is the rate at which they can be processed through the MWS.

The limiting factor for the 155mm H projectiles is the rate at which they can be processed through the PMD to remove the bursters.

c. **Explain why the ANS has increased from 150 to 6,626 gallons per hour in a reduced capacity facility.**

Response: Please see response to 6a. In addition, the ANS capacities listed in Table 3.2 had incorrect units of measure and are the average rates rather than the peak rates. Table 3.2 will be changed to reflect the peak hourly rate of 7,300 lb/hr and a daily design rate of 175,200 lbs.

d. **The capacity of the MPT changed from 40 projectiles per hour to 7,723 pounds per hour. Provide KDEP the equivalent rate in pounds per hour of 40 projectiles.**

Response: The average rate in pounds per hour of forty GB 8" projectiles is 6,998 lbs/hr. As the design has matured, the MPT treatment rate increased with the elimination of the HDC. The capacity of the MPT was calculated as shown on M&EB 24915-07-M5-MPT-00001.

33 Page 3-10, Table 3-3 Estimated Quantity of Waste by year.

a. **Add NCRM and other waste as appropriate.**

Response: The NCRMs are primary wastes and not secondary wastes and therefore are not listed in Table 3-3. Table 3-3 has been revised to include other wastes as appropriate.

b. **Explain why the MPT Waste estimate increased so dramatically each year in a reduced capacity facility.**

Response: The MPT Waste estimate now includes the HDC Waste estimate. The HDC has been eliminated and the MPT will be treating the solid residue from the EBHs (excluding the NCRM components) that were originally treated by the HDC.

c. **Based on the RO data presented here, and the stated 30% reject rate, Waste**

Stream 3 (SCWO Effluent) in Part A should be 133,257 tons and not 155,000 tons. Clarify and correct.

Response: Waste stream 3 in the Part A has been reduced to 133,257 tons.

34 Page 4.2, 4.1, 4 Consider adding "other secondary waste" to the list of items in the MPT, or explain why it should not be.

Response: "Solid residue" as stated in the current text includes other secondary wastes that may be generated in the BGCAPP.

35 Page 4-2, 4.1 Justification for Research.

a. Consider adding the ARS to the justification, or explain why it should not be.

Response: Precipitation and filtration systems similar to the ARS are used in industry and thus, are not unique to the BGCAPP. The ARS requires no further research to be used in the BGCAPP.

b. Consider adding the WRS to the justification, or explain why it should not be.

Response: The WRS is an off-the-shelf reverse osmosis package and it requires no further research to be used in the BGCAPP.

36 Page 4-3, line 2-5 The Division reserves the right to determine if and when a permit modification is necessary. Remove the sentence.

Response: The sentence in question has not been changed since the Revision 1 of the RD&D Permit Application was submitted in March 2004. However, this sentence has been removed as requested.

37 Page 4-3, lines 16 through 20 While the Compliance Schedule has been designed to include components of a Part B application, the Division reserves the right to require additional information. Modify this paragraph so that it does not presume that the Compliance Schedule items necessarily complete a Part B application.

Response: The following sentence has been added at the end of line 20:

"It is recognized, however, that the Division of Waste Management has the right to require additional information as part of a complete Part B application."

38 Page 4-3, line 21 The Division emphasizes that a schedule for performance tests, the objectives, protocol, and test plans have not yet been determined or approved. The Division concurs that initial performance shall be demonstrated as indicated in line 12.

Response: The BGAD and BPBG will work with KDEP to develop this information in the future.

39 Page 4-4, Process Description, Item 7 There are many details yet to be worked out prior to shipping untreated spent activated carbon from the HVAC filter. This step will be considered for approval in the final Closure Plan.

Response: The BGAD and BPBG will work with KDEP to develop this information in the future.

40 Page 4-4, lines 35-37 Army Decontamination Standards. This reference is used throughout this application for managing secondary waste. An acronym should be developed and used throughout this application for clarity. It shall be understood that it refers to a specific set of standards and criteria for determining contamination. Include the Army decontamination standards, and criteria for determining contamination, along with a statement from an independent scientific review (CDC?) that concurs with the standards and criteria, in a separate attachment to this application.

Response: The United States Army has adopted the airborne exposure limits criteria for the general population and chemical workers as recommended by the Center for Disease Control and Prevention (CDC) guidance published in the Federal Register (FR) Volume 68, Number 196, October 9, 2003 for nerve agents GB, GA, and VX and FR Volume 69, Number 85, May 3, 2004 for blister agents H, HD and HT. Copies of these Federal Register are attached for your review.

BGAD and BPBG will replace the Army Decontamination Standard reference with Airborne Exposure Limits (AELs) in Attachment 4.

The decontamination standards will be addressed in the Waste Analysis Plan and the Monitoring Plan that are included in the RD&D Permit Compliance Schedule as Items # 18 and # 30, respectively.

The CDC has been mandated by Congress to provide oversight to the chemical demilitarization facilities and will also perform the same role with BGCAPP. It is our understanding that they will review the BGCAPP monitoring program prior to the start of pilot testing.

41 Page *4-5,* line 4-5. Explain the appropriate means by which RO reject is managed to minimize waste.

Response: The RO Reject is a candidate for delisting which may allow it to be managed as a non-hazardous waste.

The following text has replaced the text on page 4-5, lines 4-5:

“The RO Reject stream is anticipated not to exhibit any characteristics of a hazardous waste. Since this waste stream will only carry an N waste code based on the derived from rule, delisting will allow this waste to be managed as a non-hazardous waste. If it is not delisted, it will be shipped to a TSDF for disposal."

42 Page *4-5,* line 25. Include the missing verb.

Response: "transferred" has been inserted between "then" and "to" on line 25.

43 Page 4-5, line 14. Make "disposal facility" plural if appropriate.

Response: It is assumed that the comment refers to Page 4-6, line 14. Since any load of waste can only be shipped to one disposal facility, the singular case as written is appropriate in this context.

44 Page 4-7,linel.

a. Will each batch of energetic hydrolysate be tested for the TRL before release?

Response: The initial batches of energetic hydrolysate will be tested prior to release. Once the BGAD and BPBG have been able demonstrate that statistical process controls can be used, the plan is to analyze on a statistical basis.

Page 4-7, line 1 has been revised to state the following:

> "…the batches of agent and energetic hydrolysate are transferred to the HSA before they are transferred to the SPB for further treatment."

In addition, the first sentence in Section 4.9.3 on pages 4-16 has been revised to state the following:

> "The energetic hydrolysate may be sampled and analyzed to ensure that it is below the target release level or it may be released based on validated process controls and statistical testing. This alternative analytical approach will be submitted to KDEP as part of the Waste Analysis Plan that is included in the RD&D Permit Compliance Schedule, Appendix B, Item # 18."

b. Provide a clear justification for not testing each batch of agent hydrolysate prior to release from the MDB.

Response: As stated on page 4-7 and in Section 4.11, a detailed justification will be provided as part of the Waste Analysis Plan when submitted as required by Compliance Schedule Item #18. This will include the statistical approach that will be used to demonstrate that process controls can be used for agent and energetic hydrolysate. This alternative approach will be reviewed and approved by the Cabinet as part of the Waste Analysis Plan.

45 Page 4-7, second paragraph.

a. Provide test data demonstrating that relocating the ARS from the MDB does not present a risk.

Response: The Energetic Hydrolysate will be transferred from the MDB to the Hydrolysate Storage Area (HSA) based on meeting the target release level. While Revision 1 of the RD&D Permit Application had the ARS (APS/AFS) inside the MDB, subsequent design indicated that this was not necessary. Revision 2 of the RD&D Permit Application, which is incorporated into the RD&D Permit by reference, shows the APS/AFS located in a separate building, the Aluminum Filtration Building, (AFB). With the reduction in the number of SCWO units as the result of the Design Consideration Studies, the APS and AFS were re-located into the SPB. As shown on PFD 24915-10-M5-APS-00001, The APS only receives energetics hydrolysate from the HSA (Stream #546). Since all hydrolysate in the HSA has been demonstrated to have an agent concentration below the target release level, there is no unusual risk associated with this transfer.

b. Explain how the fumes from the aluminum precipitate will be captured.

Response: As shown in the M&EBs associated with PFD 24915-10-M5-APS-00001, the vent from the APS (Stream # 548) is anticipated to contain only small quantities of volatile compounds, mainly ammonia. These are removed from the stream by the carbon filters MK-PS-0101A/B, which are designed to remove the volatile compounds in the APS vent gas.

c. What tests will be conducted on the filtrate to characterize it?

Response: Since the only reason for removing aluminum is to prevent clogging in the SCWO, the only test that is required is for turbidity. The test procedure will be submitted as part of the Waste Analysis Plan, Compliance Schedule Item #18.

46 Page 4-8, line 6, 7. Discuss bypassing the agent sampling tank for VX.

Response: VX hydrolysate is a mixture of organic and aqueous components. Operations experience from the Newport Chemical Agent Disposal Facility (NECDF) has shown that the two components can separate if not kept agitated. The in-line static mixer in the reactor piping system and the reactor agitator are specifically designed to keep the hydrolysate homogeneous while the reactor is being circulated for a sample.

47 Page 4-8, 4.3.1.2.1., Nonleaker Rocket Processing Sequence. Add a step between 9 and 10 where the agent is hydrolyzed and destroyed.

Response: Instead of adding a step here, BGAD and BPBG have deleted steps 10 and 11 which are already addressed in Section 4.11. With the deletion of steps 10 and 11, Steps 12 through 19 become steps 10 through 17. In addition, the reference to Section 4.10 in steps 7 and 9 has been corrected to reference Section 4.11.

To be consistent, the same changes have been made to Section 4.3.1.1.

48 Page 4-11, 4.3.1.4, GB Ton Containers.

a. If the OTC's are not processed during the GB campaign, when will they be processed?

Response: The OTC's will be processed during the GB campaign.

b. A Work Plan or additional process description must be submitted to KDEP for approval prior to treatment.

Response: A separate work plan will not be required because the treatment will be conducted under the RD&D permit or the Part B permit. If the OTCs are treated under the RD&D Permit, additional process description will be submitted in sufficient time to allow for KDEP review and approval prior to treatment.

49 Page 4-12, 4.3.4. Wood Pallets.

a. Line 8, "appropriate means" as used here and throughout this application is not considered an acceptable description of the intended managing procedures. Further elaboration is required.

Response: The term "appropriate means" refers to different methods of recycling or disposal that may be available in the future during the operations of the BGCAPP. The specific methods that will be used will be provided in the Waste Analysis Plan, Compliance Schedule Item # 18, which will be submitted 18 months prior to the start of hazardous waste operations. Information included in the Waste Analysis Plan will include methods for waste determination, waste characterization and management procedures for waste streams in accordance with 401 KAR 34:020 Section 4.

b. Line 10, "if chemical decontamination does not prove successful" as used here and though out this application is incomplete. The Division expects a complete description of the proposed test methods in Compliance Schedule Item 18, Waste Analysis Test Plan...

Response: The BGAD and BPBG will provide a complete description of the proposed test methods in the Waste Analysis Plan.

50 Page 4-12, 4.3.7. Spent Activated Carbon. See comments 23 and 39.

Response: Please see response to Comments 23 and 39.

51 Page 4-12, 4.3.8, 1. Spent Decontamination Solution.

a. List the components what SDS will be tested for during characterization.

Response: Characterization will be performed in accordance with 401 KAR 31.

b. **Describe the trigger that will invoke "other appropriate means".**

Response: If through generator knowledge or analyses, the Category C sump liquid is determined to be non-hazardous, it will not be processed through the BGCAPP, but disposed in accordance with applicable requirements.

c. **Describe "other appropriate means".**

Response: Please see response to Comment 49 a.

52. **Page 4-13, lines *1-5.***
  a. **Correct the formatting.**

  Response: The formatting has been corrected.

  b. **Explain how adding decontamination solution in the SDS constitutes treatment and not dilution, considering that the primary hydrolysis occurs in a reactor, or remove the statement "treat the SDS in the SDS tank with caustic and resample or".**

  Response: Please see the response to item 5(c).

53 **Page 4-13. footnote 11. Add any "missing" components in this list equipment to the RD&D justification if appropriate.**

Response: Footnote 11 has been changed to include 4-15.

54 **Page 4-17, line *5.***
  a. **Justify in detail (citing reports) why is appropriate and acceptable treatment to send ENR gas to the OTE versus the OTM, or remove the sentence.**

  Response: The M&EBs for the EBH and the ENS (24915-07M5-EBH-00001 and -ENS-00001) show the vents from the ENR (Stream #552) contain far fewer contaminants than the vent from the EBH (Stream #17). Neither stream contains measurable quantities of chemical agent because the caustic environment in the EBH and in the ENR neutralizes any residual agent by hydrolysis. As a result, the OTE is fully capable of also handling the off-gases from the ENR in case of shutdown of the OTM. Furthermore, because the OTE vents to the MDB HVAC filter, diversion of the ENR gas to the OTE is fully protective of the environment.

  b. **Describe the conditions when the OTM may not be in operation.**

  Response: The OTM may not be in operation in the event of a malfunction on one of the OTMs while the other OTM is shutdown for scheduled maintenance.

55 Page 4-17, 4.10, Aluminum Precipitation System. See comment 45.

Response: Please see response to comment 45.

56 Page 4-17 line 39. SDS Treatment. See comment 52.

Response: Please see response to comment 5(c).

57 Page 4-18, line 1-2. VX Hydrolysate Sampling. See comment 46.

Response: Please see response to comment 46.

58 Page 4-18, lines 3-6. The Division emphasizes that a statistical approach to hydrolysate release from the MDB has only been discussed, and has not been submitted in detail or approved at this time.

Response: The BGAD and BPBG understand that additional information must be provided to the Cabinet before statistical process controls can be approved. This information will be provided in conjunction with the submittal of the Waste Analysis Plan required by Compliance Schedule item # 18.

59 Page 4-18, Footnote 13. Change OTE to OTM.

Response: The reference in the footnote has been changed from OTE to OTM.

60 Page 4-19, 4.12.2, MCS, Is the Metal Cooling System enclosed?

Response: As shown on PFD 24915-07-M5-MCS-00001, the MPT cooling chamber (MJ-THS-0136) is enclosed and the air exiting the cooling chamber is filtered by particulate filter MK-MCS-0101.

61 Page 4-19, 4.12.3, OTM.

a. What is the temperature of the OTM entering the MDB HVAC stream?

Response: The temperature of the OTM exhaust gas entering the MDB HVAC filter is 158°F for the GB case. This information is shown in the PFDs and M&EBs 24915-07-M5-OTM-00001, sheets 1 through 4, stream #807.

b. Describe the addition and removal of liquids from the OTM.

Response: As shown on PFD 24915-07-OTM-00001, process water is added to the OTM to control temperature in the BOX and to the Scrubber Tower. The only liquid discharge from the OTM is the MPT Condensate Stream #820, which goes to the Energetics Hydrolysate Storage Tank prior to further treatment in the SCWO. In the event of an upset condition in the MPT/OTM, piping has been included to allow return of the MPT Condensate to the Spent Decon Storage Tank; this line is also shown on the above referenced PFD.

c. List the minimum residence time in the BOX.

Response: The following text has been added to Page 4-19, following line 34.

"The BOX consists of two sections, an oxidizing section, and a quench section. The oxidizing section has a minimum gas residence time of two seconds at a minimum temperature of 2,000°F."

d. Describe the material used to construct the OTM filter/demister.

Response: The OTM filter is a cartridge-type filter made of polyester fiber.

e. Describe the replacement schedule for this media.

Response: The media used is self-cleaning in that as the mist accumulates on it, it runs down the filter elements, collects at the bottom of the filter housing and, as shown on the PFD, returned to the bottom of the packed tower section of the scrubber tower. If the cartridge shows signs of clogging, as determined by the pressure drop across it, it will be replaced.

62 Page 4-20, 4.13 Decontamination Solutions. Discuss the impact of possible combinations of ammonia and decontamination solutions anywhere in individual systems at the facility.

Response: The only place ammonia may be generated is in the EBH and the ENS rooms. This is shown on M&EBs 24915-07-M5-EBH-0001 & -ENS-00001. The vent gases from the EBHs are further treated in the OTE and the vent gases from the ENRs are treated in the OTM or the OTE, if the OTM is shutdown. The scrubbers in both the OTE and the OTM use sodium hydroxide which is compatible with ammonia. Sodium hypochlorite (NaOCl) and ammonia may react to produce chlorine gas, However, they do not come in contact with each other in the BGCAPP process.

63 Page 4-20, 4.14 SCWO Units. Line 2 1-24. The TRRP was conducted using the assumption the larger quantities of energetic hydrolysate would be available. Describe what design, operational, or maintenance changes will be implemented; and if additional studies will be conducted if NCRM's are not treated in BGCAPP.

Response: In the BGCAPP response to the KDEP comments on the SCWO TRRP Report, dated July 24, 2006, the response to comment #3 addresses this question:

> "Since completion of the SCWO TRRP test reports, the Blue Grass Program has decided that non-contaminated rocket motors will be processed separately from the BGCAPP facility. Relative to SCWO processing, the effect of this decision is

a reduction in the amount of energetics hydrolysate available for combining with agent hydrolysate. Since the essentially non-corrosive energetics hydrolysate dilutes the more corrosive agent hydrolysate, less energetics hydrolysate results in slightly higher corrosion rates for the titanium liners of the reactor during SCWO processing. With removal of the non-contaminated rocket motors, the energetics hydrolysate-to-agent hydrolysate ratio for the GB campaign was reduced from 3.4:1 to 2.5:1, while the energetics hydrolysate-to-agent hydrolysate ratios for the VX and H campaigns were unchanged at 2.5:1 and 1:1, respectively. Although not actually tested during the SCWO TRRP program, the reduced energetics hydrolysate-to-agent hydrolysate ratio of 2.5:1 for BGCAPP GB blended feed operations was evaluated by BGCAPP risk assessment personnel and was determined to be a low-risk change not requiring further testing. The SCWO TRRP VX blended feed tests were performed at a blend ratio of 2.5:1, and VX hydrolysate is more corrosive than GB hydrolysate. Therefore, GB blended feed operations at a 2.5:1 ratio will be less corrosive than VX blended feed at the same ratio, where the corrosion rate was already determined to be acceptable”.

No additional TRRP testing will be conducted.

64 Page 4-21. Add a paragraph describing how SCWO effluents will be managed during startup, shut down, and upset conditions.

Response: Please see response to Comment #4.

The following text has been added to Section 4.14, Page 4-21, after Line 28;

“During upset conditions, the SCWO effluent is diverted to the Off-Spec Effluent Tank (MV-SCWO-0041), and not to the tanks in the STA. The Off-Spec Effluent tanks are located in the SPB and are controlled by the SPB HVAC system. This is shown in PFD 24915-10-M5-SCWO-00001, Sheet 3.”

65 Page 4-22, Table 4-2, Hydrolysis Types to be Used at BGCAPP. References were made to NaOCL and other decontamination solutions. Include these here if appropriate.

Response: The hydrolysis process will use either sodium hydroxide (GB, VX and Energetics) or hot water (H). Sodium hypochlorite and the other decontamination solutions will be used only for personnel and equipment decontamination.

66 Page *5-5,* 4. Hazardous Waste Container Storage Areas. See Comment 2 and adjust as appropriate. Closure waste can be dealt with in the final approved Closure Plan.

Response: Please see the responses to comment 2. The container storage areas that will be used only for closure wastes have been removed.

67 Page *5-6,* Table *5.1* Container Management Regulatory Standards. See Comments 2 and 66.

Response: Please see responses to comment 2. The container storage areas that will be used only for closure wastes have been removed.

68 Page 5-7, 1. Unpack Areas (UPAs). If there are sumps, they should be mentioned here.

Response: There are sumps located in the Unpack Areas.

Lines 10-12 on page 5-7 have been revised as follows:

> "The number of construction and expansion joints will be kept to a minimum in this area and the floor, sumps and curbs have been coated."

69 Page *5-7, 5-8, 5-9.* See Comments 2, 66 and 65.

Response: Please see responses to comment 2. The container storage areas included that will be used only for closure wastes have been removed.

70 Page *5-8,* 10. ANS Room.

a. Describe the contingency basis when SDS may need to be stored in containers.

Response: Please see response to Comment 2(a).

b. Describe the container to be used during such a contingency.

Response: The containers that will be used are 55 gallon polyethylene drums.

71 Page *5-8,* 13. and 14. NCRM Storage. See Comment 3

Response: Please see response to Comment 3.

72 Page *5-9,* lines 10-18. Correct the formatting.

Response: The formatting has been corrected.

73 Page 5-10, Table *5-2,* Tank Systems Regulatory Standards. This table is incomplete and presents an inaccurate impression of the scope of the hazardous waste tanks.

a. Include the Hydrolysate Storage Area Tanks.

Response: The table has been revised to include HSA

b. **Include The Spent Decon Tanks.**

Response: The table has been revised to include SDS tank

c. **Include Lab Waste Tanks**

Response: The lab waste tank was deleted from the Part A and Attachment 5 of Revision 3 of the RD&D Permit Application. Table 5-2 is correct as written.

d. **Include Sampling Tanks.**

Response: The sampling tanks are included as part of the ANS. No change to Table 5-2 is required.

e. **Include other tanks not listed above.**

Response: All regulated tank units are included

f. **Include the regulations for Air Emission Standards where appropriate.**

Response: 401 KAR 34:275, 34:280 and 34:281, which incorporate by reference 40CFR §264.1030 through §264.1090, Subparts AA, BB, and CC, do not apply to any of the tanks in either the MDB or the SPB. Subpart AA applies only to evaporators and distillation columns, which do not exist in the BGCAPP. Subparts BB (equipment leaks) and CC (Tanks, surface impoundments and containers) do not apply because to the tanks located inside the MDB because both the tanks and fittings are completely vented through the MDB HVAC filters. The MDB, therefore, qualifies as "an enclosure, as opposed to a cover, and meets the control device requirements of § 264.1084(i)." Finally, the RO Permeate Tank and the RO Reject tank are not subject to these regulations as discussed in the response to NOD comment #4.

g. **Include other regulations where appropriate.**

Response: All applicable regulations have been listed.

74 **Page *5-11.* Table 5.3 Treatment Unit Regulatory Standards. This table is incomplete and presents an inaccurate impression of the scope of the hazardous waste treatment units.**

a. **The APS/AFS is shown in the MDB, which may be correct, but is inconsistent with earlier description of the process.**

Response: Table 5.3 has been corrected to indicate that the APS/AFS are located in the SPB.

b. **Include the OTE.**

Response: The OTE is an integral part of the EBH and included as part of the EBH Subpart X Unit.

c. **Include the OTM**

Response: The OTM is an integral part of the MPT and included as part of the MPT Subpart X Unit.

d. **Include the MDB HVAC.**

Response: The MDB HVAC Filter System is an Air Pollution Control System and is not a hazardous waste management unit.

e. **Include other treatment units not list above if appropriate.**

Response: All treatment units have been included.

f. **Include the air emission Standards were appropriate.**

Response: None of these treatment units is subject to 401 KAR 34:275, 34:280, and 34:281, which incorporate by reference 40CFR §264.1030 through §264.1090, Subparts AA, BB, and CC for the reasons presented in the response to NOD item 4.

g. **Include other regulations where appropriate.**

Response: All applicable regulations have been listed.

75 Page 5-12. Add additional regulations where appropriate. Include 38:230, 38:240, and 38:250.

Response: A discussion regarding 401 KAR 38:230 is already included on page 5-12. BPBG does not believe that 401 KAR 38:240 and 401 KAR 38:250 are appropriate to include here. These regulations govern permitting requirements for air emission standards for process vents and equipment leaks. See response to comment #4 for a discussion of the applicability of these requirements.

76 Attachment 6. The organization of this attachment is misleading and presumptuous. Do not separate buildings and equipment that are "potentially subject" or "not potentially subject to KHW regulations". BGCAPP is being design, constructed and operated for the sole purpose of treating hazardous waste. Therefore the entire facility is subject to KHW regulations. The Division will determine which areas and equipment will receive over-site and specific permit conditions. Excluding systems that are critically important to the protection of human health and the environmental, such as standby electrical generators and fire protection systems, is illogical. Reformat and re-title the attachment.

Response: The format of Attachment 6 in Revision 3 of the RD&D Permit Application has not changed from Revision 1 and Revision 2 of the RD&D Permit Applications. Attachment 6 was formatted to provide the Cabinet with information on all of the buildings and facilities that are part of the BGCAPP and to identify those buildings and facilities that contain hazardous waste management units. The BGAD and BPBG concur that there are other critical systems, including the Standby Diesel Generators and the Fire Protection Systems, that will be an integral part of the emergency systems for the BGCAPP, but are not hazardous waste management units. The BGAD and BPBG will revise the title of Section 6.1.2 to "Building and Structures containing Hazardous Waste Management Units" and Section 6.1.4 to "Buildings and Structures not Containing Hazardous Waste Management Units".

The BGAD and BPBG believe that with this change, no other changes to Attachment 6 are required.

77 Page 6-2. List the Aluminum Removal System somewhere.

Response: The Aluminum Removal System has been added to Page 6-2 after line 26

78 Page 6-3. Reinsert references to the maintaining positive pressure in the CSB or justify why it is no longer necessary.

Response: The control room, not the CSB, is referenced in Revisions 1 and 2 of the RD&D Permit Application as being positive pressure. The reference to maintaining positive pressure in the control room has been reinserted.

79 Page 6-4, line 34. Justify why the MDB, HVAC Air Handlers is considered a major component of the CSB.

Response: It is not a major component of the CSB and it has been deleted.

80 Page 6-7, 6.1.4.16 Toxic Maintenance Building (TMB).

a. Describe the activities that will be performed in this building, and if they include working with agent contaminated equipment.
b. Describe the size of this building.
c. What type of floor?
d. Justify the use a fabric faced building in a facility treating energetics.

Response: The Toxic Maintenance Building (TMB) has been eliminated from the BGCAPP. The TMB was originally intended to house shops that repair decontaminated or uncontaminated equipment. This function will now be performed in the Vehicle Support Facility (VSF), which is inside of the Chemical Limited Area (CLA). No agent, or agent-contaminated material or equipment will be housed or handled in the VSF. In addition, the Toxic Chemical Maintenance Building (TCM), an existing building on the BGAD, has been incorporated into the BGCAPP. The TCM will be outside of the CLA when the security fence is rerouted and will be used strictly for personnel support. No hazardous waste, including agent or agent-contaminated materials, will be allowed in the TCM

Section 6.1.4.16 has been replaced by the following text and a new section, Section 6.1.4.17 has been added as follows:

"6.1.4.16 Toxic Chemical Maintenance Building (TCM)

1. Description: The TCM is an existing BGCA building, which was originally intended as a repair facility for chemical weapons; however, it was never used for this purpose. It will be used only as a personnel service building. It contains a small medical area, lockers, showers, break rooms, and related facilities. It is located outside of the CLA. No hazardous waste, including energetics, agent or agent-contaminated materials, will be stored or processed in the TCM.

2. Method of Construction: Existing structure.

3. Major Equipment: None.

6.1.4.17 Vehicle Support Facility (VSF)

1. Description: The building will be used to service vehicles and contains an area for performing maintenance activities for uncontaminated equipment. On rare occasions, decontaminated equipment from the BGCAPP may be brought to the VSF for repair. The building is expected to house a shop area, tool crib, and a supply of operational material and spares. It includes a maintenance shop that has areas for welding, small metal fabrication, instrument calibration, tool storage, and storage space for maintenance consumables. The VSF is a metal framed structure on a concrete slab. It is located inside of the CLA. No hazardous waste, including energetics, agent or agent-contaminated materials, will be stored or processed in the VSF.

2. Method of Construction: Field fabricated.

3. Major Equipment: None."

81 **Page 6-11, 6.4, Systemization. The Division will need assurances that the facility is ready to begin treating hazardous waste. Therefore the BPBG and the Division must work together during Systemization to provide and review preliminary and intermediate testing and validation of equipment and processes.**

Response: The BGAD and BPBG will work with the Cabinet to provide them the necessary information prior to the start of hazardous waste operations. This includes Compliance Schedule Items #22 and #23, the Subpart X Units, Performance Test Plans & Reports, respectively.

82 ***6.5.1* Several key components appear to be missing.**

a. OTE

Response: The OTE is an integral part of the EBH and is included as part of the EBH Subpart X Unit.

b. OTM

Response: The OTM is an integral part of the MPT and is included as part of the MPT Subpart X Unit.

c. MDB, HVAC

Response: The MDB HVAC Filter System is not part of the RD&D as it has operated at all of the other chemical demilitarization facilities. Testing of the MDB HVAC system will occur during the systemization phase.

d. ARS

Response: Precipitation and filtration systems similar to the ARS are used in industry and thus, are not unique to the BGCAPP. The ARS requires no further research to be used in the BGCAPP.

83 Page *6-15,* line 23. Describe the difference between M61 and M55/M56 rockets.

Response: The difference between the M61 rocket and M55 rocket is that the M61 rocket is a test munition that contains ethylene glycol instead of chemical agent. All other components are the same. The M56 warhead is described in Attachment 3, Section 3.1.2.1 of the RD&D Permit Application.

84 Page 6-15, line 28. Change OTS to OTM.

Response: The reference to OTS has been replaced by OTM.

85 6.5.1.6. Demonstrate SCWO. If there will be multiple blended hydrolysate formulas, the justification and demonstration should reflect this.

Response: During the RD&D pilot testing, the intent is to process only blended energetics hydrolysate and GB agent hydrolysate in a ratio of 2.5:1 energetic hydrolysate to GB agent hydrolysate. However, during RD&D, if it is determined that a revised blend formula needs to be evaluated, other blended hydrolysate formulas may be used.

86 Page 6-18. lines 1-6.

a. Explain what criteria would prevent H from being processed through the SCWO.

Response: BGAD and BPBG assume the Cabinet is asking what would prevent hydrolysate from being processed through the SCWO. The intent is to continue to process hydrolysate through the SCWO throughout the RD&D pilot testing period once SCWO processing has started.

b. **List other non-preferred alternatives.**

Response: During the RD&D Pilot testing, as stated on page 6-16, lines 2 & 3, the two alternatives are to accumulate hydrolysate in the HSA or process the hydrolysate through the SCWO units.

c. **How would these alternatives affect the water supply and HSA capacities.**

Response: See the response to comment 29a. If the SCWO units are not operating, the amount of hydrolysate accumulating in the HSA would increase and since the water from the Water Recovery System is only recycled to the SCWO units, there will be no impact to the plant water balance if the SCWO units are shutdown.

The following sentence on page 6-16, lines 4-6 has been deleted:

"The continued processing of hydrolysate through the SCWO is an important aspect of maintaining the plant water balance by recycling water to the ANRs and the EBHs; therefore, it is the preferred alternative."

87 **Page 6-16, 6.5.1.7, The RO is part of the WRS. Characterizing the reject and maximizing the reuse should be listed if appropriate.**

Response: The WRS is not part of the RD&D program as it is an off the shelf commercial system. The characterization requirements of the RO reject will be included in the Waste Analysis Plan that will be submitted in accordance with Compliance Schedule Item # 18. Maximizing the amount of water that can be reused will be part of the optimization of the WRS.

88 **6-15, 6.5.3, Testing schedule and Criteria for Processing Rates. The Division will need assurances that the facility is ready to increase treatment rates of treating hazardous waste. Therefore the BPBG and the Division must work together during RD&D to provide and review preliminary and intermediate testing and validation of equipment and processes. Performance testing is expected to occur very early on and not the last 2 weeks.**

Response: BGAD and BPBG understand the need for collaboration on reviewing preliminary and intermediate testing. The performance testing described in this section is intended to be performed at the design rate for the facility

89 **Page 7-2, 7.2. See comment 58.**

Response: As stated in Section 7.2, lines 24-29, the BGAD and BPBG understand that additional information must be provided to the Cabinet before statistical process controls can be approved. This information will be provided in conjunction with the submittal of the Waste Analysis Plan required by Compliance Schedule item # 18.

90 Page 7-2. Describe how the ARS will be tracked.

Response: Section 7.4 has been modified to include both the ARS (7.4.1) and the SCWO (7.4.2).

The following has been added as Section 7.4.1:

"7.4.1 Aluminum Removal System

Energetic hydrolysate from the HSA is transferred into the Aluminum Precipitation Reactor and recorded on a log sheet. As each batch of filtrate is transferred to the SCWO blend tank, it is recorded on a log sheet. As the aluminum precipitate from each batch is collected in a roll-off box, the batch will be recorded on the roll-ff box log sheet for use in manifesting the waste to a TSDF."

91 Page 7-3, 7.8 Secondary Waste. Provide more information about secondary waste tracking. Include weight methods, and connection to analysis and decontamination verification.

Response: At this stage of the design, the analytical and waste tracking requirements have not been determined. The requirements for secondary waste analysis will be included in the Waste Analysis Plan, Compliance Schedule Item #18, which is included in Appendix B of the RD&D Permit. The waste tracking system that will be used has not been developed at this time but will comply with the requirements of 401 KAR 34.290.

92 Page 8-1. Add a statement near line 18 that the analytical methods will be included in the Waste Analysis Plan that will be submitted to KDEP according to Compliance Schedule Item 21 (Waste Analysis Plan).

Response: The last sentence on page 8-1 has been revised to state the following:

"The BGCAPP specific analytical procedures will be referenced in the Waste Analysis Plan required by Compliance Schedule item # 18 of the RD&D Permit."

93 Page 9-1, lines 32 and 33. "Army Decontamination Standard". See Comment 40.

Response: The references to the Army Decontamination Standards on page 9-1 lines 32 and 33 have been replaced with the following:

"… in accordance with the Closure Plan that will be submitted as required by the RD&D Permit Compliance Schedule Item # 28."

In addition, there are three other references (pages 9-2, 9-3 and 9-4) to the "Army Decontamination Standards" in Attachment 9 of the RD&D Permit Application. These references have been addressed as follows:

On page 9-2, the last sentence in the first paragraph, lines 1-3 has been deleted as this is repetitive.

On page 9-3, line 1 "… to the Army Decontamination Standard" has been replaced with the following:

"… in accordance with the Closure Plan that will be submitted as required by the RD&D Permit Compliance Schedule Item # 28."

On page 9-4, lines 31-33, "… that cannot be decontaminated to the Army Decontamination Standard will be processed onsite in the MPT and disposed of at a permitted hazardous waste TSDF." Has been replaced with the following:

"will be decontaminated in accordance with the Closure Plan that will be submitted as required by the RD&D Permit Compliance Schedule Item # 28."

94 Page 10-1. Add MPT, SCWO, OTE and OTM to the first paragraph.

Response: The OTE and the OTM are part of the EBH and MPT Subpart X Miscellaneous Treatment Units. The MPT, the EBH and the SCWO have been added to the list of items on Page 10-1, after line 26 as follows:

"7. Verify that the MPT can treat the materials to a minimum of 1000°F for a minimum of 15 minutes and that the OTM performs as designed.
8. Verify that the EBH and the OTE perform as designed.
9. Verify proper operation of the SCWO system on actual hydrolysate**"**

95 Page 10-1 line 19. Consider removing footnote 1.

Response: Footnote 1 has been removed.

96 Page 10-1, line 27, Add aluminum precipitate, treated metal, and RO brine reject if appropriate.

Response: These are incorporated in item 4 on page 10-1. No change is required to the application.

97 Page 10-2, 10.2 1. The ENS vents to the OTM not OTR.

Response: Section 10.2, 1 and 2 have been revised as follows:

1. EBH, which vents to the EBH offgas treatment system (OTE)
2. Energetics Neutralization Reactor which normally vents to the MPT offgas treatment system (OTM), but may vent to the OTE if the OTM is shutdown for maintenance.
3. The Agent Collection System (ACS) tanks, Agent Neutralization System (ANS) reactors and sampling tanks and the Spent Decontamination Solution Tanks and Metal Parts Treaters (MPT), which vent to the MPT offgas treatment system (OTM).

98 Page 10-2, line 21. Add the footnote that is referenced in this line.

Response: The referenced footnote is listed on page 10-1 and is associated with the sentence on lines 30-31, which is the same as the sentence on page 10-2, lines 20-21. The sentence will be deleted on page 10-1 and the footnote moved to page 10-2.

99 Page 11-1, item 3.

a. The SPB has multiple emission points that are not all controlled by redundant air pollution control equipment.

Response: The redundant air pollution control equipment only applies to the MDB where all agent and agent-contaminated materials are stored and processed. All of the material that is in the HSA and the SPB has met the release criteria prior to transfer from the MDB. Therefore, redundant controls are not required.

The revised text for number 3 on lines 16-17 is as follows:

“3. The BGCAPP has three emissions points:

a. The MDB which is controlled by redundant air pollution control equipment
b. The SCWO system which vents to the SPB HVAC filters
c. The HSA which has carbon filters on the tank vents”

b. Include diesel generators, boiler, RO effluent, Tanker load/unload stations, ARS if appropriate.

Response: The following items have been added on page 11-1 after line 24:

7. The Standby Diesel Generators which are used to provide emergency backup power to critical systems in the BGCAPP.
8. The process boilers, which provide process and space heat steam.
9. The tanker load and unload stations, which are used for receipt of raw materials and shipment of RO reject.

Please type or print clearly in ink (Do not use pencil) DEP-7058A (July 1997)

Kentucky Natural Resources and Environmental Protection Cabinet
Department for Environmental Protection
Division of Waste Management
14 Reilly Road - Frankfort, Kentucky 40601

DO NOT WRITE IN THIS SPACE

Part A of the Kentucky Hazardous Waste Permit Application

Facility's EPA ID No.	K	Y	8	2	1	3	8	2	0	1	0	5

FIRST SUBMITTAL *(see INSTRUCTIONS)* XX REVISION PAGE 1 OF 11

RENEWAL

1. Name of Facility: Blue Grass Chemical Agent-Destruction Pilot Plant
2. Location of Facility: 2091 Kingston Highway

   City: Richmond State: KY Zip Code: 40475-5001

3. County: Madison *See INSTRUCTIONS:* Latitude: 37º 42' 00" N Longitude: 84º 12' 30" W
4. Name of Land Owner: *See INSTRUCTIONS:* U.S. Department of the Army

   Legal status of Land Owner: XX Federal (F) State (S) County (C) Indian (I)

   Municipal (M) District (D) Private (P)

   Other (O) specify: ________

   Land Owner's Mailing Address: 2091 Kingston Highway

   City: Richmond State: KY Zip Code: 40475-5001

   Facility Land Owner's Telephone Number: (859) 779-6246

5. Existing Facilities, provide the date operation began or construction commenced: 1941 (Month, Day, Year)

   New Facilities, provide the date operation is expected to begin: ________ (Month, Day, Year)

6. Facility Mailing Address: 2091 Kingston Highway

   City: Richmond State: KY Zip Code: 40475-5001

7. Facility Contact Person: Todd G. Williams

   Title: Environmental Coordinator Phone Number: (859) 779-6280

   Facility Contact Person may be reached at Mailing Address XX Location Address Other Specify: ________

   Street Address: ________

   City: ________ State: ________ Zip Code: ________

Facility's EPA ID Number

K	Y	8	2	1	3	8	2	0	1	0	5

8. Name of Facility Operator: *See INSTRUCTIONS:* Bechtel Parsons Blue Grass

Type of Owner: XX Federal (F) State (S) County (C) Indian (I)

Municipal (M) District (D) XX Private (P)

Other (O) specify: __________

Operator's Mailing Address: 301 Highland Park Drive

City: Richmond State: KY Zip Code: 40475

Facility Operator's Telephone Number: (859) 625-1665

New Operator Assumed Responsibility for Facility on this Date: See Notes, Page 11
(Month, Day, Year)

9. Name of Facility Owner: *See INSTRUCTIONS:* U.S. Department of the Army

Legal status of Land Owner: XX Federal (F) State (S) County (C) Indian (I)

Municipal (M) District (D) Private (P)

Other (O) specify: __________

Owner's Mailing Address: 2091 Kingston Highway

City: Richmond State: KY Zip Code: 40475-5060

Facility Owner's Telephone Number: (859) 779-6246

New Operator Assumed Responsibility for Facility on this Date: 1941
(Month, Day, Year)

10. SIC Codes: (1) 9711 (1) ____ (1) ____ (1) ____

Briefly describe the type of business conducted at this site: National Security (U.S. Army)

Facility's EPA ID Number: K Y 8 2 1 3 8 2 0 1 0 5

11. PROCESS DESCRIPTION. *See Instructions*

Commercial Indicator	Unique Unit or Group Name	Legal Status Code	Process Codes	Process Design Capacity Of All Units Listed Under This Name	Unit of Measure	Number of Individual Units In This Process	Operating Status Code	Description Of Process
4	Container Handling Building (CHB)	RD	S01	9,500	G	1	BC	Stores up to 53 EONCs, 30 rockets per EONC prior to movement to MDB
4	Laboratory Waste Handling Area	RD	S01	2,200	G	1	BC	Store hazardous waste generated during operation of the facility laboratory
4	MDB Residue Handling Area *	RD	S01	24,000	G	1	BC	Store various hazardous wastes prior to final treatment or disposal
4	Box Storage *	RD	S01	3,000	G	1	BC	Store 36 DOT boxes of 30 rocket motors per box
4	Agent Neutralization System (ANS) Storage Area *	RD	S01	2,750	G	1	BC	Store various secondary wastes as well as contingency storage for the SDS
4	Tray/Container Transfer Room *	RD	S01	550	G	1	BC	Store various secondary wastes
4	Metal Parts Treater (MPT) Cooling Conveyor Storage Area *	RD	S01	8,190	G	1	BC	Store up to one 20 cubic yards roll off bin and various trays queued on conveyor
4	Toxic Maintenance Area (TMA) Storage Area *	RD	S01	5,500	G	1	BC	Store drums of various waste, contaminated equipment and/or leaking munitions

* Unit(s) located in Munitions Demilitarization Building

Facility's EPA ID Number: K Y 8 2 1 3 8 2 0 1 0 5

11. PROCESS DESCRIPTION. *See Instructions*

Commercial Indicator	Unique Unit or Group Name	Legal Status Code	Process Codes	Process Design Capacity Of All Units Listed Under This Name	Unit of Measure	Number of Individual Units In This Process	Operating Status Code	Description Of Process
4	Explosive Containment Vestibule (ECV) Storage Area *	RD	S01	500	G	2	BC	Store various secondary wastes
4	Unpack Area (UPA) *	RD	S01	4,800	G	2	BC	Store munitions and various secondary wastes
4	Motor Shipping Room (MSR)/Covered Loading Area (for NCRM) *	RD	S01	350	G	1	BC	Store up to 2 DOT boxes of 30 rocket motors per box & 2 DOT boxes of empty warhead shipping and firing tubes
4	Motor Packing Room (MPR) Storage Area (for NCRM) *	RD	S01	350	G	1	BC	Store up to 2 DOT boxes of 30 rocket motors per box & 2 DOT boxes of empty warhead shipping and firing tubes
4	Explosive Containment Room (ECR) Storage Area *	RD	S01	30	G	2	BC	Store various secondary wastes
4	SCWO Processing Building (SPB) Storage Area	RD	S01	8,550	G	1	BC	Store AFS filter cake and various secondary wastes
4	Waste Storage Area (WSA)	RD	S01	5,000	G	1	BC	Stage waste prior to offsite shipment
4	Hydrolysate Storage Area (HSA)	RD	S02	3,210,000	G	9	BC	Store hydrolysate prior to treatment in SCWO

* Unit(s) located in Munitions Demilitarization Building

Facility's EPA ID Number: K Y 8 2 1 3 8 2 0 1 0 5

11. PROCESS DESCRIPTION. *See Instructions*

Commercial Indicator	Unique Unit or Group Name	Legal Status Code	Process Codes	Process Design Capacity Of All Units Listed Under This Name	Unit of Measure	Number of Individual Units In This Process	Operating Status Code	Description Of Process
4	Agent Collection/Toxic Storage Tanks *	RD	S02	3,600	G	2	BC	Store agent prior to treatment
4	SCWO Tank Area (STA)	RD	S02	412,500	G	7	BC	Store brine generated during hydrolysate treatment
4	Spent Decon System (SDS) *	RD	T01	30,000	U	3	BC	Store and or treat spent decon collected from sumps and various decon activities.
4	Agent Neutralization System (ANS) *	RD	T01	7,300	J	5	BC	Neutralize agent (system includes reactors and sampling tanks)
4	Energetics Neutralization System (ENS) *	RD	T01	12,100	J	3	BC	Neutralize waste energetics in tanks
4	Munitions Washout System (MWS) *	RD	X02	871	J	3	BC	Drain and washout chemical warfare agent from projectiles
4	Nose Closure Removal System (NCRS) *	RD	X02	581	J	1	BC	Remove nose closures from projectiles
4	Projectile Mortar Disassembly Machine (PMD) *	RD	X02	410	J	1	BC	Mechanically disassemble projectiles for treatment

* Unit(s) located in Munitions Demilitarization Building

Facility's EPA ID Number: K Y 8 2 1 3 8 2 0 1 0 5

11. PROCESS DESCRIPTION. *See Instructions*

Commercial Indicator	Unique Unit or Group Name	Legal Status Code	Process Codes	Process Design Capacity Of All Units Listed Under This Name	Unit of Measure	Number of Individual Units In This Process	Operating Status Code	Description Of Process
4	Rocket Shear Machine (RSM) *	RD	X02	3,900	J	2	BC	Mechanically disassemble M55 rockets and M56 warheads for treatment
4	Rocket Cutting Machine (RCM) *	RD	X02	3,900	J	2	BC	Mechanically disassemble M55 rockets by separating the motor from the warhead
4	Metal Parts Treater (MPT) *	RD	X03	8,500	J	2	BC	Treat contaminated metal parts
4	Energetics Batch Hydrolyzer (EBH) *	RD	X99	5,180	J	6	BC	Treatment of waste energetics
4	Water Recovery System	RD	X99	146,063	U	1	BC	System recovers water from SCWO effluent
4	Aluminum Removal System	RD	X99	3,200	J	2	BC	Precipitate and filter aluminum compounds from hydrolysate
4	Supercritical Water Oxidation (SCWO) Reactors	RD	X99	6,600	J	6	BC	Treat blended agent and energetic hydrolysate by oxidation

* Unit(s) located in Munitions Demilitarization Building

Facility's EPA ID Number											
K	Y	8	2	1	3	8	2	0	1	0	5

12. **WASTE STREAM DESCRIPTION.** *See Instructions.*

WASTE STREAM NUMBER	ESTIMATE ANNUAL WASTE AMOUNT	UNIT OF MEASURE	EPA WASTE NUMBERS	PROCESS CODE ASSOCIATED WITH THIS WASTE
1	2,400	**TONS**	D004, D005, D006, D007, D008, D009, D010, D011, N001, N002 and/or N003	S01, S02, T01, X02, X03, X99 MPT Residues
2	1,417	**TONS**	D004, D005, D006, D007, D008, D009, D010, D011, N001, N002 and/or N003	S01, S02, T01, X02, X03, X99 APS/AFS Preciptate
3	133,257	**TONS**	D004, D005, D006, D007, D008, D009, D010, D011, N001, N002 and/or N003	S01, S02, T01, X02, X03, X99 SCWO Effluent (70% of this waste stream is recycled back into the BGCAPP process)
4	0.5	**TONS**	F001, F002, F003, F004 & F005	S01 & S02 Metal Parts Washing Waste
5	2,500	**TONS**	D004, D005, D006, D007, D008, D009, D010, D011, D022, D024, D029, D037, N001, N002 and/or N003	S01, S02, T01, X02, X03, X99 Closure Waste
6	5,200	**TONS**	N001, N002, D001, D003, D004, D005, D006, D007, D008, D009, D010 and/or D011	S01, S02, T01, X02, X03, X99 Rocket Handling Systems (RCM & RSM)
7	400	**TONS**	N001, N002, N003, D001, D003, D004, D005, D006, D007, D008, D009, D010 and/or D011	S01, S02, T01, X02, X03, X99 Projectile Handling Systems (PMD, NCRS & MWS)
8	3,600	**TONS**	N001, N002, N003, D001, D002, D003, D004, D005, D006, D007, D008, D009, D010 and/or D011	S01, S02, T01, X02, X03, X99 Energetics Treatment (EBH & ENS)
9	3,000	**TONS**	N001, N002, N003, D001, D002, D004, D005, D006, D007, D008, D009, D010 and/or D011	S01, S02, T01, X02, X03, X99 Agent Treatment (ACS & ANS)
10	9,100	**TONS**	N001, N002, N003, D001, D002, D004, D005, D006, D007, D008, D009, D010 and/or D011	S02 HSA

Facility's EPA ID Number											
K	Y	8	2	1	3	8	2	0	1	0	5

12. **WASTE STREAM DESCRIPTION.** ***See Instructions.***

WASTE STREAM NUMBER	ESTIMATE ANNUAL WASTE AMOUNT	UNIT OF MEASURE	EPA WASTE NUMBERS	PROCESS CODE ASSOCIATED WITH THIS WASTE
11	2,500	**TONS**	N001, N002, N003, D002, D004, D005, D006, D007, D008, D009, D010 and/or D011	S02 & T01 SDS
12	10	**TONS**	D001, D002, D003, D004, D005, D006, D007, D008, D009, D010, D011, D022, D024, D029, D037, N001, N002 and/or N003	S01 Lab Waste
13	260	**TONS**	N001, N002, N003, D022, D024, D029 and/or D037	S01 & X03 Wood and Metal Dunnage
14	931	**TONS**	D001, D003 and/or D008	S01 NCRM
		TONS		
		TONS		
		TONS		
		TONS		
		TONS		
		TONS		

Facility's EPA ID Number											
K	Y	8	2	1	3	8	2	0	1	0	5

13 Existing Environmental Permits:

Inter-State Regional Program [A]:
Single Well (FURS) [B]:
County Program [C]:
DOE Program [D]:
Other EPA Program [E]: specify:
EPA 404 (dredge or fill program) [F]:
USGS Program [G]:
Area Wells (FURS) [H]:
NOTIS [J]:
Superfund (CERCLIS) [K]:
FATES [L]:
Municipal (city, town, etc.) Program [M]:
NPDES/KPDES (discharges to surface water) [N]: KY0020737; KYR10
PSD (prevention of significant deterioration - Clean Air Act) [P]: Title V permits, BGAD: V-05-020, Rev.1 (July 3, 2006) & BGCAPP: V-05-034 (October 5, 2005)
CDS [Q]:
RCRA (hazardous wastes) [R]: KY8-213-820-105 AI2805
State Program [S]:
DOT Program [T]:
UIC (underground injection of fluids) [U]:
Intra-State Regional Program [W]:
Other Federal Program [X]: specify:
CICIS (OTS Chemicals in Commerce Information System) [Y]:
Other Non Federal Programs [Z]: Permit to Withdraw Public Water (Permit No. 1013)

14 FACILITY STATUS:

[X] Waste is NOT received from off-site
[ ] Accepts waste from any off-site source(s) [A]
[ ] Accepts waste from only a restricted group of off-site sources(s) [R]:
Specify:

15 PHOTOGRAPHS, DRAWING AND MAP - *See INSTRUCTIONS*

All existing facilities must include photographs (aerial or ground-level) that clearly delineate all existing structures; existing storage, treatment or disposal areas; and sites of future treatment, storage or disposal areas. All existing facilities must include a drawing showing the general layout of the facility and a topographic map. The photographs, drawing and map must be attached to this form.

16 If the facility owner is also the facility operator, please skip this section and complete item 17 below.
Owner Certification - I certify under penalty of law that I have personally examined and am familiar with the information submitted in this and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

NAME (PRINT OR TYPE) SIGNATURE DATE SIGNED

Richard J. Mason Jr., Colonel, U.S. Army, Commanding Officer [signature] 18 Jun 07

NAME (PRINT OR TYPE) SIGNATURE DATE SIGNED

17 17. Operator Certification - I certify under penalty of law that I have personally examined and am familiar with the information submitted in this and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

NAME (PRINT OR TYPE) SIGNATURE DATE SIGNED

Mark H. Seely, P.E., General Manager, BPBG [signature] 15 JUNE 2007

NAME (PRINT OR TYPE) SIGNATURE DATE SIGNED

18 Land Owner Certification - I certify under penalty of law that I have personally examined and am familiar with the information submitted in this and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

Richard J. Mason Jr., Colonel, U.S. Army, Commanding Officer [signature] 18 Jun 07

NAME (PRINT OR TYPE) SIGNATURE DATE SIGNED

NOTES

I. Waste streams listed on pages 8 & 9 are further described below.

1. Waste stream number 1 is the residues coming out of the Metal Parts Treaters (MPTs). Annual waste amount represents the highest annual waste amount processed during the life of the facility.
2. Waste stream number 2 is the solid residues coming out of the Aluminum Precipitation System (APS)/Aluminum Filtration System (AFS). Annual waste amount represents the highest annual waste amount processed during the life of the facility.
3. Waste stream number 3 is the SCWO Effluent coming out of the SCWO system. 70% of this waste stream is recycled after treatment in the Water Recovery System. Annual waste amount represents the highest annual waste amount processed during the life of the facility.
4. Waste stream number 4 represents waste generated from onsite metal parts washers used during facility maintenance.
5. Waste stream number 5 is the estimated amount of waste generated during closure of the facility as well as secondary wastes. Annual waste amount represents the highest annual waste amount generated during the closure of the facility.
6. This waste stream represents the waste generated by the Rocket Handling System. Annual waste amount represents the highest annual waste amount processed during the life of the facility.
7. This waste stream represents the waste generated by the Projectile Handling System. Annual waste amount represents the highest annual waste amount processed during the life of the facility.
8. This waste stream represents the waste generated by the Energetics Treatment System. Annual waste amount represents the highest annual waste amount processed during the life of the facility.
9. This waste stream represents the waste generated by the Agent Treatment System. Annual waste amount represents the highest annual waste amount processed during the life of the facility.
10. This waste stream represents the waste managed through the HSA tank system. Annual waste amount represents the highest annual waste amount processed during the life of the facility.
11. This waste stream represents the waste managed by the SDS tank system. Annual waste amount represents the highest annual waste amount processed during the life of the facility.
12. This waste stream represents the waste generated by the BGCAPP laboratory. Annual waste amount represents the highest annual waste amount processed during the life of the facility.

13. This waste stream represents the wood dunnage waste (wooden munition pallets and metal strapping) generated by the BGCAPP. Annual waste amount represents the highest annual waste amount processed during the life of the facility.

II. This Part A permit application is submitted as part of the Blue Grass Chemical Agent-Destruction Pilot Plant's application for a Research, Development and Demonstration permit.

General Instructions for
Part A of the Kentucky Hazardous Waste Permit Application
(DEP - 7058A, effective 7/97)

Instructions are provided only for categories on Part A of the Kentucky Hazardous Waste Permit Application form which are not self explanatory. If you have questions about any information category, please call the Division of Waste Management at (502) 564-6716 and ask for the Hazardous Waste Branch. The form must be typed or printed legibly. **Important Note: This Part A of the Kentucky Hazardous Waste Permit Application form will supersede all Part A forms previously submitted for your company. Be sure to include all information for every activity at your installation.**

Part A Filing Fee: For first time submittals $1,000, Part B Permit renewals $1,000; there is no filing fee for revising the Part A form. Checks must be made payable to the **Kentucky State Treasurer** and submitted with the form to the Division of Waste Management, Hazardous Waste Branch, 14 Reilly Road, Frankfort, Kentucky 40601.

First Submittal: Applications marked as "first submittal" must be accompanied by the completed form (DEP - 7037).

3. **Latitude/Longitude:** This can be obtained from a USGS topographic map. Latitude and longitude must be provided in degrees, minutes, and seconds. If you cannot determine this information for your company, leave this category blank and send a map which clearly identified your company's location with respect to named streets and landmarks.

4. **Name of Land Owner:** Enter the name of the property owner(s) of the land. Identify EVERY individual or stockholder owning 25% or more interest in this property. Use a separate sheet if necessary. Identify the legal status of the land owner and provide a mailing address and telephone number of the land owner's contact person.

8. **Name of Facility Operator:** Enter the legal name of the company(ies) or individual(s) that serve as the operator at this facility. Identify EVERY individual or stockholder owning 25% or more interest in the operation of this facility. Use a separate sheet if necessary. Identify the legal status of the operator and provide a mailing address and telephone number of the operator.

9. **Name of Facility Owner:** Enter the legal name of the company(ies) or individual(s) that own this facility. Identify EVERY stockholder owning 25% or more interest in this facility. Use a separate sheet if necessary. Identify the legal status of the owner and provide a mailing address and telephone number of the owner's contact person.

10. **SIC Codes:** Identify the four-digit Standard Industrial Classification code that applies to your business. If several codes apply, use up to four separate SIC codes to describe your business. The first SIC code entered is the primary code for the facility. SIC Codes can be obtained from the 1987 Standard Industrial Classification Manual available at libraries or from the Division of Waste Management.

11. **PROCESS DESCRIPTION**

COMMERCIAL INDICATOR:	1 = Accepts waste from off-site generators 2 = Accepts waste only from related "captive" off-site generators (same corporation) 3 = Accepts waste from a restricted group of off-site generators 4 = Not commercial - accepts no off-site waste (Closed units should use this category)

UNIQUE UNIT OR GROUP NAME: Provide a brief and unique name (the computer will accept only 18 characters) for each unit or group of units at the facility. Do **NOT** include units that have verified clean closure. Names must be descriptive and must be identified on the attached maps. These names should be referenced on future submittal such as Part B applications and reports. Examples of descriptive names include: Tank Farm 1; Drum Area; West Pond; Cool Pond; Acid Tank; Tank B52; etc.

LEGAL STATUS CODE: Use from the double character legal status codes identified below for the process code selected for each unit/group name:

DL = Delisted
EM = Emergency Permit
IS = Interim Status
IT = Interim Status Terminated
LI = Lost of Interim Status
LP = Loss of Pre-Mod Authorization
NN = Non-notifier/Illegal
NR = Never Regulated as a TSD
PC = Post-Closure Permitted
PI = Permitted
PM = Pre-Mod Authorization
PR = Proposed
PT = Permit Terminated/Permit Expired, not Continued
RD = Research, Development, and Demonstration Permit
RQ = Requested but Not Approved
RU = Permit-by-Rule
SR = State Regulated
TA = Temporary Authorization

PROCESS CODES: Use any code from the tables below that applies. The "Unit of Measure" used to report "Process Design Capacity: must be one of the codes identified in the table below. For example, a waste pile (S03) may only report "Process Design Capacity" in cubic meter (C) or cubic yards (Y).

TREATMENT		
PROCESS CODES	**PROCESS DESCRIPTION**	**UNIT OF MEASURE CODE**
T01	Tank Treatment	D, E, H, J, N, R, S, U, V, W
T02	Surface Impoundment Treatment	D, E, H, J, N, R, S, U, V, W
T03	Incinerator	D, E, H, I, J, N, R, S, U, V, W, X
T04	Other Treatment	D, E, H, I, J, N, R, S, U, V, W, X
T80	Boiler	E, G, H, I, L, X
T81	Cement Kiln	D, E, H, I, J, N, R, S, U, V, X, X
T82	Lime Kiln	D, E, H, I, J, N, R, S, U, V, X, X
T83	Aggregate Kiln	D, E, H, I, J, N, R, S, U, V, W, X
T84	Phosphate Kiln	D, E, H, I, J, N, R, S, U, V, W, X
T85	Coke Oven	D, E, H, I, J, N, R, S, U, V, W, X
T86	Blast Furnace	D, E, H, I, J, N, R, S, U, V, W, X
T87	Smelting, Melting, or Refining Furnace	D, E, H, I, J, N, R, S, U, V, W, X
T88	Titanium Dioxide Chloride Process Oxidation Reactor	D, E, H, I, J, N, R, S, U, V, W, X
T89	Methane Reforming Furnace	D, E, H, I, J, N, R, S, U, V, W, X

PROCESS CODES CONTINUED . . . .

"Use any code from the tables below that applies"

TREATMENT CONTINUED		
PROCESS CODE	**PROCESS DESCRIPTION**	**UNIT OF MEASURE CODE**
T90	Pulping Liquor Recovery Furnace	D, E, H, I, J, N, R, S, U, V, W, X
T91	Combustion Device Used in the Recovery of Sulfur Values from Spent Sulfuric Acid	D, E, H, I, J, N, R, S, U, V, W, X
T92	Halogen Acid Furnaces	D, E, H, I, J, N, R, S, U, V, W, X
T93	Other Industrial Furnaces Listed in 401 KAR 30:010	D, E, H, I, J, N, R, S, U, V, W, X
T94	Containment Building for Treatment	C, D, E, H, J, N, R, S, U, V, W, Y

STORAGE		
PROCESS CODE	**PROCESS DESCRIPTION**	**UNIT OF MEASURE CODE**
S01	Container	C, G, L, Y
S02	Tank Storage	C, G, L, Y
S03	Waste Pile Storage	C, Y
S04	Surface Impoundment Storage	C, G, L, Y
S05	Drip Pad	C, G, L, Q, Y
S06	Containment Building for Storage	C, Y
S99	Other Storage	A, B, C, D, E, F, G, H, I, J, L, N, Q, R, S, U, V, W, Y

DISPOSAL		
PROCESS CODE	**PROCESS DESCRIPTION**	**UNIT OF MEASURE CODE**
D79	Underground Inject Well Disposal	G, L, U, V
D80	Landfill	A, B, C, F, Q, Y
D81	Land Application	B, C, Q, Y
D82	Ocean Disposal	U, V
D83	Surface Impoundment Disposal	C, G, L, Y
D99	Other Disposal	A, B, C, D, E, F, G, H, I, J, L, N, Q, R, S, U, V, W, Y

PROCESS CODES CONTINUED . . . .

"Use any code from the table below that applies"

MISCELLANEOUS		
PROCESS CODE	**PROCESS DESCRIPTION**	**UNIT OF MEASOURE CODE**
X01	Open Burning/Open Detonation	A, B, C, D, E, F, G, H, I, J, L, N, Q, R, S, U, V, W, X, Y
X02	Mechanical Processing	D, E, H, J, N, R, S, U, V, W
X03	Thermal Unit	C, D, I, J, N, R, S, U, V, W, X, Y
X04	Geologic Repository	A, C, F, G, L, Y
X99	Other Subpart X (Other Miscellaneous Units)	A, B, C, D, E, F, G, H, I, J, L, N, Q, R, S, U, V, W, Y

PROCESS DESIGN CAPACITY: If the unit/group of units is operating, provide the total capacity for the entire group of units identified under the Unique Unit ID Name. For example, a storage tank farm with four 1,000 gallon tanks could be reported as 4,000 G (gallons). If the unit/group of units is closed with waste in place, provide the total amount of waste or soil contamination disposed. For example, a landfill with an original design capacity of 1,000 cubic yards that closed with only 500 cub yards of waste in place would be reported as 500 Y (cubic yards). A tank that closed as a landfill due to contamination would be reported as a landfill (D80) with the estimated amount of soil contamination present in A (acre-feet) or F (hectare-meter). A certified clean closed unit which has been verified by the Division (i.e., a verified clean closed container storage unit) is NOT reported.

UNIT OF MEASURE: Use the single digit Unit of Measure Code identified below for the Process Code selected for each unit. For example for a container storage area (S01), the only valid units of measure are gallons (G) or liters (L).

A = acre-feet
B = acres
C = cubic meters
D = short tons per hour
E = gallons per hour
F = hectare-meter
G = gallons
H = liters per hour
I = BTUs per hour
J = pounds per hour

L = liters
N = short tons per day
Q = hectares
R = kilograms per hour
S = metric tons per day
U = gallons per day
V = liters per day
W = metric tons per hour
X = million BTU's per hour
Y = cubic yards

NUMBER OF INDIVIDUAL UNITS IN PROCESS: Identify the number of individual units within the area identified with the Unique Unit or Group ID Name. For example, a tank farm may have five tanks within the containment area; a cooling water system may have only one impoundment; a container storage area may be divided into three separate containments areas, etc. Do not count the number of containers within each containment area; list the number of containment areas.

OPERATING STATUS CODE: Use from the double character operating status codes identified below for the process code selected for each unit/group name:

AB = Abandoned
BC = Before Construction
CC = Cleaned Closed
CO = Completed Post-Closure Care
CP = Closed with waste in place
DC = Delay of Closure
CV = Converted but Not RCRA Closed

CR = Conducting Activities not Requiring a Permit
IN = Inactive/Closing but not yet RCRA Closed
OP = Operating, Actively Managing RCRA-Regulated Waste
PF = Protective Filer
SF = Referred to CERCLA
UC = Under Construction
CN = Constructed, Not yet Managing Hazardous Waste

DESCRIPTION OF PROCESS: Provide a brief description of each process for every unique unit/group name (i.e. storage of waste antifreeze, storage/treatment of halogenated waste, etc.)

12. WASTE STREAM DESCRIPTION

WASTE STREAM NUMBER: Number each waste stream. A waste stream is the total output of waste at a single "point of generation" such as the waste generated by a piece of equipment or at the end of a pipeline, etc. Closed facilities/units should report the waste streams which remain on-site (i.e., landfill, disposal surface impoundments, soil contamination from tanks, etc.), but NOT generator accumulation wastes or clean closed units. (Waste stream examples: acetone waste (F003) which is generated from two separate processes (such as degreasing and paint removal) would be reported on two separate lines with two different waste stream numbers. A waste which is generated as a mixture of several hazardous wastes (i.e., degreasing solvent containing both acetone and 1,1,1-trichloroethane) would be reported as a single stream F003/F001, if it is mixed before the point of generation.

ESTIMATED ANNUAL WASTE AMOUNT: List the estimated annual amount of waste managed at this facility for each waste stream listed. For closed facilities, this category should be completed with a zero since no new wastes will be received annually (i.e., closed landfills, D80 can only be reported with a zero).

UNIT OF MEASURE: The annual estimated amount of waste managed must be reported in TONS (2000 pounds per ton). When possible, use the actual weight of the waste. Approximations can be made for liquids based upon the weight of water (8.34 pounds per gallon).

EPA WASTE NUMBERS: List every EPA waste number that describes the waste stream. Facilities/units that closed with waste or soil contamination in place should report the waste numbers for these wastes. The codes PALL, UALL, FALL, KALL, or DALL may be used to designate that a waste stream contains EVERY waste listed under P(PALL), U(UALL), F(FALL), K(KALL), or D(DALL) waste codes. The lists of hazardous wastes are found in 401 KAR 31:040. The waste numbers for characteristically hazardous wastes are found in 401 KAR 31:030.

PROCESS CODES ASSOCIATED WITH THIS WASTE: Identify every process code from the preceding page that is used in the management of each waste stream. Process codes on this page must match those reported in item 11 Process Description.

13. EXISTING ENVIRONMENTAL PERMITS:

Identify every existing environmental permit that your facility holds. Categories that are not applicable may be left blank.

14. FACILITY STATUS:

Mark each category that is applicable. Identify whether your facility operates as a commercial waste management facility and whether waste is received from off-site. Commercial facilities typically are those that accept waste from off-site and whose primary business is waste management as opposed to manufacturing or other services. Non-commercial or private facilities typically handle only those wastes generated on-site or from related (same corporation) generators.

15. PHOTOGRAPHS, DRAWING AND MAPS:

Each Part A must be accompanied by the following:

(1) Topographic map of the area extending at least to one mile beyond the property boundaries of the facility which clearly shows: (a) the legal boundaries of the facility (b) the location and serial number of each existing

or proposed intake and discharge structure (c) all hazardous waste management facilities (d) each well where you inject fluids underground and (e) all springs and surface water bodies in the area plus all drinking water wells within ¼ mile of the facility which are identified in the public record or are otherwise known to you. Each map must contain the map scale, a meridian arrow showing north, and latitude/longitude at the nearest whole second. On all maps which depict rivers, show the direction of flow. You must use a 7 ½ minute map published by the US Geological Survey if one is available for your area. If a 7 ½ minute map is unavailable, you may use a 15 minute map from the US Geological Survey. If neither a 7 ½ minute map nor a 15 minute map is available from the US Geological Survey, then use a plat map or other appropriate map which includes all the required information and briefly describe land uses in the map area (i.e., residential, commercial, etc.). You may trace a map from a geological survey chart or other map meeting the required specifications. If you do, your map must bear the number or title of the map or chart from which it was traced. It must include the names of towns, water bodies and other prominent points.

(2) All existing facilities must include a drawing showing the general layout of the facility. The drawing must be approximately to scale and must fit on an 8 ½ x 11 inch piece of paper. The drawing must show (a) the property boundaries of the facility; (b) the areas occupied by all storage, treatment or disposal operations; (c) the name of each hazardous waste operation and this name MUST match the name provided for each unit in category 11; (d) areas of past storage, treatment or disposal operations; (e) areas of future storage, treatment, or disposal operations, and approximate dimensions for the property boundaries and all storage, treatment or disposal areas. NEW FACILITIES are not required to submit this drawing.

(3) All existing facilities must include photographs that clearly delineate (a) all existing structures (b) all existing areas for storage, treatment, or disposal and (c) all known sites for future storage, treatment or disposal operations. Photographs may be in color or black and white. They may be taken at ground level or may be aerial photographs. The date, that each photograph was taken, must be included on the back of the photograph.

16. OWNER CERTIFICATION:
17. OPERATOR CERTIFICATION:
18. LAND OWNER CERTIFICATION:

Each entity must certify the accuracy of the Part A form. All Part A forms must include this certification to be considered complete. Copies or stamped signatures are are not acceptable. If the company, which owns the facility is the same as the company which operates the facility, only one signature is required in Item 17. If one company owns the facility, operates the facility, and owns the land, then only one signature is required in Item 17. Each certification must be originally signed and dated by the owner, operator, land owner or an *"authorized representative" of the owner, operator or land owner.* "Authorized representative" is defined in 401 KAR 38:070, Section 7 and includes:

(1) For corporations: (a) a responsible corporate officer such as a president, vice president, secretary or treasurer or any other person who performs a similar policy/decision making role for the corporation: (b) the manager of a manufacturing, production or operating facility employing more than 250 persons or having gross annual sales or expenditures exceeding $25 million (in second quarter 1980 dollars) if authority to sign documents has been delegated to this manager in accordance with corporate procedures.

(2) For partnerships: a genera partner

(3) For sole proprietorships: the proprietor

(4) For public agencies: a principal executive officer (i.e., the chief executive officer of the agency or a senior executive officer having responsibility for overall operations of a principal geographic unit of the agency) or a ranking elected official.

IMPORTANT NOTE: All information submitted on this form will be subject to public disclosure to the extent provided by Kentucky law. Persons filing this form may make claims of confidentiality in accordance with 400 KAR 1:060.

Acronym	Definition
A/G	aboveground
AAE	Army Acquisition Executive
ABCDF	Aberdeen Chemical Agent Disposal Facility
ACAMS	automatic, continuous air monitoring system
ACANF	Aberdeen Chemical Agent Neutralization Facility
ACB	access control building
ACO	Administrative Contracting Officer
ACWA	Assembled Chemical Weapons Alternatives
ACWP	actual cost of work performed
ADA	Americans with Disabilities Act
AEL	airborne exposure limit
AFB	aluminum filtration building
AFS	aluminum filtration system
AHA	activity hazards analysis
AISC	American Institute of Steel Construction
AMC	Army Materiel Command
AMS	agent monitoring system
AMSAA	Army Materiel Systems Analysis Activity
ANCDF	Anniston Chemical Agent Disposal Facility
ANR	agent neutralization reactor
ANS	agent neutralization system
APE	area project engineer
APP	accident prevention plan
APS	aluminum precipitation system
AQS	agent quantification system
AR	Army Regulation
ARP	access road and parking lot
ASB	access security building
ASF	administrative support facility
ASME	American Society of Mechanical Engineers
AWS	American Welding Society
BC	brine concentrator
BCC	Bechtel Construction Company
BCD	bulk chemical distribution
BCOI	Bechtel Construction Operations Inc.
BCS	bulk chemical storage
BCWP	budgeted cost of work performed
BCWS	budgeted cost of work scheduled
BEA	bid, evaluate, and award
BETK	Bechtel Estimating Tool Kit
BG	Blue Grass
BGAD	Blue Grass Army Depot
BGCA	Blue Grass Chemical Activity

Acronym	Definition
BGCAPP	Blue Grass Chemical Agent Destruction Pilot Plant
BMPT	batch metal parts treater
BNI	Bechtel National Inc.
BOD	basis of design
BOX	bulk oxidizer
BPBG	Bechtel Parsons Blue Grass
BPBGT	Bechtel Parsons Blue Grass Team
BPS	Bechtel Procurement System
BRS	brine recovery system
BRS	burster removal station
BSII	Bechtel Systems and Infrastructure, Inc.
C&S	civil and structural
C_3H_8O	isopropyl alcohol
CA	chemical agent
CAA	Clean Air Act
CAC	Citizens Advisory Committee
CAD	computer-aided design
CADD	computer-aided design and drafting
CAE	computer-aided engineering
CAM	cavity access machine
CAM	cost account manager
CAMDS	chemical agent munitions disposal system
CAR	corrective action report
CASARM	chemical agent standard analytical reference material
CatOx	catalytic oxidation
CCB	Change Control Board
CCTV	closed-circuit television
CD	compact disk
CDB	chemical demilitarization building
CDCAB	Chemical Destruction Community Advisory Board
CDP	construction data package
CDRL	contract data requirements list
CDTF	Chemical Demilitarization Training Facility
CEMS	continuous emissions monitoring system
CFR	Code of Federal Regulations
CHB	container handling building
chem demil	chemical demilitarization
CHP	chemical hygiene plan
CI	configuration item
CIE	computer-integrated engineering
CLA	chemical limited area
CM	configuration management
CMA	Chemical Materials Agency

Acronym	Definition
CMP	configuration management plan
CMU	concrete masonry unit
CN	change notice
CO	carbon monoxide
CO_2	carbon dioxide
COCO	cost and commitment
COPQ	cost of poor quality
COTS	commercial off-the-shelf
CPM	critical path method
CPR	cost performance report
CPRP	Chemical Personnel Reliability Program
CPSR	contract purchasing systems review
CQCM	construction quality control manager
CRM	contaminated rocket motor
CRO	control room operator
CRS	controller reporting system
CSB	control and support building
CSDP	Chemical Stockpile Disposal Program
CSEPP	Chemical Stockpile Emergency Preparedness Program
CSMP	Chemical Surety Management Plan
CST	continuous steam treater
CWA	Clean Water Act
CWBS	contract work breakdown structure
CWC	Chemical Weapons Convention (treaty)
CWP	construction work package
CWWG	Chemical Weapons Working Group
DA	Department of the Army
DA PAM	Department of the Army Pamphlet
DAT	drill and transfer
DBM	Design-Build Manager
DBP	Design-Build Plan
DCAA	Defense Contract Audit Agency
DCD	Deseret Chemical Depot
DCHCDI	dicyclohexylcarbodiimide
DCN	design change notice
DCS	distributed control system
DDESB	Department of Defense Explosives Safety Board
decon	decontamination (solution)
DEMP	diethylmethylphosphonate
DFARS	Defense Federal Acquisition Regulation Supplement
DH	direct hire
DIA	design integration assessment
DICDI	diisopropylcarbodiimide

Acronym	Definition
DIMP	diisopropyl methyl phosphonate
DIU	diisopropyl urea
DMCS	document and material control system
DoD	Department of Defense
DOT	Department of Transportation
DPE	demilitarization protective ensemble
DR	deficiency report
DrChecks	Design Review and Checking System
DRE	destruction and removal efficiency
DRL	data requirements list
DRMO	Defense Reutilization and Marketing Office
DRN	design review notice
DSA	demilitarization protective ensemble (DPE) support area
DSCM	dry standard cubic meter
DSH	dunnage shredding and handling
DVD	digital video disk
DWM	Division of Waste Management
EA	environmental assessment
EA 2192	S-(2-diisopropylaminoethyl) methyl phosphonothioic acid
EAC	estimate at completion
EBH	energetics batch hydrolyzer
EC	evaporator/crystallizer
ECD	electron capture detector
ECF	entry control facility
ECP	engineering change proposal
ECR	explosive containment room
ECV	explosive containment vestibule
EDE	execution and delivery environment
EDI	electronic data interchange
EDM	electronic distance measuring
EDMS	electronic data management system
EDP	[Bechtel] Engineering Department Procedure
EDPI	[Bechtel] Engineering Department Project Instruction
EDS	engineering design study
EG&G	Edgerton, Germeshausen & Grier
EIS	environmental impact statement
EKU	Eastern Kentucky University
ENR	energetics neutralization reactor
ENS	energetics neutralization system
ENVIROP	environmental/operability
EO	Executive Order
EONC	enhanced onsite container
EPA	Environmental Protection Agency

Acronym	Definition
EPC	engineering, procurement, and construction
EPPR	engineering progress and performance report
ERH	energetic rotary hydrolyzer
ES&H	environmental safety and health
ESS	electronic security system
ETAP	Electrical Transient and Analysis Program
ETC	estimate to complete
*e*TRACK	timekeeping software
EVMS	earned value management system
FAR	Federal Acquisition Regulation
FCC	facilities construction certification
FCN	field change notice
FCR	field change request
FCS	facility control system
FDM	Facilities Design Manager
FDP	final design package
FEM	fire extinguishing medium
FIL	filter area
FMEA	failure mode and effects analysis
FMECA	failure mode, effect, and criticality analysis
FMP	forestry management plan
FOAK	first-of-a-kind
FOCIS	FOCIS Associates, a Geo-Centers, Inc., Company
FPDA	fire protection design analysis
FPS	facility protection system
FTA	fault tree analysis
FWC	fuze well cup
FY	fiscal year
GA	general arrangement
GATS	General Atomics Total Solution
GB	nerve agent sarin, isopropyl methyl phosphonofluoridate ($C_4H_{10}FO_2P$)
GC	gas chromatograph
gCMIS	Global Contract Management Information System
GCS	gimbal cam socket
GFE	government-furnished equipment
GLS	gas/liquid separator
GP	General Physics
GPA	Government Property Administration
gpd	gallon per day
GSA	Government Services Administration
GSB	gas mask storage building
H	blister agent mustard made by the Levinstein process, bis(2-chloroethyl) sulfide or 2,2'-dichlorodiethyl sulfide ($C_4H_8Cl_2S$)

Acronym	Definition
H_2	hydrogen
H_2SO_4	sulfuric acid
H_3PO_4	phosphoric acid
HAZMAT	hazardous material
HAZOP	hazard and operability (analysis)
HD	mustard agent, bis(2-chloroethyl) sulfide or 2,2'-dichlorodiethyl sulfide
HDC	heated discharge conveyor
HEPA	high-efficiency particulate air (filter)
HP	high pressure
HPGLSS	high-pressure gas/liquid/solid separator
HPSLS	high-pressure solid/liquid separator
HSA	hydrolysate storage area
HTRR	hazard tracking and risk resolution
HVAC	heating, ventilating, and air conditioning
I&C	instrumentation and control
I/O	input/output
IBC	intermediate bulk container
IBR	integrated baseline review
ICD	interface control document
ICP	inductively coupled plasma
ICS	integrated process and facilities control system
ID	identification
IDLH	immediately dangerous to life and health
IDS	intrusion detection system
IFA	issued for approval
IFC	issued for construction
IFD	issued for design
IFF	issued for fabrication
IFR	issued for (external) review
IMP	integrated management plan
IMS	integrated master schedule
IPA	isopropyl alcohol
IPT	integrated product team
IS	information systems
IS&T	information systems and technology
ISO	International Organization for Standardization
IT	information technology
JACADS	Johnston Atoll Chemical Agent Disposal System
JMC	Joint Munitions Command
JTA	job task analysis
JV	joint venture
KAR	Kentucky Administrative Regulation
KDEP	Kentucky Department for Environmental Protection

Acronym	Definition
KHW	Kentucky Hazardous Waste
KK	bis(2-diisopropylaminoethyl)sulfide
KM	bis(2-diisopropylaminoethyl)disulfide (or EA 4196)
KPDES	Kentucky Pollutant Discharge Elimination System
KRS	Kentucky Revised Statute
LAB	laboratory building
LBCDF	Lexington Bluegrass Chemical Agent Destruction Facility
LCCE	life cycle cost estimate
LCHP	laboratory chemical hygiene plan
LDT	line designation table
LEL	lower explosive limit
LFA	laboratory building (LAB) filter area
LFL	lower flammability limit
LOP	laboratory operating procedure
LPMD	linear projectile/mortar disassembly
LWCR	lost workday case rate
M&EB	material and energy balance
MAS	material assignment schedule
MB	maintenance building
MCA	Military Construction Allowance
MCC	motor control center
MCD	Military Construction Defense
MCS	metal parts treater (MPT) cooling system
MDB	munitions demilitarization building
MDL	method detection limit
MEL	master equipment list
MFCR	minimum functional control report
MILCON	Military Construction
MIL-HDBK	Military Handbook
MIL-STD	Military Standard
MIP	Medical implementation plan
MLA	modular laboratory area
MOP	maintenance operating procedure
MPR	monthly progress report
MPR	motor processing room
MPRS	miscellaneous parts removal system
MPT	metal parts treater
MR	material requisition
MS	mass spectrometer
MS	mass spectroscopy
MSB	munition storage building
MSDS	material safety data sheet
MSR	motor storage room

Acronym	Definition
MTBF	mean time between failures
MTO	material takeoff
MTTR	mean time to repair
MWR	material withdrawal request
MWS	munitions washout system
N_2	nitrogen
N_2O	nitrous oxide
Na_2SO_4	sodium sulfate
NaCl	sodium chloride
NaF	sodium fluoride
NaH_2PO_4	sodium monophosphate
NaOCl	sodium hypochlorite
NaOH	sodium hydroxide
NCA	National Construction Agreement
NCR	nose closure removal
NCRM	noncontaminated rocket motor
NCRS	nose closure removal station
NDE	nondestructive examination
NECDF	Newport Chemical Agent Disposal Facility
NEPA	National Environmental Policy Act
NGO	nongovernment organization
NIOSH	National Institute for Occupational Safety and Health
NOD	notice of deficiency
NOI	notice of intent
NOV	notice of violation
NPDES	National Pollutant Discharge Elimination System
NRC	National Research Council
NTP	notice to proceed
O&M	operations and maintenance
O&SHA	operating and support hazard analysis
OBS	organizational breakdown structure
OHHP	occupational health and hygiene plan
OPSEC	operations security
ORR	operational readiness review
OSHA	Occupational Safety and Health Administration
OTE	energetics batch hydrolyzer (EBH) offgas treatment system
OTM	metal parts treater (MPT) offgas treatment system
OTS	offgas treatment system
P&A	precision and accuracy
P&ID	piping and instrumentation diagram
P.E.	Professional Engineer
P2	pollution prevention
P3	Primavera Project Planner

Acronym	Definition
PA	public address
PAB	process auxiliary building
PBCDF	Pine Bluff Chemical Agent Disposal Facility
PCA	physical configuration unit
PCAPP	Pueblo Chemical Agent Destruction Pilot Plant
PCB	polychlorinated biphenyl
PCD	Pueblo Chemical Depot
PDCC	Project Document Control Center
PDM	Process Design Manager
PDS	plant design system
PE	project engineer
PEBH	propellant energetics batch hydrolyzer
PEDMS	Parsons Engineering Data/Document Management System
PESC	project engineering systems coordinator
PFCI	Parsons Fabricators and Constructors
PFD	process flow diagram
PFE	project field engineer
PFS	project field superintendent
PHA	preliminary hazard analysis
PHL	preliminary hazard list
PHS	projectile handling system
PI&T	Parsons Infrastructure & Technology
PIL	priority items list
PIP	process improvement project
PLC	programmable logic controller
PM ACWA	Program Manager, Assembled Chemical Weapons Alternatives
PMATA	Program Manager for Alternative Technologies and Approaches
PMB	process and maintenance building
PMCD	Program Manager for Chemical Demilitarization
PMD	projectile/mortar disassembly
PMECW	Program Manager for the Elimination of Chemical Weapons
PMS	plant monitoring system
PO	purchase order
PPE	personnel protective equipment
PPM	Project Procurement Manager
PRP	personnel reliability program
PSA	protective equipment support area
PSB	personnel support building
PSD	prevention of significant deterioration
QA	quality assurance
QC	quality control
QD	quantity-distance
QMP	quality management plan

Acronym	Definition
QRA	quantitative risk assessment
QRS	quantity reporting system
QURR	quantity unit rate report
QV	quantity verification
R&D	research and development
RAC	risk assessment code
RAM	reliability, availability, and maintainability
RCM	rocket cutting machine
RCRA	Resource Conservation and Recovery Act
RD&D	research, development, and demonstration
RDM	rocket demilitarization machine
RDT&E	research, development, test, and evaluation
RDX	cyclonite
RE	resident engineering
RFA	RCRA Facility Assessment
RFI	request for information
RFP	request for proposal
RHA	residue handling area
RHS	rocket handling system
RIR	recordable injury rate
RO	reverse osmosis
ROM	rough order of magnitude
RSM	rocket shear machine
RTS	RTW Wright Industries
RX	reactor
SC	systems contractor
SCA	subcontracts administrator
SCM	site construction manager
SCWO	supercritical water oxidation
SDD	system design description
SDDR	supplier document deviation request
SDG	standby diesel generator
SDN	standard document number
SDRM	safety design requirements manual
SDS	spent decon system
SETH	simulated equipment training hardware
SFT	shipping and firing tube
SHA	system hazard analysis
SME	subject matter expert
SOP	standard operating procedure
SOW	scope of work
SP	site preparation
SP	site plan

Acronym	Definition
SPB	supercritical water oxidation (SCWO) processing building
SPI	schedule performance index
SR	service requisition
SRC	single round container
SS	substation
SSHA	subsystem hazard analysis
SSLD	system symbolic logic diagram
SSPP	system safety program plan
STA	supercritical water oxidation (SCWO) tank area
STARRT	safety task analysis risk reduction talk
STDP	system technical data package
STR	subcontract technical representative
SUB	substation
SUPLECAM	Surveillance Program, Lethal Chemical Agents and Munitions
SVOC	semivolatile organic compound
SWPP	standard work process procedure
TAA	throughput and availability analysis
TBA	tertiary butyl alcohol
TBD	to be determined
TC	ton container
TCC	temporary configuration change
TCM	**Toxic Chemical Maintenance Building**
TDP	technical data package
TEAD	Tooele Army Depot, Utah
TF	total float
TM	technical manager
TMA	toxic maintenance area
TMB	toxic maintenance building
TNT	trinitrotoluene
TOC	total organic carbon
TOCDF	Tooele Chemical Agent Disposal Facility
TPIL	technical risk reduction project (TRRP) priority items list
TRA	technical risk assessment
TRIS	test requirements and impact specification
TRRP	technical risk reduction project
TSCA	Toxic Substances Control Act
TSDD	technical risk reduction project (TRRP) system design description
TSDF	treatment, storage, and disposal facility
TWA	time-weighted average
U/G	underground
UB	utility building
UBK	utility block building
UMCDF	Umatilla Chemical Agent Disposal Facility

Acronym	Definition
UPA	unpack area
UPS	uninterruptible power supply
USACE	U.S. Army Corps of Engineers
USAESCH	U.S. Army Engineering and Support Center, Huntsville
USATCES	U.S. Army Technical Center for Explosives Safety
UV	ultraviolet
UXO	unexploded ordnance
VE	value engineering
VECP	value engineering change proposal
VOC	volatile organic compound
VX	nerve agent, O-ethyl S-(2-diisopropylaminoethyl) methylphosphonothiolate
WBS	work breakdown structure
WDC	Washington Demilitarization Company
WEBH	warhead energetics batch hydrolyzer
WHEAT	water hydrolysis of energetic and agent technologies
WIPT	working integrated product team
WRS	water recovery system
WSA	waste storage area
WSB	waste storage building
ZFF	zero free float

Natural Resources and
Environmental Protection Cabinet

DEPARTMENT FOR ENVIRONMENTAL PROTECTION
DIVISION OF WASTE MANAGEMENT
14 REILLY ROAD
FRANKFORT, KENTUCKY 40601
TELEPHONE NUMBER (502) 564-6716

RESEARCH DEVELOPMENT, AND DEMONSTRATION
PERMIT APPLICATION
DEP 7094B (3/92)

GENERAL INSTRUCTIONS

1. APPLICABILITY - This permit form must be completed and submitted to the Cabinet by persons Who propose to utilize an innovative and experimental special waste for technology or process not Specifically regulated under 401 KAR Chapter 45.

2. ASSISTANCE - Questions regarding this registration form may be directed in writing to the Division of Waste Management, Solid Waste Branch, at the address listed above, or by calling (502) 564-6716.

3. SUBMISSION - Please type or print legibly. Submit the original and three (3) copies of the completed application form to the Division of Waste Management at the address listed above. If an item is not applicable to your facility write "N/A" for not applicable in the space provided.

4. FILING FEES – Applicants must submit appropriate filing fees a the time of application submittal in accordance with 401 KAR 45:250.

5. LAWS AND REGULATIONS – Permittees are expected to understand and comply with all laws and regulations applicable to special waste management, treatment and disposal. Reference 401 KAR Chapter 45 and 401 KAR 30:301.

A. GENERAL INFORMATION

Application No.________________ (To be assigned by Cabinet)

Fee Submitted $ ____________ County ____________ Date ____________

Method of Payment: ________Check ________Certified Check ________Money Order

No.________________

Type of application: X New ________Renewal

1. Applicant Blue Grass Army Depot

   Address 2091 Kingston Highway

   City Richmond State KY Zip Code 40475-5001

   Telephone Number (859) 625-6280

   Contact Person Mr. Todd Williams

2. Mailing Address (If different from above) See above

   Address ________________

   City ________________ State ________ Zip Code ________

   Telephone Number (______)________________

   Contact Person at Facility See above

3. Corrections to application are to be made by:

   Name Todd Williams [1]

   Address 2091 Kingston Highway

   City Richmond State KY Zip Code 40475-5001

   Telephone Number (859) 625-6280

4. Applicant legal status: X Government ________ Private

[1] Please copy all correspondence regarding permit application to Thomas A Kurkjy, 301 Highland Park Drive, Richmond, KY 40475

5. Do you now hold, or have you held, any other permit or approval to dispose of waste from the Division, including a landfarming permit, registered permit-by-rule, sludge giveaway, or permit modification to landfill? If so, state type, permit number if applicable, and date permit or approval was granted.

Type	Permit Number if Applicable	Date of Approval	Landfill Name if Applicable	Landfill Permit Number if Applicable
None				

B. OWNERSHIP INFORMATION

---

1. Indicate by checking the appropriate blank, the legal organizational structure of the applicant.

_______________ Proprietorship

_______________ Partnership _______________ General _______________ Limited

_______________ Corporation

_______________ Joint venture

______X_______ Governmental agency

_______________ Other. Describe ____

____

2. If the owner is a corporation, is it registered with the Kentucky Secretary of State?

______N/A__________ Yes _______________ No

3. For the applicant and each person meeting the definition of key personnel, provide a Past Performance Information form as required by KRS 224.40-330 (1) and (3). The Cabinet has developed form DEP 7049J for submittal of this information. Complete this form and include it as part of this application as **Attachment 1**.

NOTE: DEP Form No. 7094J may be obtained by contacting the Division of Waste Management at the address specified on the "General Instructions" page of this application.

C. WASTE SOURCE INFORMATION

1. Waste Source (Generator): Blue Grass Army Depot

   Address 2091 Kingston Highway

   City Richmond State KY Zip Code 40475-5001

   Telephone Number (859) 625-6280

   Contact Person Mr. Todd Williams

2. Describe the waste that is proposed to be managed, treated and disposed of for which this application is being sought: The proposed RD&D facility will ultimately be used to treat (destroy) the chemical weapon stockpile located at the facility. A more detailed waste description is included in this application as Attachment 3.

3. Daily design capacity of special waste source generator plant:

Wastewater Treatment Plant		Other Waste Plan
		See Table 3-2 Attachment 3
____________ gallons per day	OR	____________ tons per day

4. Describe the Process to Significantly Reduce Pathogens specified in 401 KAR 45:100 Section 11 that will be used under this permit:

   Land farming and/or composting of special waste will not be performed at this facility. Thus, 401 KAR 45:100 Section 11 does not apply.

5. Total estimate quantity of waste to be disposed of per year:

   See attachment 3

6. Provide the actual laboratory analysis of the waste to be processed under this permit. Label as **Attachment 2**.

   Repeat items C1 through C6 for each waste source if necessary. Label as **Attachment 3**.

D. DESCRIPTION OF PROPOSED RESEARCH, DEVELOPMENT OR DEMONSTRATION PROCESS

1. Describe in detail the proposed process(es) that are to be used pursuant to the issuance of the permit. Label as **Attachment 4**.

2. Describe how this process will meet Environmental Protection Standards in accordance with 401 KAR 30:031. Label as **Attachment 5**.

E. DESCRIPTION OF CONSTRUCTION AND OPERATION OF FACILITY

1. Describe any construction of a facility that will be used under this permit. Label as **Attachment 6**.

2. Describe the recordkeeping that will be used to record the receipt, storage and disposal of waste at the proposed facility. Label as **Attachment 7**.

3. Describe the monitoring procedures that will be used (i.e., surface water monitoring, groundwater monitoring, soil testing, waste analysis(s)) under this permit. Label as **Attachment 8.**

4. Describe the closure procedures that will be required for the type of waste and method of disposal under this permit. Label as **Attachment 9**.

F. PERFORMANCE CRITERIA

1. Describe the criteria that will be used to determine the efficiency and performance capabilities of the technology or process(es) used under this permit. Label as **Attachment 10**.

2. Describe the criteria that will be used to determine the effects of the technology or process(es) used under this permit on human health and the environment. Label as **Attachment 11**.

G. PERMIT PREPARATION INFORMATION

* Complete the appropriate information (1 or 2) for the individual(s) responsible for completing this application.

1. Engineer Kevin M. Regan, P.E.

   Kentucky Registration No. 21992

   Address 301 Highland Park Drive

   City Richmond State KY Zip Code 40475

   Company Name Bechtel Parsons Blue Grass

   Telephone Number (859) 625-5417

2. Other Professional Thomas A. Kurkjy

   Address 301 Highland Park Drive

   City Richmond State KY Zip Code 40475

   Company Name Bechtel Parsons Blue Grass

   Telephone Number (859) 625-1285

3. Indicate the individuals(s) authorized to make any necessary corrections to this application and to receive related correspondence from the Division:

   Name(s) Todd Williams[2]

   Address 2091 Kingston Highway

   City Richmond State KY Zip Code 40475-5001

   Company Affiliation Blue Grass Army Depot

   Telephone Number (859) 625-6280

H. OTHER INFORMATION

1. Provide any additional information that is pertinent to the proposed operation of the experimental waste facility or process(es). Label as **Attachment 12**.

NOTE: The Cabinet may require additional information before a final determination to issue a permit or deny this application in accordance with 401 KAR 45:030 Section 8(7).

[2] Please copy all correspondence regarding permit application to Thomas A. Kurkjy, 301 Highland Park Drive, Richmond, KY 40475

I. PUBLIC NOTICES

Public notices are required for a special waste research, development, and demonstration permit in accordance with KRS 224.40-310. Draft notices are found in **Attachments 13 and 14**. Complete the public notice forms; however, only those applicants notified by correspondence from the Cabinet may publish the notices.

J. CERTIFICATION

Owner's Certification:

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons directly responsible for gathering the information, the information submitted in, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for such violations."

Martin A. Jacoby, Commander, Blue Grass Army Depot		1 MAR 04
NAME (PRINT OR TYPE)	SIGNATURE	DATE

Operator's Certification:

SEE ATTACHED CERTIFICATION PAGE

OPERATOR'S CERTIFICATION

Operator Certification:

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining this information, I believe that the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

J. Christopher Midgett General Manager Bechtel Parsons Blue Grass	Christopher Midgett	3/1/04
NAME (PRINT OR TYPE)	SIGNATURE	DATE

Attachment 1 Contents

Natural Resources and
Environmental Protection Cabinet

DEPARTMENT FOR ENVIRONMENTAL PROTECTION
DIVISION OF WASTE MANAGEMENT
14 REILLY ROAD
FRANKFORT, KENTUCKY 40601
TELEPHONE NUMBER (502) 564-6716

PAST PERFORMANCE INFORMATION
DEP 7094J (3/92)

GENERAL INSTRUCTIONS

1. APPLICABILITY - KRS 224.40-330(1) and (3) requires applicants and all key personnel, as defined in KRS 224.01-010(44), to submit past performance information prior to the issuance or transfer of a waste permit. Part A of this form is to be completed by the applicant. Part B of this form is to be completed by each person meeting the definition of key personnel. Part B may be copied as needed to provide one form for each person.

2. PREPARATION - Questions regarding this application form may be directed in writing to the Division of Waste Management, Solid Waste Branch, at the address provided above.

3. SUBMISSION - Submit the original and three (3) copies of the completed form to the Division of Waste Management at the address provided above. The application for a permit for which this form is being executed shall not be deemed complete until this form is submitted.

4. LAWS AND REGULATIONS - Applicants are expected to understand and comply with all laws and regulations applicable to this form. The requirement to submit this information is specified in KRS 24.40-330(1) and (3). Key personnel is defined in KRS 224.01-010(44). The term "person" is defined in KRS 224.01-010(17).

PERMIT/APPLICATION NO.__________

DATE__________

PART A

PAST PERFORMANCE INFORMATION FOR APPLICANT

1. Bechtel Parsons Blue Grass Joint Venture
Applicant's Complete Name

FEIN 61-1450836 / Kentucky
Social Security Number/State of Incorporation or Registration

301 Highland Park Drive
Business Address (Do not use P.O. Box Number)

Richmond, Kentucky 40475
Mailing Address

2. List the names of all "Key Personnel" as defined by KRS 224.010(44), and their positions and titles. (Attach additional sheets if necessary and label as Attachment 1.)

	Name	Title/Position
a.	Mark H. Seely, P.E.	General Manager
b.	Richard Reid Rife II	Deputy General Manager
c.		
d.		
e.		
f.		
g.		

FOR EACH "KEY PERSONNEL" LISTED, A COMPLETED PART B SHALL BE ATTACHED TO THIS FORM.

THE NUMBER OF KEY PERSONNEL PART B's ATTACHED TO THIS FORM IS 2.

3. Have any civil or administrative complaints been brought or filed against the APPLICANT for the violation of any state or federal environmental protection law which resulted in a fine or penalty greater than one thousand dollars ($1,000) within five (5) year period immediately preceding the submission date of the APPLICANT'S permit application?

YES ______________ NO ___X___

If yes, describe each civil or administrative complaint which resulted in the fine or penalty. Include in the description the style of the complaint; the case, file or other identifying number; the identity of all parties named in the complaint; the forum in which the complaint was filed; the identity of each state or federal agency involved with or named in the complaint; the amount of the fine(s) or penalty(s); whether the fine or penalty has been paid; the identity and a description of each law or regulation violated or alleged to have been violated and upon which the fine(s) or penalty(s) is/are based; and state whether the fine was a result of a settlement or agreed order, an administrative order, or a court judgement. If litigation is ongoing, describe any orders or judgements entered and describe the current status of the litigation. Attach additional sheets if necessary and label as Attachment 2.

None

4. Have any civil administrative complaints been brought or filed against the APPLICANT which allege that an act or omission that constitutes a violation of a state or federal environmental protection law or regulation presented a substantial endangerment to public health or to the environment?

YES ______________ NO X

If yes, describe each civil or administrative complaint containing the allegation of the act or omission presenting a substantial endangerment to public health or to the environment. Each description shall include at a minimum the following: the style of the complaint; the case, file or other identifying number; the identity of each party to the complaint; the forum in which the complaint was filed; the identity of each state or federal agency involved with or named in the complaint; an explanation of the alleged act or omission; the identity and a description of the environmental protection law or regulation violated or alleged to have been violated; an explanation of all corrective action measures performed to correct or mitigate the alleged violation(s); a description of the alleged endangerment to public health or to the environment; and state whether the issues raised in the complaint have been resolved, and if so, whether the resolution was the result of a settlement or agreement, an administrative order or a court order or judgement. If litigation on the allegation(s) is ongoing, describe any orders or judgements entered and describe the present status of the litigation. Attach additional sheets if necessary and label as Attachment 3.

None

5. Describe all pending criminal complaints which allege the APPLICANT'S violation of a state or federal environmental protection law or regulation. If none, write NONE. Each description must include at a minimum the style of the case and the identifying case number, the date the complaint was filed, the forum in which the complaint is pending, the identity of the law or regulation allegedly violated and a narrative description of the law or regulation, whether the alleged violation(s) is a misdemeanor or a felony, and all actions and pleadings which have occurred or been filed in association with the complaint. Criminal complaints filed more than five years prior to the date of submission of the APPLICANT'S permit application need not be listed. Attach additional sheets if necessary and label as Attachment 4.

None

IN RESPONSE TO ITEMS 6 AND 7, EACH DESCRIPTION GIVEN MUST INCLUDE AT A MINIMUM THE FOLLOWING: STYLE, CASE NUMBER; FORUM IN WHICH CONVICTION ENTERED; DATE OF JUDGEMENT;SENTENCE IMPOSED; THE IDENTITY AND DESCRIPTION OF EACH LAW APPLICANT WAS CONVICTED OF VIOLATING; WHETHER THE CONVICTION WAS THE RESULT OF A PLEA AGREEMENT OR A TRIAL; AND, IF CURRENTLY ON APPEAL, THE STATUS OF THE APPEAL. ATTACH ADDITIONAL SHHETS IF NECESSARY AND LABEL AS ATTACHMENTS 5 AND 6.

6. Describe all judgements of criminal conviction entered against the APPLICANT for the violation of any state or federal environmental protection law or regulation. Convictions entered more than five (5) years before the submission date of the APPLICANT'S permit application need not be listed.

None

7. Describe all judgements of criminal conviction of a felony under the laws of any state or of the United States that have been entered against the APPLICANT within the five (5) year period preceding the date of submission of the APPLICANT'S application.

None

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted in, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for such violations."

Original Signature of Responsible Official

15 JUNE 2007
Date

Mark H. Seely, P.E.
Typed Name or Responsible Official

General Manager
Title

Bechtel Parsons Blue Grass Joint Venture
Name of Applicant, i.e. Corporation or Unit of Government

Subscribed and sworn to before me by Mark H. Seely, P.E.

this the 15th day of June, 2007.

Notary Public Signature

My Commission Expires: 5/23/2009.

Notary Public's Name and Address: Kevin M. Regan, 400 Chinoe Road, Lexington, Kentucky 40502

ATTACHMENT NO.__________________

PERMIT/APPLICATION NO.___________

DATE______________________________

PART B

PAST PERFORMANCE INFORMATION FOR KEY PERSONNEL

1. Mark H. Seely, P.E.
   Complete Name

   301 Highland Park Drive
   Business Address (Do not use P.O. Box Number)

   Richmond, Kentucky 40475
   Mailing Address

   Manager
   Type of Person (KRS 224.01-010 (17))

2. Describe the relationship between the applicant and the person completing this Part B attachment that establishes the person as a key personnel of the applicant.

   General Manager, Bechtel Parsons Blue Grass Joint Venture

3. Have any civil administrative complaints been brought or filed against you that alleges that an act or omission that constitutes a violation of a state or federal environmental protection law or regulation presented a substantial endangerment to public health or to the environment?

   YES ______________ NO ____X____

If yes, describe each civil or administrative complaint containing the allegation of the act or omission presenting a substantial endangerment to public health or the environment. Each description shall include at a minimum the following: the style of the complaint; the case, file or other identifying number; the identities of each party to the complaint; the forum in which the complaint was brought; the identity of each state or federal agency involved with or named in the complaint; an explanation of the alleged act or omission; the identity and a description of the environmental protection law or regulation alleged to have been violated; an explanation of all corrective action measures performed to correct or mitigated the alleged violation(s); a description of the alleged endangerment to public health or to the environment; and state whether the issues raised in the complaint have been resolved, and if so, whether the resolution was the result of a settlement or agreement, an administrative order or a court order or judgement. If litigating on the allegation(s) is ongoing, describe any orders or judgements entered and describe the present status of the litigation. Attach additional sheets if necessary and label as Attachment B-1.

None

4. Describe all pending criminal complaints that allege that your violation of a state or federal environmental protection law or regulation. If none, write NONE. Each description must include at a minimum the style of the case and the identifying case number, the date the complaint was filed, the forum in which the complaint is pending, the identity of the law or regulation allegedly violated and a narrative description of the law or regulation, whether the alleged violation(s) is a misdemeanor or a felony, and all actions and pleadings which have occurred or been filed in association with the complaint. Criminal complaints filed more than five (5) years prior to the date of submission of the Applicant's permit application need not be listed. Attach additional sheets if necessary and label as Attachment B-2.

None

IN RESPONSE TO ITEMS 5 AND 6, EACH DESCRIPTION GIVEN MUST INCLUDE AT A MINIMUM THE FOLLOWING: STYLE, CASE NUMBER; FORUM IN WHICH CONVICTION ENTERED; DATE OF JUDGEMENT;SENTENCE IMPOSED; THE IDENTITY AND DESCRIPTION OF EACH LAW APPLICANT WAS CONVICTED OF VIOLATING; WHETHER THE CONVICTION WAS THE RESULT OF A PLEA AGREEMENT OR A TRIAL; AND, IF CURRENTLY ON APPEAL, THE STATUS OF THE APPEAL. ATTACH ADDITIONAL SHHETS IF NECESSARY AND LABEL AS ATTACHMENT B-3 AND B-4.

5. Describe all judgements of criminal conviction entered against you for the violation of any state or federal environmental protection law or regulation. Convictions entered more than five (5) years before the submission date of the Applicant's permit application need not be listed.

N/A

6. Describe all judgements of criminal conviction of a felony under the laws of any state or of the United States that have been entered against the you within the five (5) year period preceding the date of submission of the Applicant's application.

N/A

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted in. Based on my inquiry of the person or persons directly responsible for gathering the information submitted in, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for such violations."

[signature] — Original Signature of Responsible Official

15 JUNE 2007 — Date

Mark H. Seely, P.E. — Typed Name or Responsible Official

General Manager — Title

Bechtel Parsons Blue Grass Joint Venture — Name of Applicant, i.e. Corporation or Unit of Government

Subscribed and sworn to before me by Mark H. Seely, P.E.

this the 15th day of June 2007.

Notary Public Signature [signature]

My Commission Expires: 5/23/2009.

Notary Public's Name and Address: Kevin M. Regan, 400 Chinoe Road, Lexington, Kentucky 40502

ATTACHMENT NO.____________________

PERMIT/APPLICATION NO.____________

DATE________________________________

PART B

PAST PERFORMANCE INFORMATION FOR KEY PERSONNEL

1. Richard Reid Rife II
Complete Name

100 West Walnut Street
Business Address (Do not use P.O. Box Number)

Pasadena, California 91124
Mailing Address

Manager
Type of Person (KRS 224.01-010 (17))

2. Describe the relationship between the applicant and the person completing this Part B attachment that establishes the person as a key personnel of the applicant.

Deputy General Manager, Bechtel Parsons Blue Grass Joint Venture

3. Have any civil administrative complaints been brought or filed against you that alleges that an act or omission that constitutes a violation of a state or federal environmental protection law or regulation presented a substantial endangerment to public health or to the environment?

YES ______________ NO _____X_____

If yes, describe each civil or administrative complaint containing the allegation of the act or omission presenting a substantial endangerment to public health or the environment. Each description shall include at a minimum the following: the style of the complaint; the case, file or other identifying number; the identities of each party to the complaint; the forum in which the complaint was brought; the identity of each state or federal agency involved with or named in the complaint; an explanation of the alleged act or omission; the identity and a description of the environmental protection law or regulation alleged to have been violated; an explanation of all corrective action measures performed to correct or mitigated the alleged violation(s); a description of the alleged endangerment to public health or to the environment; and state whether the issues raised in the complaint have been resolved, and if so, whether the resolution was the result of a settlement or agreement, an administrative order or a court order or judgement. If litigating on the allegation(s) is ongoing, describe any orders or judgements entered and describe the present status of the litigation. Attach additional sheets if necessary and label as Attachment B-1.

N/A

4. Describe all pending criminal complaints that allege that your violation of a state or federal environmental protection law or regulation. If none, write NONE. Each description must include at a minimum the style of the case and the identifying case number, the date the complaint was filed, the forum in which the complaint is pending, the identity of the law or regulation allegedly violated and a narrative description of the law or regulation, whether the alleged violation(s) is a misdemeanor or a felony, and all actions and pleadings which have occurred or been filed in association with the complaint. Criminal complaints filed more than five (5) years prior to the date of submission of the Applicant's permit application need not be listed. Attach additional sheets if necessary and label as Attachment B-2.

None

IN RESPONSE TO ITEMS 5 AND 6, EACH DESCRIPTION GIVEN MUST INCLUDE AT A MINIMUM THE FOLLOWING: STYLE, CASE NUMBER; FORUM IN WHICH CONVICTION ENTERED; DATE OF JUDGEMENT;SENTENCE IMPOSED; THE IDENTITY AND DESCRIPTION OF EACH LAW APPLICANT WAS CONVICTED OF VIOLATING; WHETHER THE CONVICTION WAS THE RESULT OF A PLEA AGREEMENT OR A TRIAL; AND, IF CURRENTLY ON APPEAL, THE STATUS OF THE APPEAL. ATTACH ADDITIONAL SHHETS IF NECESSARY AND LABEL AS ATTACHMENT B-3 AND B-4.

5. Describe all judgements of criminal conviction entered against you for the violation of any state or federal environmental protection law or regulation. Convictions entered more than five (5) years before the submission date of the Applicant’s permit application need not be listed.

None

6. Describe all judgements of criminal conviction of a felony under the laws of any state or of the United States that have been entered against the you within the five (5) year period preceding the date of submission of the Applicant’s application.

None

DEP 7094J(3/92)

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted in. Based on my inquiry of the person or persons directly responsible for gathering the information submitted in, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for such violations."

[signature] — 6-14-07

Original Signature of Responsible Official — Date

Richard Reid Rife II — Deputy General Manager

Typed Name or Responsible Official — Title

Bechtel Parsons Blue Grass Joint Venture

Name of Applicant, i.e. Corporation or Unit of Government

Subscribed and sworn to before me by Richard Reid Rife II

this the 14th day of June 2007.

Notary Public Signature [signature]

My Commission Expires: 3/17/09.

Notary Public's Name and Address: Anna Marie Hicks, 100 W. Walnut St, Pasadena, CA 91124

ANNA MARIE HICKS
Commission # 1564011
Notary Public - California
Los Angeles County
My Comm. Expires Mar 17, 2009

Attachment 2 Contents

Tables

Attachment 2 Laboratory Analysis of Waste to be Processed

Limited analytical data is available regarding the agent stored at the Blue Grass Army Depot (BGAD). Some of the GB 8-inch projectiles were sampled and analyzed during operations conducted in 1979. No other munition types have been sampled or analyzed. However, laboratory analytical data is available from other chemical agent disposal facilities. Material safety data sheets (MSDSs) for GB and VX nerve agent and for H blister agent are provided in Appendix D. The source of the available data for each munition type is provided below.

2.1 GB 115-mm Rockets

Table 2-1[1] provides the laboratory analytical data from sampling that was performed at the Tooele Chemical Agent Disposal Facility (TOCDF). Although the analytical data from the other chemical disposal facilities is not from the munitions stored by Blue Grass Chemical Activity (BGCA) at BGAD, it is representative of the nerve agent stored at BGAD.

2.2 GB 8-Inch Projectiles

Table 2-2 provides the data from sampling and laboratory analysis that was performed on the GB 8-inch projectiles in storage at BGAD in 1979.

2.3 VX 115-mm Rockets

Table 2-3 provides the laboratory analytical data from the sampling that was performed at the TOCDF. Although the analytical data from the other chemical disposal facilities is not from the munitions stored by BGCA at BGAD, it is representative of the nerve agent stored at BGAD.

2.4 VX 155-mm Projectiles

Laboratory analytical data is currently not available; however, data from TOCDF will be available in the future. Although the analytical data from the other chemical disposal facilities is not from the munitions stored by BGCA at BGAD, it is representative of the nerve agent stored at BGAD.

2.5 H 155-mm Projectiles

Samples were taken of the agent in the 155-mm projectiles during the testing of the munitions washout system (MWS) at Chemical Agent Munitions Disposal System (CAMDS) in 2003 for the Assembled Chemical Weapons Alternatives (ACWA). Analyses have been completed on these samples, and the results are shown in Table 2-4.

2.6 Nonstockpile Items

2.6.1 GB Ton Containers

During recent operations, the BGCA transferred the contents of the ton container (TC) stored at the BGCA to two additional TCs as part of a risk reduction program. BGAD previously submitted the sample results to the Kentucky Department of Environmental Protection (KDEP) in January 2005.

[1] Tables are presented at the end of this attachment.

2.6.2 DOT Bottles

No analytical data is available on the VX and H Department of Transportation (DOT) bottles.

2.7 Energetics/Propellants

Energetic and propellant materials that are part of the munitions in storage at BGAD consist of the explosive compounds described in the following sections. No waste analyses are provided for these compounds; however, the MSDSs for these compounds are provided in Appendix D.

2.7.1 Rocket Energetics

Rocket energetics consist of the following components:

1. Fuze composed of RDX
2. Detonator composed of lead azide and RDX
3. Burster composed of Comp B, which is a 60:40 mixture of RDX and trinitrotoluene (TNT)

2.7.2 Rocket Propellant

The rocket propellant consists of M-28, which is a mixture of the following components:

1. 60% nitrocellulose
2. 23.8% nitroglycerin
3. 9.9% triacetin
4. 2.6% diethylphthlate
5. 2% lead stearate
6. 1.7% 2-nitrodiphenylamine

2.7.3 Projectile Energetics

The projectile energetics consist of tetrytol, which is a 70:30 mixture of tetryl and TNT.

Table 2-1—Laboratory Analytical Data for GB 115-mm Rockets

Compound (wt%)	Average	Maximum	Minimum
Agent GB	85.1	97.0	44.8
DIMP	4.5	10.8	2.7
TBA	5.6	5.9	5.5
DIU	0.9	2.4	0.4
DICDI	0.4	1.1	0.0
Metals (mg/kg)			
Aluminum	628.3	3205.0	10.0
Antimony	26.3	154.0	0.2
Arsenic	7.0	34.0	3.5
Barium	4.7	40.0	0.1
Beryllium	0.1	0.6	.0.0
Boron	1135.8	4585.0	4.1
Cadmium	3.2	12.0	1.1
Chromium	3.2	12.0	1.1
Cobalt	2.5	8.9	0.1
Copper	13.4	120.0	1.7
Lead	9.8	46.0	0.6
Manganese	2.7	18.2	0.6
Mercury	0.1	0.2	0.0
Nickel	7.2	31.0	2.1
Selenium	16.3	92.0	0.4
Silver	1.2	6.2	0.1
Thallium	26.3	154.0	0.1
Tin	53.3	308.0	1.1
Vanadium	1.4	6.2	0.7
Zinc	28.8	172.0	5.4

Source: Tooele Chemical Agent Destruction Facility, 1996–1998

Key:
- DICDI = Diisopropylcarbodiimide (stabilizer)
- DIU = Diisopropyl urea
- DIMP = Diisopropyl methyl phosphonate
- TBA = Tributylamine

Analytical Methods:
- Agent: TE-LOP-584 (agent and degradation products)
- Metals: Method 7470, SW-846 (mercury)
  Method 6020, SW-846 (all other metals)

Table 2-2—Laboratory Analytical Data for GB 8-Inch Projectiles

Agent Lot No.	1034-54-1005	1034-62-1330
% GB	89.59	86.53
Metals, ppm		
Iron	102.34	521.27
Copper	<0.010	<0.008
Nickel	<0.019	<0.015
Aluminum	34.61	28.49
Source: Surveillance Program, Lethal Chemical Agents and Munitions (SUPLECAM) Report, 1979 Analytical Methods Mil-C-10758D (MU), 2 September 1969		

Table 2-3—Laboratory Analytical Data for VX 115-mm Rockets

Compound (wt%)	Average	Maximum	Minimum
Agent VX	90.0	93.2	86.5
DICDI	<0.6	<0.6	<0.6
DEMP	0.7	0.95	<0.6
DCHCDI	0.9	1.6	0.7
KK	0.5	<0.5	<0.3
KM	1.5	2.4	<0.6
EA 2192	0.3	0.55	0.21
Metals (mg/L)			
Aluminum	1,273.5	7,391	<46
Antimony	3.3	<10	<1.8
Arsenic	3.3	<10	<1.8
Barium	1.7	<5.0	<0.91
Beryllium	1.7	<5.0	<0.91
Boron	<83.7	<252	<46
Cadmium	1.7	<5.0	<0.9
Chromium	3.4	<10	<1.9
Cobalt	1.7	<5.0	<0.9
Copper	<4.2	<10	<1.9
Lead	3.2	13.6	<1.0
Manganese	<1.0	<1.1	<0.9
Mercury	0.3	1.31	<0.078
Nickel	<3.3	<10	<1.8
Selenium	3.3	<10	<1.8
Silver	<1.7	<5.0	<0.9
Thallium	<1.7	<5.0	<0.9
Tin	<16.7	<50	<9.1
Vanadium	<16.7	<50	<9.1
Zinc	13.7	< 41.60	<4.9

Source: Tooele Chemical Agent Disposal Facility, 2003

Key:
- Agent VX = O-ethyl-S-(2-diisopropylaminoethyl) methyl phosphonothiolate
- DICDI = Diisopropylcarbodiimide (stabilizer)
- DEMP = Diethylmethylphosphonate
- DCHCDI = Dicyclohexylcarbodiimide
- KK = Bis(2-diisopropylaminoethyl)sulfide
- KM = Bis(2-diisopropylaminoethyl)disulfide or EA 4196
- EA 2192 = S-(2-diisopropylaminoethyl) methyl phosphonothioic acid

Analytical Methods:
- Agent : TE-LOP-584 (agent and degradation products)
- Metals: Method 7470, SW-846 (Mercury)
  Method 6020, SW-846 (all other metals)

Table 2-4—155-mm H Projectile Sample Summary Results

Target	Minimum	Maximum	Average
Organic Compounds, wt%			
Bis (2-chloroethyl) sulfide	70.5	83.6	77.0
Thiodiglycol	< 0.025	< 0.026	< 0.026
1,2-Dichloroethane	1.22	2.88	1.93
Tetrachloroethylene	< 0.049	< 0.052	< 0.050
1,1,2,2-Tetrachloroethane	< 0.049	< 0.052	< 0.050
T	< 0.24	< 0.27	< 0.26
Q	4.55	7.34	5.52
Hexachloroethane	< 0.024	< 0.027	< 0.026
Organic Compounds, mg/kg			
Lewisite	< 4.9	< 5.3	< 5.1
Metals, mg/kg			
Aluminum	< 48	< 53	< 50
Antimony	< 4.8	< 5.3	< 5.0
Arsenic	< 4.8	< 5.3	< 5.0
Barium	< 4.8	< 5.3	< 5.0
Beryllium	< 4.8	< 5.3	< 5.0
Boron	< 9.6	< 11	< 10
Cadmium	< 4.8	< 5.3	< 5.0
Chromium	< 4.8	6.58	< 5.3
Cobalt	< 0.96	< 1.1	< 1.0
Copper	20.5	52.5	35.9
Lead	< 4.8	< 5.3	< 5.0
Manganese	< 0.96	2.83	< 1.3
Mercury	< 0.48	< 0.53	< 0.50
Nickel	< 4.8	< 5.3	< 5.0
Selenium	< 9.6	< 11	< 10
Silver	< 4.8	< 5.3	< 5.0
Thallium	< 4.8	< 5.3	< 5.0
Tin	< 9.6	< 11	< 10
Vanadium	< 4.8	< 5.3	< 5.0
Zinc	< 9.6	< 11	< 10

Source: Tooele Chemical Agent Disposal Facility, 2003.

Key: T = Bis[2(2-chloroethylthio)ethyl] ether
Q = 1,2-bis(2-chloroethylthio) ethane

Attachment 3 Contents

Figures

Tables

Attachment 3 Waste Description

3.1 Waste Description

The wastes that the Blue Grass Chemical Agent Destruction Pilot Plant (BGCAPP) will eventually treat consist primarily of M55 rockets and M56 warheads and projectiles (8 inch and 155 mm). Under the proposed research, development, and demonstration (RD&D) permit, the GB munitions and GB ton container (TC) will be used to demonstrate the effectiveness of the treatment process.

Although not all of the munition types and nonstockpile items stored at Blue Grass Army Depot (BGAD) will be used during the RD&D process, the Bechtel Parsons Blue Grass Team (BPBGT) has included descriptions of all of these items to provide KDEP a complete list of munitions in storage at BGAD. The assembled munitions stored at BGAD contain both chemical agent (CA) and energetic materials (i.e., propellant and/or explosive charges). Two basic classes of assembled chemical weapons are stored at BGAD: projectiles and rockets.

Each waste class is described below in greater detail. The waste codes associated with each waste stream are provided in Part A of this permit application.

3.1.1 Projectiles

Projectiles are shells that are fired from guns or cannons. They have roughly cylindrical steel bodies with tapered noses and a hollow cylindrical tube (known as the burster well) running down the center of the shell. This tube holds the burster, an explosive charge that disperses the CA upon detonation. The liquid agent itself is contained in the annular region between the burster well and the shell wall. All projectiles stored at BGAD have nose closures installed in place of fuzes. **The projectile processing sequence is discussed in more detail in Sections 4.3.1, 4.5 and 4.6**

3.1.1.1 155-mm Projectiles

The BGAD stockpile contains both VX and H 155-mm projectiles. The VX 155-mm projectiles are designated as M121A1; the H 155-projectiles are designated as M110 (see Figure 3-1[1]).

Only the H 155-mm projectiles contain energetic material (composed of tetrytol) in the burster well.

3.1.1.2 8-Inch Projectiles

The 8-inch (20.32-cm) projectile, designated as M426, has a mass of more than 90 kg and contains GB chemical agent. These projectiles are stored without a burster.

3.1.1.3 Overpacked Leaker Projectiles

Currently, 69 H 155-mm projectiles have been overpacked at BGAD. They will be processed in the same manner as regular (nonleaker) projectiles after they are removed from the overpack container.

Additionally, 26 GB 8-in projectiles have been overpacked at BGAD. They will be processed in the same manner as regular (nonleaker) projectiles after they are removed from the overpack container.

[1] Figures and tables are presented at the end of this attachment.

3.1.2 M55 Rockets

A rocket is an airborne weapon propelled by a mixture of a fuel and an oxidizer. The only rocket type in the chemical stockpile is the 115-mm-diameter M55 rocket. This rocket is 1.98 m long and has a mass of nearly 26 kg (see Figure 3-2). It consists of two sections:

1. An aluminum-alloy warhead section, which contains the CA, two bursters, and the fuze
2. A steel motor section, which contains the propellant grain, the igniter assembly, and the nozzle and fins

Both GB and VX M55 rockets are part of the BGAD chemical stockpile. The bursters are composed of Composition B (Comp B) explosive. The propellant is double base M28 (nitroglycerin/nitrocellulose). The rocket is stored in a shipping and firing tube (SFT) made of fiberglass-reinforced resin that could contain polychlorinated biphenyls (PCBs). An indexing ring on the outside of the tube near the front (fuze) end of the rocket identifies the front of the rocket in the SFT. Aluminum caps seal the ends of the tube.

PCB concentrations could range from under 50 to more than 2,000 parts per million (ppm). These PCBs are integral to the structure of the rockets' SFTs and are regulated under the Toxic Substances Control Act (TSCA) regulations subject disposal requirements of 40 CFR 761.62(c). This information is based on a study conducted by the U.S. Army Environmental Hygiene Agency, Hazardous Waste Study No. 37-26-1345-86 and -87 which sampled and analyzed SFTs in the Tooele Army Depot (now called the Deseret Chemical Depot) to determine the PCB concentration. This information has been used by the Environmental Protection Agency (EPA) as the basis for issuing the nationwide approval for incineration of PCBs at the four continental United States Chemical Demilitarization Incineration Facilities. The PCB aspects of the project are subject to regulation by the EPA Region 4. A separate permit request will be submitted to EPA Region 4 to address the processing of the PCB-contaminated SFTs.

3.1.2.1 M56 Warheads

M56 warheads are similar to the M55 rockets except that the motor section has been removed; thus, M56 warheads do not contain M28 propellant.

3.1.2.2 Overpacked Leaker M55 Rockets

Currently, 97 leaker GB 115-mm M55 rockets have been overpacked at the BGAD. They will be processed after they are removed from the overpack container **as discussed in Section 4.3.1.2.2**.

3.1.3 Nonstockpile Items

Six nonstockpile items are stored at BGAD and will be processed at BGCAPP: three GB TCs, one VX Department of Transportation (DOT) bottle, and two H DOT bottles. These items are listed in Table 3-1.

3.1.4 Types and Quantities of Munitions

Table 3-1 lists the types and quantities of the munitions in the BGAD stockpile.

3.1.5 Secondary Wastes

Six major types of secondary waste will be generated at BGCAPP; these wastes are described below.

3.1.5.1 Wood Pallets

All munitions are stored on wood pallets in the igloos. As munitions are shipped to BGCAPP, wood pallets and metal straps that are not contaminated with agent as determined by enhanced onsite container (EONC) monitoring prior to opening, will be shipped off site for disposal by appropriate methods to promote waste minimization without any treatment at BGCAPP. All wood pallets and other dunnage associated with leaking munitions will be treated as agent-contaminated dunnage and will be processed as described in Attachment 4, Section 4.3.

3.1.5.2 Agent-Contaminated Plastic and Personnel Protective Equipment (PPE)

Plastic materials and PPE that are not contaminated with agent will be shipped off site for disposal by appropriate methods to promote waste minimization without any treatment at BGCAPP. Plastic and PPE (plastic, rubber **and gas mask carbon filters**) are assumed to be contaminated if they have been exposed to agent; they will be processed as described in Attachment 4, Section 4.3.

3.1.5.3 Miscellaneous Agent-Contaminated Metal Parts

Miscellaneous agent-contaminated metal parts generated during the RD&D program are sent directly to the metal parts treater (MPT) for thermal treatment (a minimum of 1,000˚F for 15 minutes) before they are shipped off site for disposal by appropriate methods to minimize waste.

3.1.5.4 Agent-Contaminated Spent Activated Carbon

Agent-contaminated spent activated carbon from the heating, ventilating, and air conditioning (HVAC) filters that is generated during the RD&D program will be processed as described in Attachment 4, Section 4.3.

3.1.5.5 Spent Decontamination Solution (SDS)

SDS that is generated during the decontamination of personnel and equipment will be processed as described in Attachment 4, Section 4.3.

3.1.5.6 Reverse Osmosis (RO) Brine Solution

The supercritical water oxidation (SCWO) effluent is a brine solution comprised primarily of sodium sulfate (Na_2SO_4), sodium chloride (NaCl), sodium fluoride (NaF), and sodium monophosphate (NaH_2PO_4). The water recovery system (WRS) package is designed to produce a water stream that is of sufficient quality to be recycled to the SCWO process (approximately 70%) and a wastewater stream (RO reject) that will be characterized and shipped to a permitted disposal facility.

3.1.5.7 Other Secondary Wastes

During the RD&D program, other secondary wastes may be generated at BGCAPP. As these waste streams are identified, they will be characterized prior to treatment. If they are contaminated with agent, either the wastes will be treated at BGCAPP through the appropriate waste handling system, **or** decontaminated, and shipped off site for disposal at a permitted treatment, storage, and disposal facility (TSDF). If the waste is not contaminated with agent, the secondary waste will be shipped off site for disposal **at a permitted treatment, storage and disposal facility (TSDF)**.

3.2 Daily Design Capacity

The initial daily design capacity of the plant is based on data developed during Program Manager for Chemical Demilitarization (PMCD) and Program Manager, Assembled Chemical Weapons Alternatives (PM ACWA) testing programs and on the actual Johnston Atoll Chemical Agent Disposal System (JACADS) and Tooele Chemical Agent Disposal Facility (TOCDF) operating data. The BGCAPP process has two critical paths:

1. GB and VX M55 rockets/M56 warheads with a limiting step of the rocket cutting machine (RCM) and rocket shear machine (RSM) to the energetics batch hydrolyzer/energetics neutralization system (EBH/ENS).

2. Burstered H 155-mm projectiles with a limiting step of the projectile/mortar disassembly machine (PMD) to the EBH/ENS and munitions washout system/agent neutralization system (MWS/ANS).

Table 3-2 summarizes the peak hourly rates and the daily design capacity of the major equipment trains.

The throughput rate is based on the peak processing rates of the RSM, nose closure removal system (NCRS), projectile/mortar disassembly (PMD), and supercritical water oxidation (SCWO). The RSM rate is based on JACADS operations verification testing (OVT) and the PMD rate is based on operating experience at JACADS and TOCDF. The other equipment in the process train is sized based on the peak processing rate of the limiting step. A major portion of the RD&D program will involve verifying and determining the optimal throughput rates. The SCWO processing rate is based on the throughput requirements for BGCAPP based on the material balance.

All of these design throughput rates will be verified and may be modified during the RD&D program after a thorough evaluation of data collected.

3.3 Total Estimated Quantity of Waste to be Disposed of per Year

Table 3-3 summarizes the estimated quantity of waste generated annually. The waste streams will come from four primary sources:

1. **MPT Residues:** This waste stream will consist of projectile **bodies and rocket** pieces consisting of steel as well as Shipping and Firing Tubes (SFTs) from Contaminated Rocket Motors **after processing through the MPT, as well as any miscellaneous metal parts and secondary wastes that are generated during the treatment processes**.

2. **AFS Precipitate:** This waste stream will consist of the aluminum compounds precipitated and filtered out of the energetics hydrolysate generated from the treatment of rockets.

3. **RO Reject Brine Solution:** The treated hydrolysate from the SCWO units will be processed through the RO system to recycle as much water as possible back into the process. Appendix C provides the process flow diagrams (PFDs) of this system. Waste brine solution will be shipped off site for disposal at a permitted TSDF. The recovered water will be recycled back into the SCWO process in lieu of makeup water or shipped off site to a permitted TSDF.

4. **NCRMs:** This waste stream consists of the **non-contaminated rocket motors that have been separated from the rocket warhead that will not be processed in the BGCAPP. This waste stream will be stored at the BGAD until final treatment process has been determined.**

Table 3-3 identifies the quantity of each waste stream listed above by munition campaign. It is important to note that the water recovery system greatly reduces the amount of waste that will be generated for off-site disposal from BGCAPP during the life of the project and will be an integral part of BGCAPP's waste minimization program.

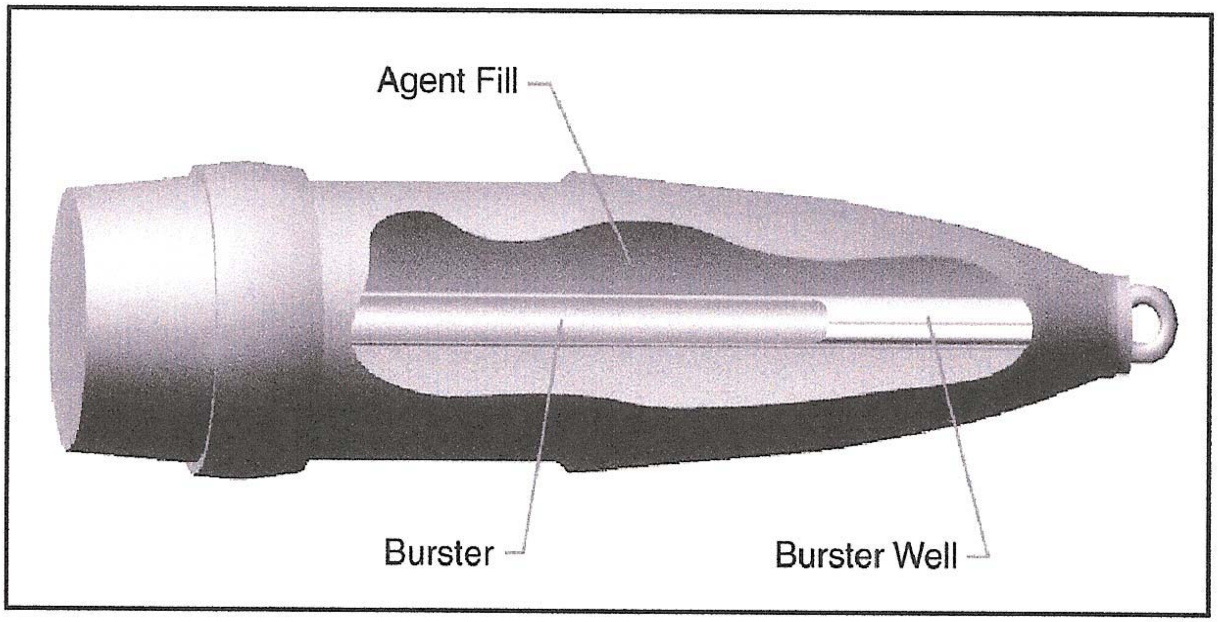

Figure 3-1—155-mm Projectile

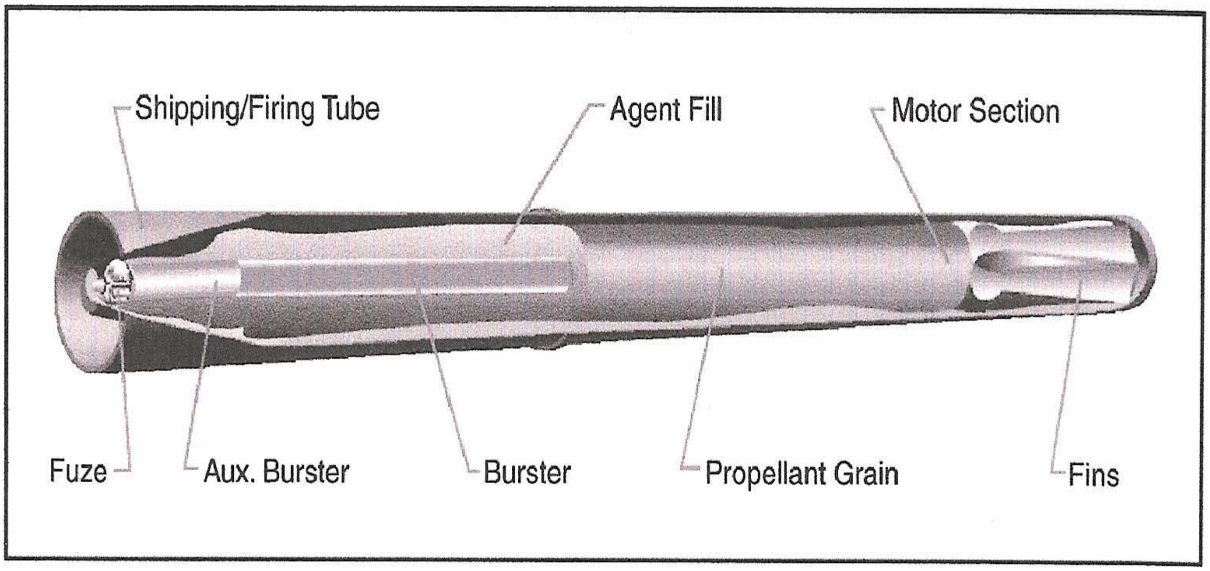

Figure 3-2—155-mm Rocket

Table 3-1—Stored Munitions Data

Munition	Agent Type	Type	Caliber
M55	GB	Rocket	115 mm
M56	GB	Warhead	115 mm
M426	GB	Projectile	8 inch
Ton container	GB	Nonstockpile	NA
M55	VX	Rocket	115 mm
M56	VX	Warhead	115 mm
M121A1	VX	Projectile	155 mm
M110	H	Projectile	155 mm
DOT bottle	H	Nonstockpile	NA
DOT bottle	VX	Nonstockpile	NA

Notes:

1. All GB will be processed during the RD&D Program. Attachment 6, Table 6-1 presents the planned Processing rates during the RD&D Program.
2. The following overpacked munitions are included in the above numbers:
   a. 97 GB M55 rockets (leakers)
   b. 24 GB M56 warheads
   c. 26 GB 8-inch projectiles
   d. 69 H 155-mm projectiles (leakers)

Table 3-2—Daily Design Capacity

Equipment/System	Munition Type	Peak Rate per hr	Daily Design Rate
Rocket cutting machine (RCM)	M55 Rockets	**26** rockets	**624** rockets
Rocket shear machine (RSM)	M55 rockets / M56 warheads	**26** rockets	**624** rockets
Projectile handling system (PHS)	155-mm H projectiles 8-inch GB projectiles 155-mm VX projectiles	26 projectiles 15 projectiles 21 projectiles	624 projectiles 360 projectiles 504 projectiles
Energetics batch hydrolyzer (EBH)	M55 rockets	**26** rockets	**624** rockets
Agent neutralization system (ANS)	All	**7300 lbs**	**175,200 lbs**
Energetics neutralization system (ENS)	All	**26** rockets	**624** rockets
Supercritical water oxidation (SCWO)	All	3,364 lb	80,736 lb
Munitions washout system (MWS)	155-mm H projectiles 8-inch GB projectiles 155-mm VX projectiles	26 projectiles 15 projectiles 21 projectiles	624 projectiles 360 projectiles 504 projectiles
Metal parts treater (MPT)	Projectiles	7,723 lb	185,352 lb

Table 3-3—Estimated Quantity of Waste by Year

Waste Type	Year 1 (tons)	Year 2 (tons)	Year 3 (tons)	Total (Tons)
MPT Residue	830	2,400	510	3,740
AFS Precipitate	1,417	1,001	290	2,708
RO Reject **Brine Solution**	39,980	38,022	14,689	92,691
NCRMs	**931**	**565**	**0**	**1496**
Total Solid Wastes	**43,158**	**41,988**	15,489	**100,635**
Note: These numbers do not include **secondary wastes that will be processed through the MPT and** closure wastes.				

Attachment 4 Contents

Figures

Tables

Attachment 4 Description of Proposed Research, Development, and Demonstration Process

This attachment describes the overall process that will be used to perform the research, development and demonstration (RD&D) program that is covered under this permit application and presents the justification for this research. Attachment 5 explains how the process satisfies the requirements of Kentucky Revised Statute (KRS) 224.50-130 and how this process will meet environmental protection standards in accordance with 401 KAR 34[1].

The proposed facility is a full-scale pilot plant that will be used to validate the National Research Council's (NRC's) stated requirement for research on process integration that is discussed in Section 4.1. Although some integration research of the BGCAPP can and will be conducted using surrogates and simulants, testing with live agents and agent-containing munitions is necessary to verify that the design will perform properly for the Blue Grass Army Depot's (BGAD's) inventory of munitions. The overriding criterion that drives this design is that the facility be capable of performing the RD&D in a manner that is safe and protective of health and the environment.

To this end, the Blue Grass Chemical Agent Destruction Pilot Plant (BGCAPP) will be built to the same standards as a full-scale treatment facility. For example, the blast-resistant containments, the highly filtered heating, ventilating, and air conditioning (HVAC) exhausts, and the numerous other protective systems that are necessary for a fully functional system are also necessary to ensure safety and environmental protection during the RD&D program. Because of this requirement, and because it is very difficult to add equipment after the treatment areas are contaminated with agent, the full facility must be built to support the RD&D program and then tested as one unit. As a result, the description of the BGCAPP is that of the full-scale facility. In spite of this similarity, it is important to emphasize that this RD&D permit application is only intended for the RD&D program.

The technology that is intended to be used by the BGCAPP was chosen to meet the requirement of KRS 224.50-130 (3a) and (4): that it exists in an operational facility or it has been demonstrated in a disposal program at a comparable scale and that it creates less risk of release, acute or chronic health effect, or adverse environmental effect. This determination was made through an extensive testing, evaluation, and selection process that was documented and critiqued by internal Department of Defense (DoD) groups and independently reviewed by many NRC panels. Table 4-1[2] lists the major reports in which the NRC panels chronicled and critiqued the progress of the evaluation and selection process.

The evaluation process first examined numerous alternative technologies (NRC 1993) and in NRC 2002 and NRC 2002a identified two technologies that were subsequently demonstrated under the Assembled Chemical Weapons Alternatives (ACWA) program. It identified the General Atomics Total Solution (GATS) process, on which the BGCAPP design is based, as the one with lower hydrocarbon and carbon monoxide emissions. The Final Environmental Impact Statement (EIS) for BGCAPP (December 2002) also discusses alternate technologies and draws the same conclusion.

The ultimate ability of the facility to destroy the chemical weapons stockpile will be assessed during the RD&D program. A Kentucky Hazardous Waste (KHW) Part B Permit application will

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[1] The RD&D Guidance document references 401 KAR 30:031, which applies to landfarming of special wastes. This is not an appropriate criterion for the subject process, which is a treatment process. We have, therefore, substituted the citation as shown.

[2] All tables and figures are presented at the end of this attachment.

be submitted prior to completion of the RD&D program to allow the Kentucky Department for Environmental Protection (KDEP) and other regulators to fully evaluate the process' safety and environmental compliance.

The process flow diagrams (PFDs) referenced throughout this attachment are presented in Appendix C. PFDs not related to hazardous waste management units may be referenced on the PFDs included in Appendix C. The applicable PFDs are cited in the headings of Sections 4.4 through 4.14.

4.1 Justification for Research

It is fully recognized that the BGCAPP will ultimately be used to destroy all chemical weapons at BGAD. Maximum safety and environmental protection will be achieved during the destruction of the chemical weapons at BGAD by incorporating the lessons learned from the RD&D program into the final design. To date, a large amount of work has been conducted to evaluate alternative technologies for destroying the BGAD's chemical weapons stockpile. This work was carefully monitored and assessed by many groups, including a number of independent panels assembled for this purpose by the NRC. The NRC panels reviewed the results in a series of reports listed in Table 4-1 and, in its last report[3], identified a process termed General Atomics Total Solution (GATS) as the most mature alternative process for use at BGAD. The report suggested improvements in the design, but most critically, it indicated that although all of the individual processes are acceptable for application at BGAD, RD&D must be performed to refine and demonstrate the integrated process before going to full operation. The BGCAPP design incorporates the design improvements identified by the NRC, and the BGCAPP RD&D program incorporates this integration research. Also, the treatment system units proposed for BGCAPP are roughly the same size as the units tested and proven during the ACWA engineering design studies. The final stage of development is the testing and evaluation of the integrated process under a carefully developed RD&D program that is the purpose of this application. The RD&D program that will be conducted at BGCAPP includes the following goals:

The RD&D program to be conducted at BGCAPP includes the following goals:

1. Conduct a thorough program of system integration including the conveyance of munitions and munition segments from one part of the treatment train to the next up to and including the release of the munition parts from the MDB.
2. Demonstrate that 99.9999% destruction efficiency of GB agent can be achieved in the agent neutralization reactors (ANRs) as required by KRS 224.50-130.
3. Demonstrate that the energetics can be treated in the energetics batch hydrolyzers (EBHs) and the energetics neutralization system (ENS).
4. Demonstrate that the metal parts treater (MPT) will destroy the residual chemical agent in the projectile bodies and solid residue in the energetics batch hydrolyzer (EBH) by thermally treating them at a minimum of 1,000°F for a minimum of 15 minutes.
5. Demonstrate the performance of the supercritical water oxidation (SCWO) reactor system.

The RD&D program described herein is being conducted interactively with the design of the facility. As data are obtained from both ongoing equipment design and testing programs, they

[3] *Analysis of Engineering Design Studies for Demilitarization of Assembled Chemical Weapons at Blue Grass Army Depot,* 2002. National Academy Press, Washington, D.C. Available for purchase or download at www.nap.edu.

are fed back to the design team so that the information can be used to improve and validate the process. No changes will be made that could increase risk or environmental releases. In fact, the likely outcome of the RD&D program will be further reductions in risk.

The present permit application only requests that approval be granted for the BGCAPP to be built and operated as a pilot plant to conduct RD&D on the process. Much of the RD&D program will not involve hazardous wastes; the initial tests will be performed using simulants and surrogate materials. After the overall plant's performance, safety, environmental acceptability, and reliability have been established, the RD&D program will progress to include small amounts of agent initially; after demonstrated performance, increasingly larger amounts of agent and chemical munitions will be processed. At the conclusion of the research, the facility will have demonstrated that it is capable of operating at full capacity and the remainder of the stockpile will be processed under the Part B permit.

The information that is included in the RD&D permit compliance schedule (Appendix B to the RD&D Permit issued on 30 September 2005) is equivalent to the information that would be required by a Part B permit application for a hazardous waste treatment facility. Therefore, the compliance schedule corresponds to the submission of the components that constitute the Part B permit application. **It is recognized, however, that the Division of Waste Management has the right to require additional information as part of a complete Part B application.**

Attachment 6, Section 6.5, presents a comprehensive draft schedule for the activities that will be performed under the RD&D permit. As shown in Attachment 6, Table 6-1, the performance test constitutes the transition from operation under the RD&D permit to operation under the full Resource Conservation and Recovery Act (RCRA) Kentucky Hazardous Waste (KHW) Part B permit. All activities prior to and including the performance test take place under the RD&D permit.

The RD&D program will include the processing of only the GB munitions in the BGAD stockpile. The VX and H munitions, as well as any GB munitions not required under the RD&D program, will be processed under the Part B permit. The material balances for the VX and H campaigns are included in Appendix C for completeness; however, they are not part of the RD&D program.

4.2 Process Description

This section presents the overall processing sequence of the BGCAPP. The subsequent sections describe the individual process units.

The BGCAPP design will safely destroy the BGAD's chemical munitions stockpile by combining proven, low-risk, Army-approved, NRC-recommended neutralization and SCWO technologies that have been successfully demonstrated for the Program Manager, Assembled Chemical Weapons Alternatives (PM ACWA) into an integrated plant that will be tested during the RD&D program that is the subject of this permit.

Chemical demilitarization of the BGAD stockpile occurs in the munitions demilitarization building (MDB) and subsequent treatment of the residual compounds occurs in the SCWO processing building (SPB). Attachment 6 describes the buildings and the high level of added safety and environmental protection that it offers. The BGCAPP design is an integrated system that will be used to safely destroy the agent and energetics by the following environmentally acceptable procedure:

1. Agent and energetics access (mechanical).
2. Energetics removal and deactivation by hydrolysis.

3. Metal and other solids decontamination by heating to a minimum of 1,000°F for 15 minutes in the inductively heated MPTs.
4. Agent neutralization by hydrolysis.
5. Post-treatment of agent/energetic hydrolysates using commercial-scale, solid-wall SCWO units.
6. Some secondary wastes (e.g., agent-contaminated pallets and personal protective equipment [PPE]) will be treated by chemical decontamination. The chemically decontaminated residue will be disposed of at an off-site treatment, storage, and disposal facility (TSDF). If chemical decontamination does not prove successful, the residue will be treated in the MPT and then managed by appropriate means to minimize waste.
7. Spent activated carbon will be shipped off site for further treatment at a permitted TSDF.
8. Agent-contaminated metal secondary wastes (e.g., miscellaneous metal parts, metal reinforced hoses, piping, valves, and tools) that have not been chemically decontaminated will be processed through the MPT and then managed by appropriate means to minimize waste.
9. Secondary wastes that are not agent-contaminated will not be processed through the BGCAPP; they will be managed by appropriate means to minimize waste.

The process achieves the required 99.9999%[4] (as a minimum) destruction of agent stored at the BGAD by neutralization via hydrolysis, whereby the agent or agent-contaminated liquid is mixed in an enclosed vessel with hot water (H) and hot caustic solution (GB and VX) [i.e., sodium hydroxide (NaOH)]. The chemical reaction destroys the agent. Hydrolysis has been shown to achieve this required performance for agent destruction. Table 4-2 lists the types of hydrolysis to be used.

The munition bodies and other metallic components of the munitions are washed using high-pressure water and thermally treated in the MPT at a minimum of 1,000°F for a minimum of 15 minutes. At this point, they will be released from the containment system.

The facility has been designed to safely treat all chemical weapons, chemical warfare agent, and ancillary materials.[5] However, certain ancillary (secondary) wastes may be decontaminated with sodium hydroxide (NaOH), sodium hypochlorite (NaOCl), or other appropriate decontamination (decon) solutions. These wastes, PPE, and other plastic/rubber items, will be decontaminated to the **Airborne Exposure Limits (AELS)** and then shipped off site to a permitted TSDF. If they cannot be decontaminated to the **AELs**, these wastes will be treated in the MPT before they are shipped off site for disposal in a permitted TSDF.

To the maximum extent possible, process liquid streams are recycled to conserve water and to prevent discharge to ground or surface water. Water is recycled via a water recovery system that produces water of a quality suitable to recycle back into the process during the pilot testing

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[4] KRS 224-50-130 (3) (b) states that "…(m)onitoring data from an operational facility or alternative disposal program as described in paragraph (a) of this subsection reflects that the emissions from treatment and destruction facilities or fugitive sources, including, but not limited to, the emissions of the compounds identified in subsection (2) of this section and products of combustion, incomplete combustion, and other processes alone or in combination present no more than a minimal risk of acute or chronic human health effect, as demonstrated by sufficient and applicable toxicological data, or adverse environmental effect…"

[5] For example, metal, agent contaminated wooden pallets, agent-contaminated PPE, and any other agent-contaminated secondary waste streams generated from these activities.

and operations phases. **The RO Reject stream is anticipated not to exhibit any characteristics of a hazardous waste. Since this waste stream will only carry an N waste code based on the derived from rule, delisting will allow this waste to be managed as a non-hazardous waste. If it is not delisted, it will be shipped to a TSDF for disposal.**

Figure 4-1[6] is a process block flow diagram for the hazardous waste processing units. The figure shows the flow of munitions and other streams from the container handling building (CHB) through the various systems.

Palletized munitions are stored in “igloos” and are currently regulated under the BGAD hazardous waste storage permit. The location of each type of munition is fully documented so that the specific munition type required for a particular test can be transferred with minimum disturbance of the overall stockpile of munitions[7]. Any munitions selected for testing will be transported via enhanced onsite containers (EONCs) from the storage igloos to the CHB.

The EONCs are airtight vessels that are specifically designed to contain munitions during transport from the BGAD storage igloos to the CHB. Figure 4-2 is a photograph of an EONC. The EONC[8] is a well-established design that is currently used safely at the Tooele Chemical Agent Disposal Facility (TOCDF), the Anniston Chemical Agent Disposal Facility (ANCDF), Umatilla Chemical Agent Disposal Facility (UMCDF), and the Pine Bluff Chemical Agent Disposal Facility (PBCDF).

The EONC is received in the CHB, where it is stored until its contents are to be treated. At that time it is transferred to the west unpack area (UPA), which is under “Engineering Controls”[9], and the air in the sealed EONC is monitored for agent. If agent monitoring indicates that the EONC does not contain any leaking munitions, the EONC is opened, and the munitions are then **transferred** to the appropriate conveyor line that convey them through the treatment process for that particular munition.

If agent is detected in the EONC (indicating a leaking munition), the EONC is moved to an area under a higher level of Engineering Control, where it is opened and the munitions are processed by personnel wearing appropriate protective clothing. The munitions are removed from the EONC and placed on the appropriate processing conveyor line, passing through the explosive containment vestibule (ECV) or toxic maintenance area (TMA). The contaminated metal straps are transferred to the MPT for treatment. The contaminated wood pallets may either be treated on site by chemical decontamination or treated in the MPT and then shipped off site to a permitted TSDF. The EONC is then decontaminated and released for further use.

The treatment operations are performed by remote control systems on the following lines:

1. Rocket input subsystem
2. Projectiles input subsystem

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6 Figures are presented at the end of this attachment.

7 SB 162 Amended KRS 224.50-130 requires that handling and movement of munitions for nonemergency situations be subject to a plan that is submitted and approved by the cabinet. Such a plan will be submitted to the cabinet in sufficient time to allow full review, including time for public notice and opportunity to be heard before munitions are handled or moved.

8 An older version of the design, termed an “ONC,” is used at TOCDF. The difference between the ONC and EONC is the type of closure locks used on the main hatch. The ONC uses bolts that require manual tightening to fasten the main hatch; the EONC uses a hydraulic locking mechanism that ensures a more uniform seal around the perimeter.

9 The higher the level of engineering control, the lower the air pressure maintained in the area by the cascading ventilation system. See Attachment 6, Section 6.1.3, for a detailed description of the HVAC system.

The specific treatment sequences for each type of munition and the operation of each unit within the system are discussed below. Briefly, the demilitarization of munitions results in the following components for treatment:

1. Liquid agent and agent-contaminated wash water.
2. Agent-contaminated wood/fiberglass/cardboard
3. Agent-contaminated metal
4. Explosive components (e.g., bursters and fuzes)
5. Noncontaminated rocket motors (NCRMs) and contaminated rocket motors (CRMs).

The design also includes a residue handling system that receives burster tubes, solid munitions bodies, and solid residue decontaminated during the above operations that will be shipped off site to a disposal facility.

KDEP approval is not being sought to process agent for any purpose other than for RD&D. Processing agent under the RD&D program is the basis for assessing the system's performance and developing the engineering information that is the objective of the RD&D program.

The munitions processing is conducted in the MDB, which contains the systems that provide the following functions:

1. Remove energetic components and disassemble the munitions.
2. Drain the agent from the agent cavities.
3. Neutralize the agent by either hot water (H) or hot caustic solution (GB and VX) hydrolysis to a minimum of 99.9999% destruction efficiency.
4. Neutralize the explosives and CRM propellant by hydrolysis to meet the 40 CFR 268 treatment standard for D003 waste streams (deactivation).
5. Place the NCRMs in containers for transfer to storage for treatment at another location on BGAD or for shipment off site to a permitted facility for recycling or disposal.
6. Treat the agent-contaminated dunnage and most other agent-contaminated ancillary wastes either by thermal treatment through the MPT or by chemical decontamination. Chemical decontamination is the first choice for wood, PPE, other plastic/rubber wastes, and other organic materials and will be decontaminated using NaOH, NaOCl, or other appropriate decon solution to the **AELs**. Wastes that have been tested to meet **AELs** will be shipped offsite to a permitted TSDF.
7. Ship the spent activated carbon off site for further treatment at a permitted TSDF.
8. Thermally treat agent-contaminated metal parts and other agent-contaminated wastes through the MPT.

Before transferring agent and energetic hydrolysates from the MDB to the hydrolysate storage tank area (HSA), the hydrolysate will be analyzed for residual agent concentration. If the agent concentration is above the target release level, additional treatment will be required. If the agent concentration is below the target release level, the **batches of agent and energetic hydrolysate are** transferred to the HSA before **they are** transferred to the SPB for further treatment.

Once the 99.9999% destruction efficiency has been demonstrated on agent hydrolysate, validated process controls and statistical testing may be used in lieu of analyzing all batches of agent hydrolysate. This alternative analytical approach will be submitted to KDEP as part of the

Waste Analysis Plan that is included in the RD&D Permit Compliance Schedule, Appendix B, Item # 18.

In the SPB, the pH of the energetics hydrolysate is adjusted in the aluminum precipitation system (APS). The dissolved aluminum compounds in the energetics hydrolysate are precipitated out of the hydrolysate in the APS and then physically separated from the hydrolysate in the aluminum filtration system (AFS). The AFS filtrate is blended with agent hydrolysate and fed to the SCWO system for treatment. The filter cake is shipped off site to a permitted TSDF.

Agent-contaminated waste streams will **either** be treated at a minimum of 1,000°F for a minimum of 15 minutes, which destroys residual agent and energetics, if present, or they will be shipped off site after being decontaminated to the **AELs**. All gas streams (including all ventilating air) are filtered through multiple banks of both particulate (HEPA) filters and activated carbon and are monitored for agent. The combination of liquid phase processing, batch operation with analysis of the contents prior to release and air stream filtering systems minimizes risk to human health and the environment.

4.3 Waste Processing Sequences

The following sections provide the processing sequence for each waste. Each unit operation is described in greater detail in subsequent subsections.

4.3.1 GB Nerve Agent Munitions

4.3.1.1 GB 8-Inch Projectile (no energetics are associated with this munition)

1. Remove the pallet of projectiles from the EONC.
2. Load the projectiles into a tray.
3. Convey the tray to the nose closure removal and munitions washout system (NCR / MWS).
4. Via robot, transfer each individual projectile to the nose closure removal station (NCRS) and remove the lifting plug from the nose.
5. Via robot, transfer the individual projectiles from the NCRS and load them into the MWS module, nose-down.
6. Hydraulically collapse the burster well into the projectile's agent cavity.
7. Gravity-drain the agent through the nose of the projectile.
8. Wash out the agent cavity using high-pressure water.
9. Send the drained agent and washout water to storage tanks in the agent neutralization room**. (See Section 4.11 for a discussion of the ANS).**
10. Replace each washed munitions body into its tray.
11. Convey the tray of washed projectiles to the MPT for thermal treatment.

The overpacked GB and VX projectiles will be removed from the EONC in the UPA and transferred to the TMA where they will be manually unpacked and placed on a tray on the conveyor system for processing through the MWS. The overpacked H projectiles will be removed from the EONC in the UPA and transferred to the ECV where they will be manually unpacked and the projectiles placed on the conveyor system for processing in the PMD. The overpack containers will be taken to the TMA. The empty overpack

container will be chemically decontaminated or thermally decontaminated in the MPT prior to offsite recycling or disposal at a permitted TSDF.

4.3.1.2 GB M55 Rockets

The majority of the M55 rockets are stored in the BGCA igloos on pallets in their shipping and firing tubes (SFTs). These rockets are termed “nonleakers.” A small number of the M55 rockets have been overpacked because of leaks that were identified during routine agent monitoring in the igloos; these rockets are termed “leaker” rockets. Section 4.3.1.2.1 presents the processing sequence for the nonleaker rockets ; Section 4.3.1.2.2, the overpacked rockets (also termed leaker rockets).

4.3.1.2.1 Nonleaker Rocket Processing Sequence

The motors from the nonleaker M55 rockets are termed “noncontaminated rocket motors” (NCRMs). The processing sequence for the nonleaker rockets is as follows:

1. Remove the pallet of rockets from the EONC (UPA).
2. Place each rocket individually onto the rocket input assembly, which conveys it through the airlock to the ECV and to the rocket cutting machine (RCM). The RCM separates the rocket into three pieces: the warhead, the warhead’s SFT and the NCRM.
3. Transfer the NCRM (still contained in its section of the SFT) to a container for further treatment at another location on BGAD or an offsite TSDF.
4. Transfer the warhead’s SFT to a container for disposal at a permitted Toxic Substances Control Act (TSCA) landfill.
5. Convey the rocket warhead to the punch-and-drain station of the rocket shear machine (RSM) in the explosive containment room (ECR).
6. Punch holes in the top and bottom of the rocket warhead agent cavity with the punch-and-drain station.
7. Drain the agent through the lower clamp. Send the drained agent into an agent storage tank in the agent neutralization room (**S**ee Section **4.11** for a discussion of the ANS).
8. Introduce high-pressure water. Flush the agent cavity (the optimum flush duration, pressure and flow rate will be the subjects of simulant, surrogate, and agent testing during the RD&D program), maintaining suction at a slightly higher flow rate than the inflow.
9. Send the washout water to a storage tank in the agent neutralization room (**See** Section **4.11** for a discussion of the ANS).
10. Move the rocket to the shear station for cutting.
11. Cut the warhead portion into segments. The warhead includes the fuze, the burster, and the washed agent cavity.
12. Send the warhead segments to the EBHs.
13. Send the energetics hydrolysate from the EBH to the energetics neutralization system (ENS) for further hydrolysis, as required.
14. Sample and analyze the energetics hydrolysate to verify that it no longer exhibits the characteristic of reactivity and that the agent concentration is below the target release level for agent before transfer to the HSA.

15. Transfer the energetics hydrolysate from the HSA to the APS and the AFS in the SPB.

16. Chemically precipitate the aluminum and then remove the precipitate by filtration. The aluminum precipitate is characterized and sent offsite to a permitted disposal facility. Send the filtrate to the SCWO for further treatment.

17. Send solid material (rocket sections and pieces) from the EBHs through the MPT for thermal treatment at a minimum of 1,000°F for a minimum of 15 minutes.

4.3.1.2.2 Leaker Rocket Processing Sequence

The leaker rockets are classified into two categories: known and unknown. The known leaker rockets are those that were identified through monitoring in the BGCA igloos and are stored in the igloos in overpacks. The unknown leaker rockets are those that did not arrive in the UPA as known leakers but were later identified as such in the EONC or in the RCM.

The known leaker rockets will be processed at the end of each agent (GB and VX) campaign at BGCAPP.

The unknown leaker rockets will be accumulated in the ECVs and then processed in a leaker campaign, or they will be overpacked and sent back to the leaker storage igloo for processing during the known leaker rocket campaign. The leaker processing sequences for both known and unknown rockets are presented below:

1. For known overpacked rocket leakers (stored in the igloos in overpacks):
   a. The EONCs of overpacked rockets are monitored for agent in the UPA. If agent monitoring indicates that the EONC does not contain any leaking overpacks, the EONC is opened and the overpacks are transferred to the ECV.
   b. In the ECV, the rocket overpack is opened manually by operations personnel in PPE and the rocket is removed from the overpack. The rocket is placed on the RCM conveyor system in the ECV.
2. For unknown rocket leakers (nonoverpacked leaker rockets that are identified in EONCs and at the RCM):
   a. Leaking rocket(s) could be detected when monitoring EONCs for agent in the UPA. The EONC that has been found to contain leaking rockets will be transported to the EONC leaker airlock so that the leaking rockets can be moved from the EONC to the ECV. Personnel in appropriate PPE will place each potentially contaminated rocket onto the RCM conveyor system.
   b. A leaking rocket could be detected when monitoring for agent at the RCM or while observing the RCM. The leaking rocket that is found at the RCM may either be stored for a short duration, overpacked, and sent back to the igloo for later processing; or it can be processed immediately if the number of stored leaking rockets in the ECV is sufficient to justify stopping normal rocket processing to process the stored leakers. Personnel in appropriate PPE will place the rockets onto the RCM conveyor system.
3. The RCM separates the rocket into three pieces: warhead, warhead's SFT, and CRM.
4. The warhead is processed in one of the two ECRs, following steps 4 through 18 in Section 4.3.1.2.1.

5. The agent-contaminated SFT is removed from the conveyor in the ECV and transferred to the TMA for chemical decontamination to the **AELs** and disposed of at an off-site permitted TSCA TSDF. If chemical treatment proves unsuccessful, the SFT may be thermally treated in the MPT.
6. The CRM is conveyed to the ECR for processing at the RSM, which shears the rocket motor into four (approximately) 8-inch pieces and the tailfin using cuts 5, 6, 7, and 8 following the original baseline design. Cut 8 is located at a point that isolates the tailfin section from the propellant.
7. The tailfin section and the segments of rocket propellant are transferred to and processed in separate EBHs.
8. The energetics hydrolysate is sent from the EBHs to the ENS for further hydrolysis, as required.
9. Before the energetics hydrolysate is transferred to the HSA, it is sampled and analyzed to verify that it no longer exhibits the characteristic of reactivity and that the agent concentration is below the target release level for agent.
10. The energetics hydrolysate is transferred from the HSA to the APS and AFS in the SPB.
11. The aluminum is chemically precipitated and the precipitate is removed by filtration. The aluminum precipitate is characterized and sent off site to a permitted disposal facility. The filtrate is sent to the SCWO for further treatment.
12. Solid material (rocket sections and pieces) from the EBHs is sent through the MPT for thermal treatment at a minimum of 1,000°F for a minimum of 15 minutes.

4.3.1.3 GB M56 Warheads

The GB M56 warheads will be processed and treated following the steps outlined in Section 4.3.1.2, except that (because they have no rocket motors) it will not be necessary to cut and remove the rocket motor in the RCM.

4.3.1.4 GB Ton Containers

The three GB TCs may be treated at the end of the RD&D program. The method for treating the GB TCs will be established on the basis of ongoing experience in handling and accessing TCs at other chemical demilitarization sites[10] and experience gained on GB munitions during the earlier stages of the RD&D program.

4.3.2 VX Nerve Agent Munitions

4.3.2.1 VX 155-mm Projectiles (no energetics are associated with this munition)

The VX 155-mm projectiles will not be treated under this RD&D permit. The treatment procedure for VX 155-mm projectiles will be similar to the procedure for GB 8-inch projectiles.

4.3.2.2 VX M55 Rockets

The VX M55 rockets will not be treated under this RD&D permit. The treatment procedure for VX M55 rockets will be similar to the procedure for GB M55 rockets.

[10] ABCDF and NECDF.

4.3.2.3 VX M56 Warheads

The VX M56 rocket warheads will not be treated under this RD&D permit. The treatment procedure for VX M56 rocket warheads will be similar to the procedure for GB M56 warheads.

4.3.2.4 VX Department of Transportation (DOT) Bottle

The VX DOT bottle will not be treated under this RD&D Permit. The method for treating the VX DOT bottle will be established on the basis of experience gained on other munitions during the earlier stages of the RD&D program.

4.3.3 H (Mustard) Blister Agent Munitions

4.3.3.1 H 155-mm Projectiles with Explosives

The H 155-mm projectiles will not be treated under this RD&D permit. The treatment procedure for H 155-mm projectiles is expected to be similar to the procedure for GB 8-inch projectiles with additional steps for treating tetrytol bursters that are part of the H projectiles.

4.3.3.2 H DOT Bottles

The H DOT bottles will not be treated under this RD&D permit. The method for treating the H DOT bottles will be established on the basis of experience gained on other munitions during the RD&D program.

4.3.4 Wood Pallets

Wood pallets that have not been exposed to a leaking munition will not be processed through the BGCAPP and will be managed by appropriate methods to promote waste minimization. The quantity of agent-contaminated wood pallets cannot be determined at this time.

All pallets and other dunnage associated with leaking munitions will be tested following Army-approved methods. If they are contaminated, they will be treated by chemical decontamination to **meet** the **AEL requirements**. Wastes that have been confirmed to meet **AEL requirements** will be managed by appropriate means to minimize waste.

If chemical decontamination does not prove successful, the contaminated material will be treated in the MPT. The decontaminated residue will be managed by appropriate means to minimize waste.

4.3.5 Agent-Contaminated Plastic and PPE

Plastic materials that are not contaminated with agent will be managed by appropriate methods to promote waste minimization without any further treatment at BGCAPP. Plastic and PPE are assumed to be contaminated if they have been exposed to agent. Agent-contaminated plastic material (e.g., personnel protective ensembles, aprons, and gloves) that is generated during the RD&D program will be chemically decontaminated. If chemical decontamination does not prove successful, the material will be treated in the MPT. The decontaminated residue will be disposed of off site at a permitted TSDF.

4.3.6 Miscellaneous Agent-Contaminated Metal Parts (e.g., banding, pumps, and pipe)

Metal material and parts that are not contaminated with agent will be managed by appropriate methods to minimize waste without any further treatment at BGCAPP. Agent-contaminated metal material and parts that are generated during the RD&D program will be chemically decontaminated. If chemical decontamination does not prove successful or efficient, the material will be treated in the MPT. The decontaminated residue will managed by appropriate methods to minimize waste.

4.3.7 Spent Activated Carbon

1. Agent-contaminated spent activated carbon will be shipped off site for further treatment and disposal at a permitted TSDF.
2. Spent activated carbon that is not contaminated with agent will be managed by appropriate methods to minimize waste.

4.3.8 Spent Decontamination Solution (SDS)

SDS that is generated during the RD&D program will be processed as follows:

1. Pump the SDS from sumps in the Category A or B areas to the SDS storage tanks. Liquid in the sumps in the Category C areas will be characterized and, based on the results of the characterization, the sumps will either be pumped to the SDS storage tanks or will be managed by other appropriate means.
2. Sample and analyze the SDS in the SDS tanks to verify that it is below the target release level for agent.
   - **a.** If the agent concentration is below the target release level for agent, send the SDS to the HSA for further treatment in the SPB.
   - b. If the residual agent concentration is above the target release level for agent, treat the SDS in the SDS tank with caustic and resample or send the SDS to the ANS for further treatment.

The following discussion describes each process component shown in Figure 4-1. Attachment 6 describes the overall facility, including the building HVAC systems, which incorporate the final air stream treatment systems and are designed to prevent a release of hazardous materials (specifically agents) from operations within the MDB[11].

4.4 Munitions Unpacking

EONCs containing munitions are moved from the CHB to the UPA of the MDB for processing. Before the EONC is opened (in the UPA) to access the munitions, the air in the sealed EONC is monitored for agent. If agent is detected, the EONC will not be opened until it is transported to the EONC leaker airlock, which is designed to handle the opening of the container as described in Section 4.2. If no agent is detected, the EONC will be opened in the UPA and the munitions will be unloaded for processing. Unburstered projectiles are loaded onto a munition tray; the tray is placed on a conveyor and moved to the NCR/MWS station. Rockets are loaded onto the rocket input assembly and conveyed into the explosive containment vestibule (ECV) where the RCM begins the processing of the rockets. The burstered H 155-mm projectiles are loaded onto the projectile feed conveyor and conveyed to the ECR, through the ECV.

In addition to the RCM operations, the overpacked rockets and overpacked projectiles are removed from the overpacks and placed on their respective conveyors for processing as described in Sections 4.3.1.2 and 4.3.1.1, respectively. Overpacked unburstered projectiles are

[11] Evaluation of process integration will require the operation and testing of all of the equipment identified in Sections 4.4 through 4.1**5** with the exception of Section 4.5.1.

loaded onto a munition tray for processing through the nose closure removal station (NCRS) as described in Section 4.3.1.1.

The following subsections describe the munitions unpacking subsystems.

4.4.1 Projectile Input Subsystem

The burstered H 155-mm projectiles are unpacked in the UPA, placed onto the projectile feed conveyor, and transferred through the ECV and into the ECR for reverse assembly by the PMD.

The projectile feed conveyor is a combination of a roller-type conveyor and an airlock assembly with a series of doors. The doors provide for an airlock into the ECV and provide the negative pressure to prevent the air in the ECV from flowing into the UPA.

4.4.2 Rocket Input Subsystem

M55 rockets are unpacked on the receiving table in the UPA, placed onto the rocket input assembly, and conveyed to the ECV for processing on the RCM. Following RCM processing, the rocket warheads are conveyed into the ECR through a munition access blast gate for processing by the RSM. The plant has two RCMs and two RSMs: each has its own rocket input system, and one RCM is located in each ECV and one RSM is located in each ECR.

4.4.3 Dunnage/Secondary Waste

The main component of the dunnage is the wood pallets on which the munitions were stored and transported. The majority of the wood pallets are not agent-contaminated; they will be segregated in the UPA and managed by appropriate methods to minimize waste.

Pallets that are associated with leaker munitions will be processed as described in Section 4.3.4.

Other agent-contaminated (or potentially agent-contaminated) secondary waste, such as PPE and plastic, will be managed as described in Section 4.3.5.

Spent activated carbon will be managed as described in Section 4.3.7.

4.5 Projectile Handling System (PHS) (Drawing 24915-07-M5-PHS-00001)

All 155-mm H projectiles are processed in the PMD to be installed in an ECR.

4.5.1 Projectile/Mortar Disassembly (PMD) Machine

The PMD machine will remove the nose closures and the bursters from the 155-mm H projectiles. After the nose closure and the burster are removed, the projectile will be conveyed out of the ECR, loaded onto a munition tray, and conveyed to the MWS.

The PMD processes the 155-mm H projectiles by first unscrewing the nose closure and removing the burster and miscellaneous components. The projectile is conveyed out of the ECR and placed on a munition tray for processing through the MWS. The nose closure, miscellaneous parts, and bursters are transferred to the energetics batch hydrolyzer (EBH) for deactivation by hydrolysis.

At any point in time, the number of projectiles in the ECR is limited by the total explosive limit of the aggregate number of projectiles present. The system is designed so that the total explosive limit is consistent with the design that has been submitted to the Department of Defense Explosives Safety Board (DDESB).

4.6 Nose Closure Removal System/Munition Washout System (Drawing 24915-07-M5-MWS-00001)

4.6.1 Nose Closure Removal Station

The NCRS removes the nose closures from the unburstered projectiles (GB and VX) by unscrewing them from the nose of the projectile and placing them in a storage bin or tray. After the nose closures have been removed from each projectile, a robot transfers the projectile from the NCR station to the MWS station. The removed nose closures are placed on munitions trays and processed through the MPT.

4.6.2 Munition Washout System

At the MWS, the projectile is inverted, placed into one of the MWS modules that contain a cavity access machine. A ram is hydraulically forced into the projectile, collapsing the burster well into the agent cavity as shown in Figure 4-3. The agent drains by gravity and is fed to the agent storage tank in the ANS. The washout nozzle array (consisting of high-pressure nozzles in a configuration that aims the water jets) is integral with the shaft of the burster well ram, and high-pressure water is sprayed to flush the cavity. After flushing the cavity, the projectile is placed back on the munition tray and transferred to the MPT.

4.7 Rocket Handling System (RHS) (Drawing 24915-07-M5-RHS-00001)

The RHS comprises the RCM and the RSM which, are discussed below. Section 4.3.1.2 describes the processing steps of this system.

4.7.1 Rocket Cutting Machine (RCM)

The RCM's design is based on a commercially available pipe cutter. The whole rocket, inside the SFT, is placed into the RCM, which clamps the motor end into a rotating chuck. As the chuck rotates, a cutting wheel cuts through the SFT and then through the rocket at the point between the warhead and the rocket motor. After the wheel cuts through the rocket, the warhead's SFT is slid away from around the warhead and sent out of the MDB. The warhead is sent to the ECR and the rocket motor is sent out of the MDB as described in Section 4.3.1.2.

4.7.2 Rocket Shear Machine (RSM)

The RSM demilitarizes the M55 rocket warheads that have been separated from the rocket motor in the RCM as well as M56 warheads containing GB and VX agents. The RSM extracts agent from rockets in a punch, drain, and wash station, and then shears them into segments to access the energetics for neutralization in the EBH. Drained agent extracted at the RSM is pumped directly into the agent storage tanks; all agent washout water is pumped to the spent decontamination solution (SDS) storage tanks. From the storage tanks, the agent and flush material are pumped to the ANS where the agent is neutralized. The rocket warheads are processed at the RSM after being removed from their fiberglass SFTs. The RSM used at the BGCAPP is similar to the RSM used at baseline operations, but it has been modified to process warheads that have been removed from the SFT to include a high-pressure flushing step that washes residual agent from the agent cavity and removes any gelled agent. A fully automated, hydraulically powered RSM is installed in each ECR.

4.7.2.1 Punch/Drain and Wash Station

The punch/drain and wash station clamps the warhead while the warhead is punched, drained, and washed out. To reduce residual agent in the rocket warhead cavity, and therefore minimize the amount of agent processed in the EBH, the baseline RSM punch-and-drain station has been modified to include a pressurized water spray system.

The sprays remove the residual agent and dissolve solidified material that does not drain during the punch-and-drain cycle. The high-pressure water flush system improves cleaning of the rocket warhead while minimizing changes to the baseline RSM system.

The flush rate is maintained at less than the drain rate capacity, assisted by vacuum, to avoid pressurizing the warhead. The spray pattern and spray duration needed to achieve an effective flush will be validated during the Technical Risk Reduction Program (TRRP).

4.7.2.2 Rocket Shear Station

The warhead, with the agent cavity drained and washed, is conveyed from the punch/drain and wash station to the rocket shear station. Shearing is necessary to open the interior of the agent cavity for improved decontamination, to open the interior of the burster for improved explosive neutralization, and to cut the warhead into smaller sections that can be safely placed into the EBHs. When processing the CRMs, cutting the CRM propellant into smaller pieces also exposes more surface area to the hot caustic in the EBH, increasing the rate of hydrolysis.

The rocket shear station is equipped with an optical sensor that reads the position of a pusher arm that moves the rocket forward for shearing. The sensor output identifies the location of each cut that the blade will make on the rocket. The rocket is progressively positioned under the blade, which shears the warhead into smaller segments in a predefined pattern.

The solid material from the rocket shear station is transferred to the EBH for further processing.

4.8 Dunnage Treatment

Dunnage will be managed in accordance with the procedures described in Sections 4.3.4, 4.3.5, 4.3.6, and 4.4.3.

4.9 Energetics Treatment (Drawings 24915-07-M5-EBH-00001, -ENS-00001, -OTE-00001, and 24915-11-M5-HSS-00002)

4.9.1 Energetics Batch Hydrolyzer

Explosives and CRM propellant contained in the rockets and explosives contained in the 155-mm H projectiles are treated in EBHs as shown in the PFD for the EBH system.

After the M55 rockets and M56 warheads are drained of agent and sheared in the RSM, the segments are placed in the EBHs for processing. Projectile bursters from 155-mm H projectiles are removed by the PMD and are also processed in the EBHs. An EBH is a large steam-heated inclined drum similar in shape to a traditional cement mixer. The drum is partially filled with hot NaOH solution. During rocket processing, sheared rocket segments are placed in the rotating drum where the energetics are dissolved and hydrolyzed. Rocket warhead segments (containing aluminum) are fed separately to EBH units. Aluminum in the rocket segments is also hydrolyzed. Steel-cased CRM segments are placed in an EBH and the propellant is hydrolyzed.

Hydrogen gas generated by the reaction of aluminum with sodium hydroxide is monitored, and an air or nitrogen purge is provided to ensure that hydrogen levels are maintained below the 25% of the lower flammability limit (LFL). The EBH room is designed as an explosion containment room (ECR).

After the EBH charging step is completed, the second and third EBHs are used as required for receipt of energetics. The first EBH then completes the treatment of the energetics. The solid residues are then separated from the liquid hydrolysate and transferred to the MPT for thermal decontamination. The hydrolysate is transferred to the energetics neutralization reactors (ENRs) for final energetics destruction confirmation. Samples are taken to verify that the hydrolysate is below the target release level for agent and then transferred to the energetic hydrolysate storage tanks in the HSA. If the residual agent concentration is above the target release level, additional reaction time will be required in the ENRs before transfer to the HSA.

Gases from the EBHs and ENRs are sent to the dedicated EBH offgas treatment system (OTE). After treatment in the OTE, the gases are released to the MDB HVAC filter system.

4.9.2 Heated Discharge Conveyors

The heated discharge conveyors (HDCs) have been removed from the BGCAPP design; the NCRMs will be processed outside the BGCAPP facility.

4.9.3 Energetics Neutralization System

The energetics hydrolysate is not released from the MDB until it has been tested for agent and verified to have met all requirements for release from engineering controls. The hydrolysate is transferred to the energetic hydrolysate storage tanks in the HSA. If the residual agent concentration is above the target release level, additional reaction time will be required in the ENRs before transfer to the HSA. Gases from the ENS are sent to the MPT offgas treatment system (OTM). After treatment in the OTM, the gases are released to the MDB HVAC filter system. The ENS gases can also be sent to the EBH OTE if the OTM is not in operation.

4.9.4 EBH Offgas Treatment System (OTE)

The offgases from the EBHs are vented through the OTE. The offgases from the ENS can also be vented to the OTE if the OTM is not in operation.

The OTE consists of a scrubber tower system, offgas filters, an air reheater and exhaust blowers.

The OTE scrubber tower’s main function is to capture and neutralize ammonia and energetics constituents that may be present in the EBH offgas. It also captures liquid mist, particulates, and other organic materials in these offgases. The pH is controlled in the system by adding sulfuric acid to the EBH scrubber recirculation tank.

The offgas from the scrubber tower is ducted to a filter that is sized to remove particulates and droplets greater than 3 microns (μ) in diameter at 99.9% efficiency. This filter normally acts as a demister, removing fine mist that may pass through the scrubber tower’s demister system.

The offgas from the filter is passed through an electric heater, which raises its temperature and reduces its relative humidity to below 55%. The gases from the OTE discharge to the MDB HVAC filter system.

4.10 Aluminum Precipitation System (APS)/Aluminum Filtration System (Drawings 24915-07-M5-APS-00001, -AFS-00001)

The energetics hydrolysate is transferred from the HSA to the APS in the SPB, where pH of the hydrolysate is adjusted to precipitate the aluminum compounds before it is sent to the AFS to remove the precipitated aluminum compounds.

The AFS filtrate is transferred to the SCWO feed tanks for blending with the agent hydrolysate. The filter cake is removed and disposed of at a permitted TSDF.

4.11 Agent Neutralization by Hydrolysis (Drawing 24915-07-M5-ACS-00001, -ANS-00001, and 24915-11-M5-HSS-00001)

The agent drained from the munitions, as well as the wash liquid from the drain-and-wash operation, is hydrolyzed in the ANS reactors. Hot water will be used to neutralize H; hot NaOH solution will be used to neutralize VX and GB.

In the neutralization process, the agent will be destroyed to at least 99.9999% on a mass basis (i.e., the mass of agent entering the ANS versus mass of agent leaving the hydrolysis system). Attachment 10, Section 10.1, discusses how the destruction efficiency is determined.

SDS will be analyzed for agent; if agent concentration is below the target release level, the SDS will be transferred to the HSA. If the agent concentration is not below the target release level, the SDS either be treated in the SDS Tanks with caustic and resampled or will be sent to the agent hydrolysis reactors for further treatment. The agent hydrolysis reactors are kept under a nitrogen purge and the reactors' vent gas is treated in the OTM (as described in Section 4.12) before it is released to the MDB HVAC filter system.

Before the hydrolysate is discharged from the agent reactors for VX or the sampling tanks for GB and H, it may be sampled and analyzed to ensure that it is below the target release level for agent or it may be released based on validated process controls and statistical testing. This alternative analytical approach will be submitted to KDEP as part of the Waste Analysis Plan that is included in the RD&D Permit Compliance Schedule, Appendix B, Item # 18. Only after one of these criteria have been met is the hydrolysate released from the reactor or the sampling tank and pumped to the HSA prior to further treatment by the SCWO treatment process.

4.12 Metal Parts Treater, MPT Cooling System (MCS), and Offgas Treatment System (Drawings 24915-07-M5-MPT-00001, -MCS-00001, and -OTM-00001)

Washed munition bodies from MWS, EBH solid residues, and secondary wastes are thermally decontaminated in the MPT units. These items are placed on trays and are conveyed to the MPT; the chamber is sealed, purged with nitrogen gas, and inductively heated until all components have been thermally treated to a minimum of 1,000°F for a minimum of 15 minute.

The MCS cools the trays exiting the MPT to a temperature at which it is safe to handle.

The OTM treats the offgases from the MPT and the vent gases from the ACS, ANS, ENS, and SDS tank systems before the offgases are released to the MDB HVAC filter system.

The following subsections describe these three systems.

4.12.1 MPT (Drawing 24915-07-M5-MPT-00001)

The MPT thermally decontaminates the munitions bodies of 155-mm and 8-in. projectiles using inductive heating and superheated steam. Air is excluded from the system through the use of airlocks and nitrogen purges.

Trays of projectiles and other materials are processed by placing them on a conveyor, which carries them through the first door[12] into the inlet airlock. The tray is staged in the inlet airlock, which is purged with nitrogen, until the trays in the MPT have completed processing and have

[12] All doors in the inlet and outlet airlocks, both between the airlocks and the MPT and the surroundings, are normally closed. They are opened only to transfer a tray of material. Both doors in each airlock cannot be opened at the same time to prevent air infiltration.

been moved downstream. The tray is conveyed through the gate into MPT zone 1, where it is held until it reaches the desired initial temperature[13]. It is then moved into MPT zone 2 where it is further heated for a sufficient time to ensure that the complete mass of material has achieved a minimum of 1,000°F for a minimum of 15 minutes. After these conditions have been achieved, the tray from zone 2 is moved into the exit airlock where it is kept for a sufficient period to ensure that it has cooled in the nitrogen atmosphere **which** prevents the formation of dioxins and related compounds. This type of sequential operation allows for continuous treatment of trays of material while ensuring that the material in each tray has been heated to a minimum of 1,000°F for a minimum of 15 minutes.

4.12.2 MCS (Drawing 24915-07-M5-MCS-00001)

The MCS cools the material to a temperature at which it is safe to handle.

The MPT residue is transferred from the outlet airlock to the MCS, where the tray and its contents are placed onto the cooling conveyor. Ambient air is slowly blown across and through the mass of solids at a flow low enough not to create dust. The air cools the munition tray to a safe temperature for removing the munitions. The MCS incorporates a system that can use water to lightly mist the hot air in the MCS. The mist is designed only to keep the air cool; it does not contact the hot residue.

A particulate filter may be installed on the MCS to control any potential emissions.

The solid residue leaving the MCS will be shipped off site for disposal at a permitted TSDF.

4.12.3 OTM (Drawing 24915-07-M5-OTM-00001)

The OTM is designed to process the offgas from the MPT and the vent gases from the ACS, ANS, ENS, and SDS tank systems. The OTM consists of two bulk oxidizers (BOXs), two cyclones, a common wet venturi scrubber system, filters and blowers. Each MPT has its own BOX and cyclone. The offgas from the two MPTs then combines to be further treated through the scrubber system and filter before it is discharged to the MDB HVAC filter system.

The BOX unit is a flameless thermal oxidizer that oxidizes organics that may be present in the MPT, ANS room tanks, and ENS offgases. It is designed to handle a wide variety of materials such as halogenated organics, methane, hydrocarbons, ammonia, carbon monoxide, and hydrogen. The BOX unit handles the following input streams:

1. Air feed to the oxidizing section to ensure that the residual oxygen level in the unit effluent is at least 5%.
2. Fine mist of water to the oxidizing section to maintain the operating temperature at 2,000°F with capability to operate at 2,200°F if the gas feed has a higher heating value. A 2,200°F temperature is required when contaminated wood pallets and SFTs from the rocket handling system are processed in the MPT.
3. Natural gas to maintain the operating temperature at 2,000°F (or 2,200°F) if the heating value in the gas feed is not sufficient to maintain the operating temperature.
4. Fine mist of water to the cooling section to maintain the exit temperature at 1,200°F.

[13] The two-zone heating allows for control of the rate of heat-up so as to properly manage the release of off-gases to the **OTM**.

The BOX consists of two sections, an oxidizing section, and a quench section. The oxidizing section has a minimum gas residence time of two seconds at a minimum temperature of 2,000°F.

The MPT cyclone removes ash and other large particulate matter from the BOX unit effluent gases and discharges the gases to the combined scrubber system.

The venturi/scrubber system is a combination of a venturi impaction scrubber that captures particulates and rapidly quenches the hot gases, followed by an absorption tower that captures acid gases. Caustic solution is added to the system to maintain pH and neutralize the captured acids.

The OTM offgas filter removes residual particulate matter greater than 3 μ in diameter. This filter also is a demister, removing fine mist that may pass through the scrubber tower's demister system.

The gas reheater reheats the OTM outlet gases to maintain the relative humidity of the blower effluent stream below 55% to avoid condensation in the HVAC ducts. The treated offgases from the OTM then go to the MDB HVAC filter system.

4.13 Decontamination Solution Supply and Spent Decontamination Solution Capture/Storage System (Drawing 24915-07-M5-SDS-00001)

Decontamination solution is used in the following activities:

1. Wash down any spills of agent that may have occurred.
2. Decontaminate equipment.
3. Decontaminate PPE that may have been contaminated during toxic area entries.[14]

Decontamination solution is used by applying it to an area of contamination, allowing sufficient contact time, and then rinsing the area with water. The wash water drains to sumps in the MDB.

The decontamination solution is based on NaOH, NaOCl, or other decon solutions. Other possible decon solutions will be evaluated and used if their overall performance and environmental health impacts prove to be equal to or better than current decon solutions.

The SDS is managed as described in Section 4.3.8.

4.14 SCWO Units (Drawing 24915-10-M5-SCWO-00001)

The SCWO units are used to treat the agent and energetics hydrolysates and spent decontamination fluid. The various waste streams may be processed through the SCWO units either individually or as blends. All materials that are fed to the SCWO units have been previously verified to be below the target release level for agent; therefore, the SCWO and downstream operations do not require engineering controls. Tests conducted as part of the TRRP have provided data on the appropriate ratios of caustic and salt transport additives. The SCWO TRRP reports have been submitted to KDEP as required by the RD&D Permit, Appendix B, Compliance Schedule Item 1.

The SCWO process is based on the unique properties of water at conditions above its thermodynamic critical point of 374°C (705°F) and 3,206 psia. At these supercritical conditions, organic materials and oxidant gases are generally completely miscible in water and the elevated

[14] To prevent agent from being carried out of the agent-contaminated areas of the MDB, PPE is washed down with decon solution and water. Agent monitoring is performed prior to exiting the area through the airlocks.

pressure increases the mixture density in the reactor, thus allowing rapid and complete oxidation reactions.

The SCWO reactor is a vertical down-flow high-pressure cylindrical vessel. Its general configuration is shown in Figure 4-4. A replaceable annular liner is fitted into the vessel as shown. A small flow of air or nitrogen is maintained in the annulus between the liner and the pressure vessel to inhibit the ingress of process fluid into the annulus.

The material to be reacted (hydrolysate or spent decontamination solution) along with air is pumped through the feed-nozzle at the top of the reactor. The feed material will be supplemented with additional organic feed (supplemental fuel) in order to increase its heating value, as required to maintain an autogenous[15] reaction. Isopropyl alcohol (IPA), fuel oil, or kerosene may be used as supplemental fuels at the BGCAPP.

In the SCWO reactor, the organic constituents of the waste are converted to carbon dioxide (CO_2), water (H_2O), nitrogen (N_2), or nitrous oxide (N_2O), and sulfates and phosphates (if sulfur or phosphorus is present in the feed). Halogens are converted to their respective acids. The acids react with the caustic to form sodium salts such as sodium chloride (NaCl), sodium fluoride (NaF), monosodium phosphate (NaH_2PO_4), and sodium sulfate (Na_2SO_4), depending on the agent being processed. The salts are not soluble in the supercritical fluid and they are carried through the reaction zone (from the injector to the quench region) as solids or as slurries. At the bottom of the reactor, quench water is introduced, lowering the temperature below the critical point and converting the supercritical fluid to a liquid into which the salts dissolve. All of the reaction products flow out of the bottom of the SCWO reactor.

During system startup, an electric feed preheater is used to heat the SCWO reactor to the fuel initiation temperature at the nominal operating pressure of about 3,400 psi. At this point, flows of oxidant and fuel are begun, and reaction is initiated. Oxidation of the fuel brings the SCWO system to the full operating temperature before the hydrolysate is introduced. After the hydrolysate flow is initiated, fuel flow is reduced to accommodate the heat released by hydrolysate oxidation. As the hydrolysate feed rate is ramped up to the target throughput, the fuel, water, and air flow rates are adjusted as required to maintain the desired operating conditions.

The quenched reactor effluent is passed through a series of heat exchangers to cool it to near-ambient temperature, passed through a high-pressure gas/liquid separator (GLS), and then passed through pressure reduction control valves. The gas stream and the liquid stream are depressurized separately. The liquid stream goes to a second GLS to further remove gases that were soluble at high pressure, principally residual CO_2. The gas is combined with the main gas stream exiting the high-pressure GLS. The SCWO aqueous effluent exits the bottom of the low-pressure gas/liquid separator and is pumped to the SCWO effluent tank for storage before it is transferred to the reverse osmosis (RO) system.

During upset conditions, the SCWO effluent is diverted to the Off-Spec Effluent Tank (MV-SCWO-0041), and not to the tanks in the STA. The Off-Spec Effluent tanks are located in the SPB and are controlled by the SPB HVAC system. This is shown in PFD 24915-10-M5-SCWO-00001, Sheet 3.

[15] Autogenous refers to the ability of a chemical reaction to maintain a sufficiently high temperature to sustain itself without the need to add additional heat to the reactor vessel.

4.15 Reverse Osmosis (RO) (Drawing 24915-10-M5-RO-00001)

The RO unit processes the effluents from the SCWO units. SCWO effluents are first fed to the feed preparation subsystem, consisting of a clarifier for removing suspended solids, a multimedia filter, and a cartridge filter. This water stream from the preparation stage is then fed to an RO unit for brine concentration. The RO system creates a permeate stream, which is of suitable quality for reuse in the SCWO system. All residues from the clarifier and the filters are injected into the RO reject stream. Reject from the RO unit combines with blowdown from processing units, stored in the RO reject tanks, and then shipped off site to a permitted TSDF.

RO permeate is introduced into the SCWO reactor near the bottom to reduce the SCWO effluent's temperature to below the critical point and results in the re-solution of the inorganic constituents facilitating their discharge from the reactor.

Table 4-1—Major NRC Reports Relevant to Destruction of Weapons at BGAD

NRC 1993	*Alternative Technologies for the Destruction of Chemical Agents and Munitions*
NRC 1995	*Review of Alternative Chemical Disposal Technologies*
NRC 1999	*Review and Evaluation of Alternative Technologies for Demilitarization of Assembled Chemical Weapons*
NRC 2000	*Evaluation of Demonstration Test Results of Alternative Technologies for Demilitarization of Assembled Chemical Weapons, a Supplemental Review for Demonstration II*
NRC 2000a	*Integrated Design of Alternative Technologies for Bulk-Only Chemical Agent Disposal Facilities*
NRC 2001	*Analysis of Engineering Design Studies for Demilitarization of Assembled Chemical Weapons at Pueblo Chemical Depot*
NRC 2001a	*Disposal of Neutralent Wastes*
NRC 2002	*Analysis of Engineering Design Studies for Demilitarization of Assembled Chemical Weapons at Blue Grass Army Depot, 2002*
NRC 2002a	*Update Engineering Design Studies for Demilitarization of Assembled Chemical Weapons at Blue Grass Army Depot*
All NRC reports are available for purchase or download at www.nap.edu.	

Table 4-2—Hydrolysis Types to be Used at BGCAPP

Hydrolysis Type	Agent
Hot water	H, blister agent mustard[a]: bis(2-chloroethyl) sulfide or ,2'-dichlorodiethyl sulfide ($C_4H_8Cl_2S$)
Hot sodium hydroxide solution	GB [nerve agent sarin: isopropyl methyl phosphonofluoridate ($C_4H_{10}FO_2P$)]
	VX [nerve agent: O-ethyl S-(2-diisopropyl-aminoethyl) methylphosphonothiolate ($C_{11}H_{26}NO_2PS$)]
	Energetic materials (explosives and rocket propellants)
[a]Levinstein mustard.	

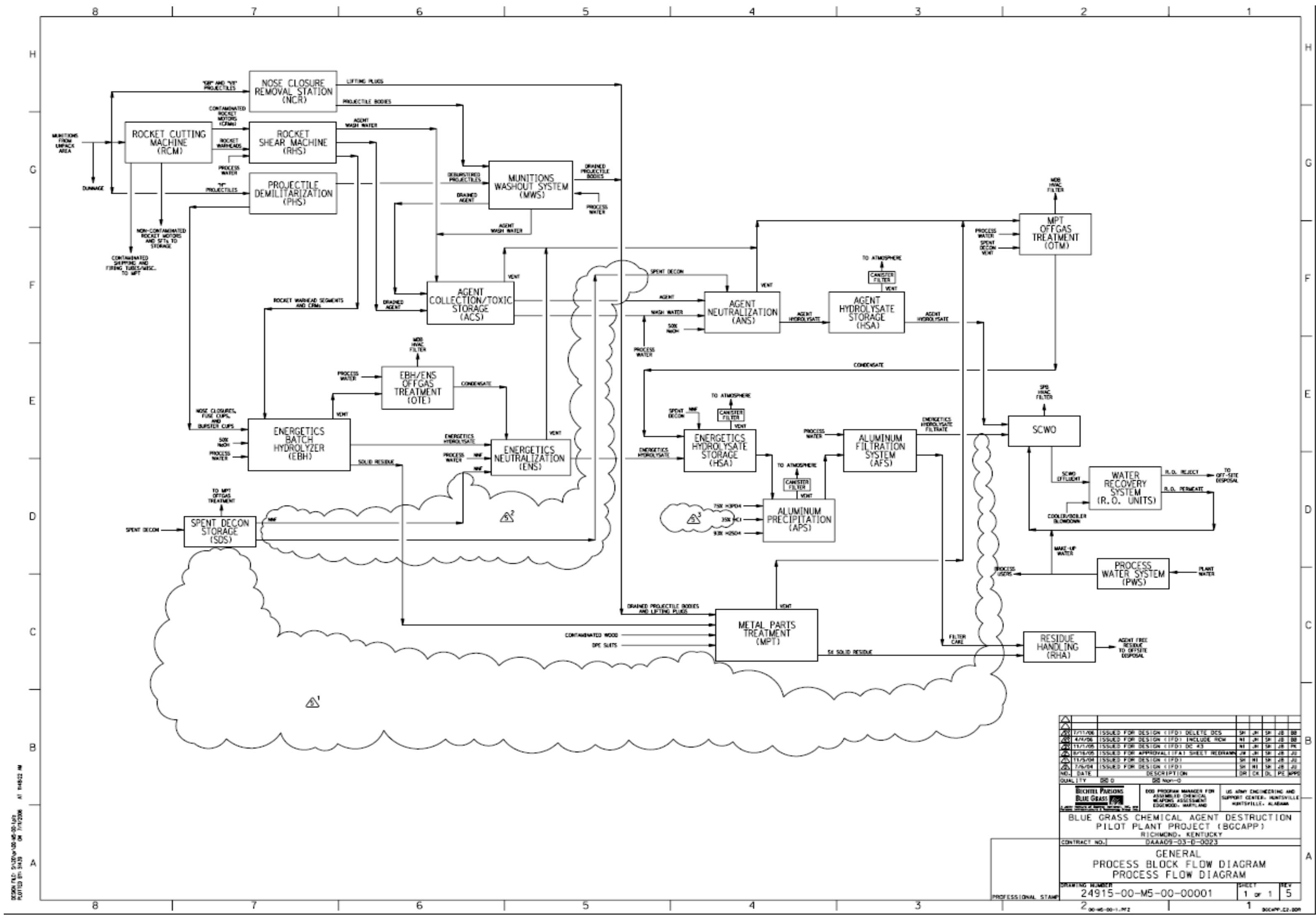
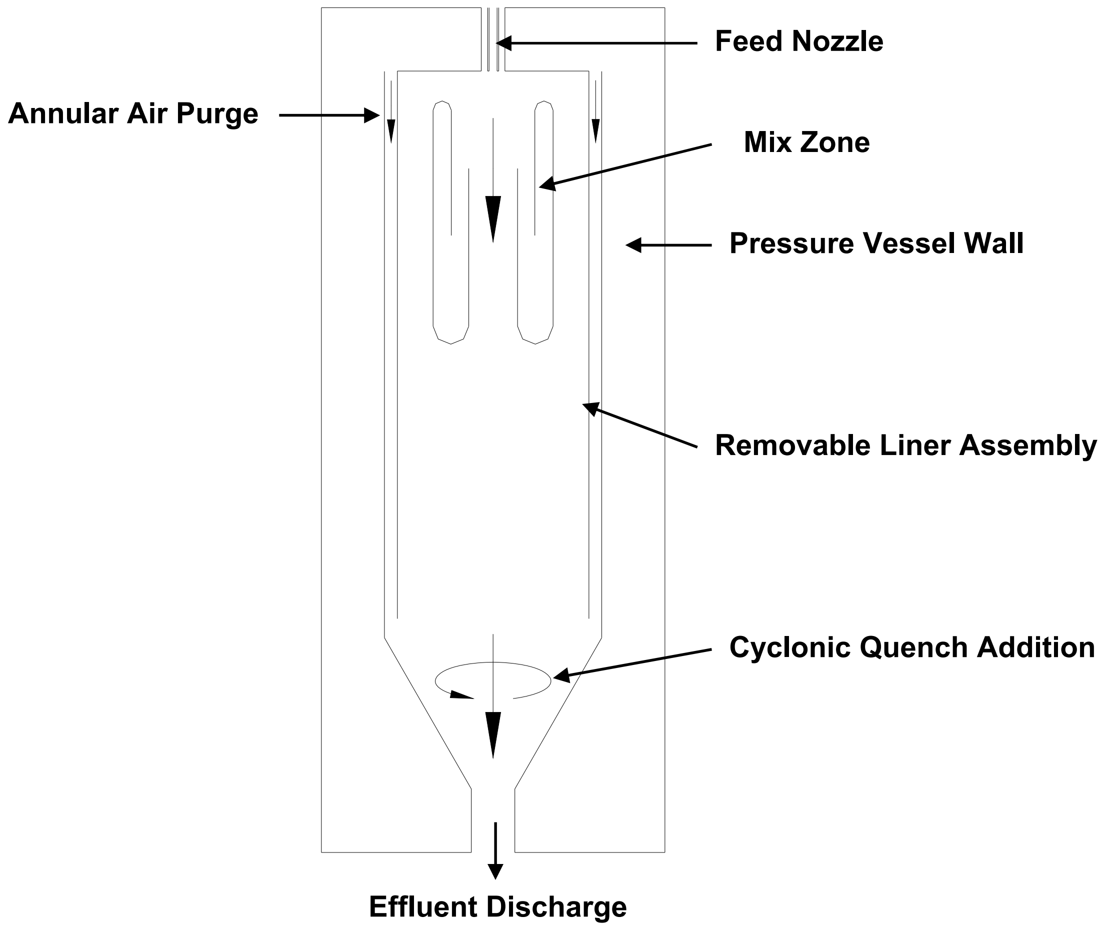


Figure 4-1— Block Flow Diagram

Figure 4-2—Enhanced Onsite Container (EONC)

Figure 4-3—Projectile with Crushed Burster Tube



Note: This figure is presented as general illustration of the functioning of a SCWO reactor. It is not necessarily an accurate representation of the interior details of the BGCAPP SCWO reactors.

Figure 4-4—Schematic of a SCWO Reactor

Attachment 5 Contents

Tables

Attachment 5 Method Used to Meet Environmental Protection Standards In Accordance with 401 KAR 30:031

The requirements of KAR 30:031 regulate the three vectors for contaminant release from a treatment, storage, and disposal facility (TSDF):

1. Discharge to surface water
2. Contamination of soil and groundwater
3. Release to the atmosphere

The Blue Grass Chemical Agent Destruction Pilot Plant (BGCAPP) is a completely enclosed facility with no discharges to surface water, ground, or groundwater. It does have the potential to release contaminants to the air. The following discussion addresses those aspects of KAR 30.031 that relate to the first two vectors for contaminant release. The discharges to the atmosphere and how these comply with and exceed all of the regulatory requirements are discussed in addressing the requirements of 401 KAR 30:031, Section 9.

KAR 30:031 Section 2: Floodplains

The BGCAPP is not located in a floodplain.

KAR 30:031 Section 3: Endangered Species

As discussed in the Destruction of Chemical Munitions at Blue Grass Army Depot (BGAD), Kentucky, Final Environmental Impact Statement (EIS) (December 2002), the area of construction has been surveyed and the BGCAPP will be sited so that it does not impact any endangered species. Final site determination will be analyzed in a National Environmental Protection Act (NEPA) document to be prepared in 2004.

KAR 30:031 Section 4: Surface Waters

The BGCAPP is a zero-discharge facility; it does not discharge to surface waters.

KAR 30:031 Section 5: Groundwater

The BGCAPP is totally enclosed. All hazardous waste storage tanks will be constructed to meet the requirements of 401 KAR 34:190 and are provided with secondary containment designed and operated to contain 100% of the capacity of the largest tank and the additional capacity to contain the precipitation from a 25-year, 24-hour storm (5.3 inches).

KAR 30:031 Section 6: Application to Land Use for the Production of Food Chain Crops

The BGCAPP does not apply waste to the land or dispose of any waste on the land.

KAR 30:031 Section 7: Land Disposal of Polychlorinated Biphenyls (PCBs)

The BGCAPP will send all PCB waste only to approved Toxic Substance Control Act (TSCA) disposal sites.

KAR 30:031 Section 8: Disease

The BGCAPP will not process pathogenic or other biological wastes.

KAR 30:031 Section 9: Air

1. **Open burning of wastes.**
The BGCAPP will not perform open burning of any wastes.

2. **KRS Chapter 224, Air Pollution Regulations.**
The BGCAPP will comply with all requirements of KRS [Kentucky Revised Statute] Chapter 224 or administrative regulations promulgated pursuant thereto. A modification to the existing Blue Grass Army Depot (BGAD) Air Permit (No. O-86-12) will be submitted in sufficient time to allow full statutory review prior to the start of construction of treatment facilities requiring the Air Permit approval. See Section 11.5, Attachment 11, for additional information on anticipated releases to the air.

KAR 30:031 Section 10: Safety

1. *Explosive gases.*
Waste processing that may generate explosive gases is described in Attachment 4, Section 4.9.1. Additional information will be provided to KDEP in sufficient time before the start of construction of the affected treatment units.

2. *Fires.*
No waste will be disposed of on land; therefore, the types of fires covered by this paragraph cannot occur.

3. *Access.*
Access to all of the BGAD chemical limited area (CLA) is controlled and monitored by security. The BGAD is surrounded by a heavy chain link fence topped by barbed wire. The BGCAPP will be surrounded by a double fence topped with barbed wire. The BGCAPP can be accessed through the manned entry control facility (ECF).

KAR 30:031 Section 11: Public Nuisance

The BGCAPP is within the confines of the BGAD and is well away from any public view or contact. It poses no public nuisance.

KAR 30:031 Section 12: Wetlands

The BGCAPP is not located in a wetland.

KAR 30:031 Section 13: Karst

All operations will be performed in enclosed buildings with no runon or runoff.

KAR 30:031 Section 14: Compliance

BGCAPP will comply with the applicable requirements of KRS 224, 401 KAR, and the BGCAPP Permit. Regulated units within BGCAPP will be managed in accordance with 401 KAR Chapter 34 “Standards for Owners and Operators of Hazardous Waste Storage, Treatment and Disposal

Facilities." Each regulated area or unit is discussed below with the appropriate regulatory requirements from 401 KAR Chapter 34.

1. *Container Storage*
This section describes the areas in which BGCAPP will manage containers of hazardous waste and some of the types of containers managed, and briefly describes the hazardous waste. Containers listed below and additional containers selected and used during systemization and the RD&D program at BGCAPP meet the definition and requirements of 401 KAR 38:005, 401 KAR 34:180, and 401 KAR 38:150.

2. *Hazardous Waste Containers*
Several different containers will be used to manage, store, and transport hazardous waste within BGCAPP, in addition to the munitions themselves. Several of these containers are described below, but this listing is not all inclusive. As additional types of containers are identified, they will be incorporated into BGCAPP procedures in compliance with 401 KAR 34:180 and 401 KAR 38:150. Only compatible wastes will be containerized together.

a. *Single Round Container (SRC)*
M55 rockets that have been found to be leaking are containerized in a single round container (SRC). The SRC was specifically developed to contain the M-55 in a substantial steel shell, which has been subjected to a helium leak test as part of the acceptance process. Leaking M-55 rockets, which were containerized before the development of the SRC, are stored in a modified M-1 container. The modified M-1 is a heavy steel cylinder bolted on with a gasket seal with eight bolts. All munitions are stored on specialized pallets designed to store the overpacked unit securely.

b. *M16 Series Overpack Container*
The M16 series containers are cylindrical steel containers designed to be air tight, designated for the over-pack of projectiles. Overpacked 155-mm projectiles are stored in wooden "egg crates" specifically designed to store the M16 overpack container.

c. *M10 Series Overpack Container*
The M10 series container is a cylindrical steel container that is designed to be airtight and is designated for use as an overpack container for leaking or deteriorated M16 containers and as an overpack container for 8-in. projectiles.

d. *DOT Bottle*
DOT bottles are cylindrical containers of steel. Each bottle contains approximately 3 gallons of chemical warfare agent.

e. *One-Ton Containers*
Three one-ton containers hold unserviceable mixtures of GB agent and liquid from drill and transfer (DAT) operations and Surveillance Program, Lethal Chemical Agents and Munitions [SUPLECAM] operation. The one-ton containers are cylindrical steel containers. All valves and pipes have been replaced with steel plugs.

f. *ISO 55-Gallon Steel Drum*
Some secondary waste generated during the RD&D process will be containerized in 55-gallon steel drums. The lids will be kept closed except during

filling. Each drum is manufactured with 18-gauge cold rolled steel in accordance with 49 CFR 178.54. Maximum volume of each drum is 55 gallons and has an empty weight of approximately 38 pounds. All drums are approximately 35 inches tall with a diameter of 22½ in.

g. *Intermediate Bulk Containers (IBCs)*
IBCs may be used throughout the process to collect various liquid waste streams. Each IBC will have a capacity of 300 gallons with nominal dimensions of 42 by 48 by 41 in. (LxWxH). IBCs are manufactured from various materials including carbon steel, stainless steel and polymers in accordance with DOT regulations.

h. *Enhanced Onsite Container (EONC)*
The Department of the Army uses EONCs to store and transport the munitions and bulk containers for the time period immediately preceding demilitarization activities. The EONC is designed to provide vaportight containment of agent; all seals on the containers are impervious to agent and are able to withstand decontamination solutions. The EONC will provide secondary containment for the munitions or containers stored within. The EONCs and any components mounted on the surface will fit within an envelope that is 8.5 ft by 8.5 ft by 12 ft high. The combined weight of the EONC and munition holding trays will not exceed 26,000 lb.

3. *Container Management*
Containers at BGCAPP will be managed in accordance with 401 KAR 38:005, 401 KAR 34:180 and 401 KAR 38:150[1]. Munitions destined for demilitarization are described in Attachment 3. The munitions are transported to the container handling building (CHB) for storage prior to processing during the RD&D program. The Blue Grass Chemical Activity (BGCA) is responsible for the safe storage and delivery to BGCAPP of these munitions, including, but not limited to:

a. Loading specified chemical munition types into EONCs.

b. Transporting the EONCs from the CLA to the CHB of BGCAPP.

c. Completing required record keeping for transfer of custody of munitions to BGCAPP.

d. Returning unloaded EONCs to the CLA.

This activity will be completed under a BGCA Work Plan approved by KDEP in accordance with the requirements of KRS 224.50.130 (Chemical Munitions).

Each truck used by BGCA can transport one EONC of munitions. The number of trucks per day and the loading configuration in the EONCs will differ with the specific goal of scheduled research. EONC movement from the CHB to the munitions demilitarization building (MDB) continues 24 hr/day, 7 days/week.

When the truck enters the BGCAPP perimeter, it will move to an off-loading area at the CHB. A bridge crane or similar device will be used to unload the EONC. All containers present in the CHB will contain the same agent because the facility will process only

[1] Attachment 12 provides a list of specific regulatory waivers BGCAPP is requesting, along with justification for each request.

one lethal chemical agent at a time. In accordance with the Kentucky Hazardous Waste regulation 401 KAR 34:180 Section 5, the vapor space of the EONCs containing waste that remain in the CHB for more than 1 week will be monitored using an agent monitor port in the EONC on a weekly basis for agent vapor in lieu of visual inspections of the hazardous waste containers (munitions).

Wastes generated during the RD&D program and construction will be placed in containers whose materials of construction is compatible with the contents. The selection will be made on a case-by-case basis consistent with generator knowledge of the stream. In cases of uncertainty, the stream's pH or other relevant parameters will be evaluated and the container material selected on the basis of this analysis. All waste containers will always be kept closed during storage except when adding or removing waste.

All containers will be handled in a manner to avoid rupturing or leaking. All handling will be performed with drum dollies, forklifts, overhead cranes, or other means, as appropriate. One of the goals of the process integration RD&D will be to evaluate the safety and suitability of the handling procedures.

Development of container management will continue throughout systemization and the RD&D program.

4. *Hazardous Waste Container Storage Areas*

Several areas within BGCAPP will have permitted container storage areas. These areas will be designed, constructed and managed in accordance with all applicable standards of 401 KAR 38:005, 401 KAR 34:180, and 401 KAR 38:150. Table 5-1 summarizes the areas within BGCAPP to be permitted for container storage; more detailed descriptions follow.

a. *CHB*

The CHB is a steel-frame building with insulated metal roofing and insulated siding panels. A side loader truck will be used to move the EONCs into the CHB and also to transfer them to the unpack area (UPA).

The EONC storage area is sized to store 53 EONCs.

Permitted storage will be limited to the storage of containers inside of EONCs. The EONC meets secondary containment requirements of 401 KAR 34:180 Section 6 for the munitions contained within.

The floor of the CHB is constructed of reinforced concrete. The CHB-MDB transition structure is metal siding with a reinforced concrete floor. The number of construction and expansion joints will be kept to a minimum. All joints between floors and walls will be covered and sealed.

b. *MDB*

The MDB is the primary treatment facility in the chemical weapons destruction process and includes the following components:

Table 5-1—Container Management Regulatory Standards

Container Storage Areas	**Container Management Regulatory Standards**
Container Handling Building (CHB)	401 KAR 34:180 (Use and Management of Containers)
Areas within Munitions Demilitarization Building (MDB)	
Unpack Areas (UPAs)	
Explosive Containment Vestibules (ECVs)	
Explosive Containment Rooms (ECRs)	
Toxic Maintenance Area (TMA)	
Residue Handling Area	
Metal Parts Treater (MPT) Cooling Conveyor Area	
Tray/Container Transfer Room	
Agent Neutralization System (ANS) Room	
Motor **Packing** Room (MPR) Area	
Motor **Shipping** Room (MSR)/Covered Loading Area	
Box Storage Area	
SCWO Processing Building (SPB) **Storage** Area	
Waste Storage Area (WSA)	
Laboratory Waste Handling Area	

1. *Unpack Areas (UPAs)*
Containers and munitions will be brought from the CHB into the MDB via the UPAs. Each UPA is a transition area between the CHB and the hazardous waste processing in the MDB. Permitted storage will be limited to the storage of containers inside of EONCs or on secondary containment pallets. The EONC meets secondary containment requirements of 401 KAR 34:180 Section 6 for the munitions contained within. This area will also provide a means to monitor the EONCs for leakers, provides an unpack station, and provides a means to return empty EONCs to the CHB for temporary storage. The floor of each UPA is constructed of reinforced concrete. The number of construction and expansion joints will be kept to a minimum **in this area and the floor, sumps, and curbs have been coated.**

2. *Explosive Containment Vestibules (ECVs)*
Munitions will be stored on the conveyors in these rooms and the munitions will also be stored on the reject systems located in these rooms. In addition, leaking or reject projectiles that have been placed in overpacks may be stored on the floor in these rooms. Storage of projectiles or rockets, in or out of EONCs, will not exceed the maximum number allowable determined by the net explosive weight. Secondary containment will be provided by a coated, reinforced concrete floor, sumps, and perimeter curbs/walls. The number of construction and expansion joints has been kept to a minimum in this area and the floor, sumps, and curbs have been coated.

3. *Explosive Containment Rooms (ECRs)*
Munitions containing explosives (projectiles with bursters and rockets) are processed in ECRs. The number of projectiles in an explosive contaminant room at any time is limited by the explosive force contained in the aggregate projectiles as determined by the net explosive weight. Munitions will be stored on the conveyors in this room and the munitions will also be stored on the reject systems located in this room. In addition, leaking projectiles that have been placed in overpacks may be stored on the floor in this room. Secondary containment will be provided by a coated and reinforced concrete floor, sumps, and perimeter curbs/walls. The number of construction and expansion joints will be kept to a minimum in this area and the floor, sumps, and curbs have been coated.

4. *Toxic Maintenance Area (TMA)*
The TMA is located within the MDB and a portion of the Category A section of the TMA is designated as the TMA container storage area. This TMA container storage area is sized to store one hundred 55-gallon drums. The TMA airlock/decon area is sized to store one EONC. Secondary containment will be provided by a coated and reinforced concrete floor, sumps, and perimeter curbs/walls. The number of construction and expansion joints has been kept to a minimum in these areas and the floor, sumps, and curbs have been coated.

5. 5. *Residue Handling Area (RHA)*
BGCAPP process residues consist of metal parts associated with the munitions from the metal parts treaters (MPTs), various solid dunnage. Also, dunnage scheduled to be processed through the BGCAPP will be stored in the RHA container storage area. Typical containers include 55-gallon drums,

rolloff boxes, and plastic bags used to hold contaminated personnel protective equipment (PPE) prior to treatment.

6. ***Metal Parts Treater (****MPT****)** *Cooling Conveyor Area*
BGCAPP process residues stored in this area include metal parts associated with the treatment of the munitions and secondary waste from the MPTs. Typical containers include 55-gallon drums and rolloff boxes.

7. *Tray/Container Transfer Room*
Miscellaneous secondary waste will be stored in this room until it is removed for disposal. Typical containers include 55-gallon drums, plastic bags, and boxes.

8. *A**gent N**eutralization S**ystem (ANS)** Room*
Miscellaneous secondary waste will be stored in this room until it is removed for disposal. The room may also used to store spent decon solution (SDS) on a contingency basis. Typical containers include IBCs, 55-gallon drums, plastic bags, and boxes.

9. *M**otor** P**acking** R**oom (MPR)***
Separated rocket motors will be stored in this room prior to their ultimate disposal. In addition to the rocket motors, empty warhead shipping and firing tubes (SFTs) will also be stored here. Typical containers include Department of Transportation (DOT)-approved shipping boxes.

10. *M**otor** S**hipping** R**oom (MSR)**/Covered Loading Area*
Separated rocket motors will be stored in this room prior to their ultimate disposal. In addition to the rocket motors, empty warhead SFTs will also be stored here. Typical containers include DOT-approved shipping boxes.

11. *Box Storage Area*
Separated rocket motors will be stored in this room prior to their ultimate disposal. In addition to the rocket motors, empty warhead SFTs will also be stored here. Typical containers include DOT-approved shipping boxes.

c. *SPB Area*
Miscellaneous secondary waste will be stored in this area until it is removed for disposal. Typical containers include rolloff bins, 55-gallon drums, plastic bags, and boxes.

d. *Waste Storage Area*
Various liquid and solid hazardous wastes will be stored in this area until it is shipped off site for disposal. Typical containers include rolloff bins and 55-gallon drums.

e. *Laboratory Waste Handling Area*
Various liquid and solid hazardous waste generated from lab operations. Typical containers include IBCs and 55-gallon drums.

5. Hazardous Waste Tank Storage Areas
Several tank systems within BGCAPP will be permitted for storage of hazardous wastes. These areas are located outside, within the MDB, and within the SPB. These tank systems will be designed, constructed, and operated in accordance with all applicable standards of 401 KAR 38:005, 401 KAR 34:190 and 401 KAR 38:160.

Table 5-2 shows areas within BGCAPP to be permitted for storage of hazardous wastes in tanks.

6. *Hazardous Waste Treatment Units*

Numerous hazardous waste treatment units will be used to destroy the chemical weapons stockpile at BGCAPP. All the units will be installed during the RD&D program, although the PMD machine will only be used to process the mustard 155-mm projectiles which are not the subject of this RD&D Permit Application. Each hazardous waste treatment unit will be designed, constructed, and operated in accordance with the applicable standards from 401 KAR Chapter 34 (Standards for Owners and Operators of Hazardous Waste Storage, Treatment and Disposal Facilities). Table 5-3 describes the hazardous waste treatment units as well as the applicable sections of Chapter 34.

See Attachment 4 for the process description of these treatment units. Materials of construction and dimensions of miscellaneous treatment units will be provided to KDEP in sufficient time before the start of construction of the miscellaneous treatment units to allow full evaluation of their adequacy.

Table 5-2—Tank System Regulatory Standards

Hazardous Waste Tank Systems	Tank System Regulatory Standard
Tank **Systems** within MDB:	
Agent **Collection**/**Toxic Storage (ACS)**	401 KAR 34:190 (Tanks)
Spent Decon System (SDS)	**401 KAR 34:190 (Tanks)**
Agent Neutralization System (ANS)	**401 KAR 34:190 (Tanks)**
Energetic Neutralization System (ENS)	**401 KAR 34:190 (Tanks)**
Hydrolysate Storage Area (HSA)	**401 KAR 34:190 (Tanks)**
SCWO Tank Area (STA)	**401 KAR 34:190 (Tanks)**

Table 5-3—Miscellaneous Treatment Unit Regulatory Standards

Hazardous Waste Treatment Unit	Applicable Standard
Munitions demilitarization building (MDB):	
Rocket cutting machine system (RCM)	401 KAR 34:250 (Miscellaneous Units - Mechanical
Rocket shear machine (RSM) system	401 KAR 34:250 (Miscellaneous Units - Mechanical)
Projectile/mortar disassembly (PMD) system	401 KAR 34:250 (Miscellaneous Units - Mechanical)
Energetics batch hydrolyzer (EBH)	401 KAR 34:250 (Miscellaneous Units - Other)
Munition washout system (MWS)	401 KAR 34:250 (Miscellaneous Units - Mechanical)
Metal parts treaters (MPTs)	401 KAR 34:250 (Miscellaneous Units - Thermal)
Nose closure removal system (NCRS)	401 KAR 34:250 (Miscellaneous Units - Mechanical)
SCWO processing building (SPB):	
SCWO units	401 KAR 34:250 (Miscellaneous Units - Other)
RO system	401 KAR 34:250 (Miscellaneous Units - Other)
Aluminum precipitation and filtration system	**401 KAR 34:250 (Miscellaneous Units - Other)**

401 KAR 38:230 Section 1 (4): Effectiveness of Treatment

See Attachment 4, Section 4.1, for a discussion of the National Research Council (NRC) Reports, which evaluated the various technologies and identified neutralization by hydrolysis to be an effective and safe method for treating the chemical agent and the energetics that are stored at BGAD. The NRC reports are prepared by committees selected for their experience and knowledge of the subject matter being evaluated. The reports are very heavily peer-reviewed prior to publication. All reports identified in Attachment 4, Table 4-1 (as well as numerous other reports), have identified neutralization followed by supercritical water oxidation (SCWO) as the appropriate treatment technology for BGCAPP.

In addition:

1. Mustard agent **was** successfully treated by hot water hydrolysis (the process that will be used at BGCAPP) at the Aberdeen Chemical Agent Disposal Facility (ABCDF). ABCDF operation **has been completed and the facility has completed closure activities**.
2. VX is being successfully treated at the Newport Chemical Agent Disposal Facility (NECDF), which is currently on line and will have completed operation before the start of the BGCAPP RD&D program.

401 KAR 38:230 Section 1 (5): Air Emissions, Additional Information

All sources of agent emissions are contained in the MDB and pass through the MDB HVAC filter system, which is described in Attachment 6, Section 6.1.3. As indicated, the MDB HVAC filter system is the same one that is used or planned at all of the chemical demilitarization facilities. It has performed satisfactorily at all active facilities.

401 KAR 34:190 and 401 KAR 38:160: Tank Systems

This section presents additional information on the tank systems. Part A of this application lists the tanks and their aggregate volumes. All tanks are maintained at essentially ambient pressure and temperature. All agent and agent-contaminated storage tanks are kept inside the MDB and are vented to the MDB HVAC filter system.

401 KAR 34:190 Section 3(1): Assessment of New Tank System's Integrity

The assessment of adequacy of the design will be submitted to KDEP before the start of construction of the tanks for their review. No underground storage tanks will be used for hazardous wastes. All tanks storing hazardous waste at the BGCAPP are located above ground.

401 KAR 34:190 Section 3: Description of Tank System Installation and Testing Plans and Procedures

An independent, qualified installation inspector or an independent, qualified registered professional engineer will inspect each new tank system prior to placing a new tank system in service. Inspection will include evaluation of the following items:

1. Welds to ensure the absence of breaks

2. Integrity to ensure the absence of punctures and cracks

3. Integrity of the protective coatings to ensure that it has not been scraped through or otherwise removed in locations

4. Lack of corrosion

5. Other structural damage or inadequate construction/installation.

All discrepancies will be repaired by appropriate methods. The tank will not be placed into service until it has passed all appropriate inspections.

All tanks and ancillary equipment will be tested for tightness to liquid and vapor as appropriate before being placed in use. All discrepancies will be repaired by appropriate methods. The tank will not be placed into service until it has passed all appropriate inspections.

Ancillary equipment will be supported and protected against physical damage and excessive stress due to settlement, vibration, expansion, or contraction.

401 KAR 38:160 Section 2: Dimensions and Capacity of Each Tank

The capacity and number of tanks is specified in the Part A permit application. The tank dimensions will be submitted to KDEP as part of the Tank Assessment Report prior to the start of tank construction.

1. *Description of Feed Systems, Safety Cutoff, Bypass Systems, and Pressure Controls*
   This information will be submitted to KDEP 24 months prior to the receipt of hazardous waste as specified in the BGCAPP RD&D Permit KY8-213-820-105, Appendix B.

2. *Diagram of Piping, Instrumentation, and Process Flow*
   The P&IDs will be submitted to KDEP 24 months prior to the receipt of hazardous waste as specified in the BGCAPP RD&D Permit KY8-213-820-105, Appendix B.

401 KAR 34:190 Section 4: Containment and Detection of Releases

1. *Plans and Description of Design, Construction, and Operation of Secondary Containment System*
   This information will be provided in sufficient time to KDEP before the start of construction to allow full evaluation of their adequacy.

401 KAR 34:190 Section 4(4)&(5): Requirements for External Liner, Vault, Double-Walled Tank or Equivalent Device

1. *External liner system.*
   The external liner (secondary containment) system will be sized to contain as a minimum 100 percent of the capacity of the largest tank within its boundary. The containment will also be sufficient size to contain precipitation from a 25-year, 24-hour rainfall (5.3 in). The containment will be

   a. Free of cracks or gaps

   b. System surrounds the tank completely and covers all surrounding soil likely to come in contact with the wastes if they were released from the tank(s)

The calculations will be provided in the Tank Assessment Report to KDEP in sufficient time before the start of construction to allow full evaluation of the containment's adequacy.

2. *Vault system.*
Vaults are not used in the BGCAPP.

3. Double-walled tank.
Double-walled tanks are not used in the BGCAPP.

401 KAR 34:190 Section 4(6): Secondary Containment and Leak Detection Requirements for Ancillary Equipment

All piping and fittings are either above ground and will be visually inspected for leaks daily or will be equipped with leak detection. All piping and fittings containing agent or agent-contaminated liquids are located in the MDB, which is subject to engineering control of liquids and monitored for agent vapor.

401 KAR 34:190 Sections 5 and 6: Controls and Practices to Prevent Spills and Overflows

This information will be provided to KDEP in sufficient time before the start of construction to allow full evaluation of the system's adequacy.

Attachment 6 Contents

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Attachment 6 Facility Construction and Operation

This attachment describes the facility and how it is to be built. The equipment and its operation are described in Attachment 4. Section 6.1 describes the buildings and structures and the plant subsystems that constitute the complete facility. Section 6.2 describes the subsystems (e.g., the air pollution control systems) that capture contaminants that might be released from the processing equipment and from activities within the buildings. Comparatively few of the buildings, structures, and systems store or treat hazardous waste, and only those so identified are subject to regulation under this research, development, and demonstration (RD&D) permit. Sections 6.3 through 6.4 describe the construction required to build the facilities that will be used for the RD&D program. Section 6.5 describes the RD&D program itself.

6.1 Facility Description

Most of the buildings that constitute the Blue Grass Chemical Agent Destruction Pilot Plant (BGCAPP) are support structures that do not handle or contain hazardous wastes and are not subject to regulation by the Kentucky Department for Environmental Protection (KDEP). The buildings that do store and/or treat hazardous waste are designed to provide maximum protection to human health and the environment. Figure 6-1[1] shows the BGCAPP building layout.

6.1.1 Building and Structure Definitions

6.1.1.1 Pre-engineered Metal Building

A metal building consisting of prefabricated steel columns and trusses will be erected at the site. This building is covered with composite sheet metal siding (insulation sandwiched between inner and outer sheet metal) and is prepainted to color and coating requirements. No architectural finishes, process, utility systems, or equipment are preinstalled.

6.1.1.2 Modular Buildings

These metal- and wood-framed buildings are of various lengths and widths that can be connected together on site. They are fabricated of sheet metal or aluminum siding for the exterior, and metal or wood studs with either gypsum board or paneling on the interior. To the maximum extent possible, all architectural finishes, process and utility systems, and some equipment will be preinstalled.

6.1.1.3 Field Fabrication

Various construction materials and pre-engineered bulk commodities are used to the maximum extent possible; however, some field fabrication is required. All architectural finishes, process, utility systems, and equipment are erected in place.

6.1.2 Buildings and Structures Containing Hazardous Waste Management Units

6.1.2.1 Container Handling Building (CHB)

1. **Description:** Permitted CHB used to store munitions received from storage igloos.
2. **Method of Construction:** Pre-engineered metal building.

[1] Figures and tables are presented at the end of this attachment.

3. **Major Equipment:** Enhanced onsite containers (EONCs)

6.1.2.2 Munitions Demilitarization Building (MDB)

1. **Description:** Pre-engineered building shell with an inner, field-fabricated reinforced concrete building that contains explosive containment rooms (ECRs).

2. **Method of Construction:** Field Fabrication

3. **Major Equipment:**

   a. Rocket cutting machine (RCM)

   b. Rocket shear machine (RSM)

   c. Metal parts treater (MPT)

   d. Energetics batch hydrolyzer (EBH)

   e. Agent neutralization system (ANS)

   f. Energetics neutralization system (ENS)

   g. Projectile mortar disassembly machine (PMD)

   h. Munition washout system (MWS)

   i. Offgas treatment units (OTE and OTM)

   j. Material handling systems and components

   k. Blast gates and doors

   l. Agent monitoring system

6.1.2.3 SCWO Processing Building (SPB)

1. **Description:** Pre-engineered building. SCWO chemical storage tanks.

2. **Method of Construction:** Pre-engineered metal building.

3. **Major Equipment:**

   a. SCWO units

   b. Reverse osmosis (RO) system

   c. Chemical storage tanks

   d. Recycled water storage

   e. Aluminum Removal System

6.1.2.4 Hydrolysate Storage Tanks Area

1. **Description:** Large carbon steel tanks and liquid transfer equipment for the agent and energetics hydrolysate from the MDB. Serves as buffer storage for processing hydrolysate feeds to the SPB.

2. **Method of Construction:** Field fabrication.

3. **Major Equipment:**

    a. Agent and energetic hydrolysate storage tanks

    b. Transfer pumps and ancillary piping systems

6.1.3 MDB Cascade HVAC System Description

The heating, ventilation, and air conditioning (HVAC) system of the MDB is one of the most important systems at the BGCAPP. Proper operation of the HVAC system is required to maintain the negative pressure within the MDB while providing heating and air conditioning for toxic and nontoxic areas.

The cascade HVAC system serves a fourfold purpose:

1. Maintain a negative pressure environment in the MDB.

2. Maintain the flow of air from areas of low contamination probability to areas of higher contamination probability.

3. Remove agent from the air prior to discharge to the atmosphere.

4. Provide for human comfort.

The primary means of preventing the release or spread of contamination is through the use of cascaded pressure control. **The control room is maintained at a positive atmospheric pressure.** Toxic areas are maintained at a negative atmospheric pressure. This arrangement ensures a flow of air from the areas with the least agent contamination to the areas with the most contamination in the MDB and ensures containment within the MDB.

The amount of air changed in each room is higher for areas likely to be contaminated. This minimizes the spread of contamination and maintains the toxic boundaries. Air flow is controlled by modulating the supply air into the building, by modulating the exhaust flow of air out of the building, and by setting weighted dampers throughout the building.

Each room in the MDB has a designated category rating of A, B, C, D, or E based on the potential for agent contamination:

Room Category	Description
A	Routinely contaminated by either agent liquid or vapor
B	High probability of agent vapor contamination resulting from routine operations
C	Low probability of agent vapor contamination
D	Very low probability of ever being contaminated by agent
E	Maintained at positive atmospheric pressure at all times to prevent contamination by agent

Only rooms with Category A, B, or C ratings are maintained under a continuous negative pressure by the HVAC system.

All process components that involve agent or agent-contaminated materials are contained in the MDB, which is vented into HVAC filters that process all air drawn by the HVAC system. It is described here to support the assertion that the RD&D will be performed in a manner that is protective of human health and the environment.

The HVAC system controls any contaminants that might be released from the process whether as a point source or as a fugitive emission. Each filter unit consists of the following stages:

1. A row of prefilters, which remove the larger particulate matter
2. A row of high-efficiency particulate air (HEPA) filters, which remove very fine particulate matter
3. Six rows of carbon filters, which remove agent and other gaseous contaminants such as organic vapors
4. A final row of HEPA filters, which capture any particulate that may be released from the carbon filters

Figure 6-2 shows the typical configuration of a HVAC filter unit. Process Flow Diagrams (PFDs) 24915-08-M5-HVAC-00001 and -00002 in Appendix C show the process flow of the HVAC filter.

6.1.4 Buildings and Structures not Containing Hazardous Waste Management Units

6.1.4.1 Access Control Building (ACB)

The ACB is a freestanding building that will be located at the entrance of the Blue Grass Army Depot (BGAD) and will be used to control access to the BGAD.

1. **Description**: Facility size and shape will depend on outcome of security requirement talks with BGAD and recent code changes for installations.
2. **Method of Construction**: Modular or field fabricated (decision pending).
3. **Major Equipment**: Standby diesel generator (SDG).

6.1.4.2 Badging Facility

1. **Description**: Houses security personnel who issue badges for site access.
2. **Method of Construction**: Prefabricated modular building.
3. **Major Equipment:** None.

6.1.4.3 Control and Support Building (CSB) and Integrated Control System (ICS)

1. **Description:** Control room and ICS used to operate BGCAPP, some storage and change facility, and breathing air auxiliary systems and demilitarization protective ensemble (DPE) storage. The ICS includes all of the programming, graphics, wiring, and devices located throughout BGCAPP for the facility control system (FCS) and facility protection system (FPS).
2. **Method of Construction:** Pre-engineered metal building included as part of the MDB separated by an accessway.
3. **Major Equipment:** Control room, consoles, cabinets.

6.1.4.4 Entry Control Facility (ECF)

1. **Description:** Provides access to the new BGCAPP chemical limited area (CLA).
2. **Method of Construction:** Modular.
3. **Major Equipment:** Standby diesel generator (SDG).

6.1.4.5 Gas Mask Storage Building (GSB)

1. **Description:** Modular building with no major systems or equipment. Its only requirement is to store gas masks within their storage requirements. Lighting and lockers are the only other known requirements.
2. **Method of Construction:** Modular building.
3. **Major Equipment:** None.

6.1.4.6 Modular Laboratory (LAB)

1. **Description:** Modular building used to house shift lab personnel and to conduct procedures to support the neutralization operations and documentation requirements.
2. **Method of Construction:** Modular building.
3. **Major Equipment:** Laboratory instrumentation and hoods.

6.1.4.7 LAB Filter Area (LFA)

1. **Description:** Activated carbon filters to control emissions from laboratory hoods.
2. **Method of Construction:** Field fabricated.
3. **Major Equipment:** HVAC filter system.

6.1.4.8 Maintenance Building (MB)

1. **Description:** Pre-engineered building with utility system. It is expected to house a shop area, tool crib, and a supply of operational material and spares. The maintenance shop has areas for welding, small metal fabrication, conduit bending, tool storage, and maintenance consumables and flammable material storage.
2. **Method of Construction:** Pre-engineered metal building.
3. **Major Equipment:** None.

6.1.4.9 Personnel Maintenance Building (PMB)

1. **Description:** Baseline facility expected to be a pre-engineered building with only utility systems being supplied. It will house the medical facilities, personnel lockers, showers, lunchroom, and equipment required to support operations. It will also house Treaty inspectors.
2. **Method of Construction:** Pre-engineered metal building.
3. **Major Equipment:** None.

6.1.4.10 Personnel Support Building (PSB)

1. **Description:** Modular building with utility systems being supplied. Its primary purpose is to house operation, maintenance, and engineering employees that support the daily activities of the plant.
2. **Method of Construction:** Modular building.
3. **Major Equipment:** None.

6.1.4.11 Standby Diesel Generators (SDGs)[2]

1. **Description:** Diesel-fueled electrical power generators.
2. **Method of Construction:** Modular.
3. **Major Equipment:** SDGs.

6.1.4.12 Substation (SUB)

1. **Description:** An outdoor electrical switchyard constructed on the installation will furnish power to the site.
2. **Method of Construction:** Modular.
3. **Major Equipment:** Switchgear and transformers.

6.1.4.13 Utility Building (UB)

1. **Description:** Pre-engineered steel framed structure with composite siding and a roof deck over slab on grade. Houses plant utility systems and local control panels.
2. **Method of Construction:** Pre-engineered metal building.
3. **Major Equipment:**
   a. Package boilers and related auxiliary systems[2].
   b. Compressors.
   c. Chillers.
   d. Motor control centers (MCCs).

6.1.4.14 Bulk Chemical Storage (BCS)

The BCS will provide tank storage for the following chemicals:

1. Sulfuric acid (H_2SO_4)
2. Sodium hypochlorite (NaOCl)
3. Sodium hydroxide (NaOH)
4. Phosphoric acid (H_3PO_4)

[2] **The SDGs and the process boilers are permitted under the BGCAPP Title V Air Permit**

5. Isopropyl alcohol (C_3H_8O)

6. Liquid nitrogen

6.1.4.15 Temporary Construction Facilities

During construction, systemization, and possibly during pilot testing, the following temporary facilities will be provided to effectively manage and perform the construction of BGCAPP:

1. Field offices (trailers)
2. Warehouses – storage handling
3. Change houses
4. Fabrication shops
5. Welder's test shop
6. First aid trailer
7. Temporary toilet facilities

6.1.4.16 Toxic Chemical Maintenance Building (TCM)

1. **Description: The TCM is an existing BGCA building, which was originally intended as a repair facility for chemical weapons; however, it was never used for this purpose. It will be used only as a personnel service building. It contains a small medical area, lockers, showers, break rooms, and related facilities. It is located outside of the CLA. No hazardous waste, including energetics, agent or agent-contaminated materials, will be stored or processed in the TCM.**
2. **Method of Construction: Existing structure**.
3. **Major Equipment:** None.

6.1.4.17 Vehicle Support Facility (VSF)

1. **Description: The building will be used to service vehicles and contains an area for performing maintenance activities for uncontaminated equipment. On rare occasions, decontaminated equipment from the BGCAPP may be brought to the VSF for repair. The building is expected to house a shop area, tool crib, and a supply of operational material and spares. It includes a maintenance shop that has areas for welding, small metal fabrication, instrument calibration, tool storage, and storage space for maintenance consumables. The VSF is a metal framed structure on a concrete slab. It is located inside of the CLA. No hazardous waste, including energetics, agent or agent-contaminated materials, will be stored or processed in the VSF.**

2. **Method of Construction: Field fabricated.**

3. **Major Equipment: None**

6.1.5 Plant Systems and Subsystems not Containing Hazardous Waste Management Units

The following systems are an integral part of the plant, but they **do not contain any hazardous waste management units.** They are included here only to provide a complete description of the construction of the facility.

1. Process water system
2. Cooling water system
3. Compressed air and nitrogen
   a. Instrument air system
   b. Plant air system
   c. Life support air system
   d. Nitrogen supply system
4. Fire protection systems:
   a. Wet and/or dry pipe sprinkler system, through all permanent buildings
   b. Dry chemical system
   c. ECR deluge fire system
   d. CSB fire extinguishing medium (FEM) (inert gas) fire protection system
5. Fire detection systems for the following buildings:
   a. MDB
   b. UB
   c. SPB
   d. CHB
   e. LAB
   f. PMB
   g. CSB
   h. PSB
   i. ECF
6. Site communication systems (site communication meets all requirements of 401 KAR 34:020)
   a. Site public address (PA) and paging system
   b. Closed circuit television (CCTV) system

   c. Site radio system
   d. Agent alarm lights
7. Process steam supply system
8. Site utilities (above- and underground)
9. Intrusion prevention system
   a. CCTV system
   b. Motion detectors

6.2 Construction Sequence

The construction sequence is described in the following two subsections.

6.2.1 Site Preparation

Prior to the start of construction of the BGCAPP, the site will be prepared by performing the following activities:

1. Install the outer perimeter security fence, which will include any silt control as specified by the Soil and Erosion Control Plan.
2. Clear and grub the site, and prepare the laydown areas surrounding the facility (including roads).
3. Bring the site to the proper grade and establish drainage.
4. Install the temporary construction roads, using the permanent plant road subgrade and base course, wherever possible.
5. Excavate and install the sediment retention basins.
6. Install the storm drain system.

Dust control procedures will be implemented immediately upon site occupancy. Water trucks with water monitors will be used as necessary to control dust during construction. These trucks or similar equipment will also be used during site preparation for soil compaction activities.

6.2.2 Construction Sequence

The precise construction sequence will depend on funding availability and on the conditions that may be encountered during construction. However, the following tentative construction sequence is presented for information:

1. Access road and parking lot (ARP)
2. Site Plan (SP)
3. Access control building (ACB)
3. Site utility systems underground (U/G)

4. Badging facility
5. Munitions demilitarization building (MDB)[3]
6. Maintenance building (MB)
7. Control and support building (CSB)
8. Electrical substation (SS)
9. Utility block/building (UBK)
10. MDB filter area (FIL)
11. Site utility systems – above ground (A/G)
12. Lab filter area (LFA)
13. Integrated process and facility control system (ICS)
14. Modular laboratory (LAB)
15. Container handling building (CHB)[3]
16. SCWO processing building (SPB)[3]
17. Hydrolysate storage area (HSA)[3]
18. Entry control facility (ECF)
19. Personnel and maintenance building (PMB)
20. Standby diesel generators (SDGs)
21. Personnel support building (PSB)
22. Electronic security system (ESS)
23. Toxic maintenance building (TMB)
24. Gas mask storage building (GSB)

6.2.3 Environmental Compliance During Construction

The environmental safety and health (E&SH) construction safety plan includes specific details relating to compliance with federal, state, and BGAD environmental regulations. BGCAPP will comply with the requirements of the permits as applicable to the construction portion of the project. This portion of the E&SH plan addresses the following issues:

1. Uncontaminated construction waste, including:
    a. Packing material
    b. Machinery components

[3] Hazardous waste management units. The RD&D Permit is required prior to the start of construction of the Hazardous Waste Management Units. The remainder of the items are listed for completeness only.

    c. General household waste
    d. Landscape waste
    e. Construction or demolition debris
2. Hazardous waste, including:
    a. Waste lubricating oil, motor fuel, hydraulic oils, and cutting oils
    b. Cleaning solvents such as those used by pipefitters, millwrights, and electricians
    c. Paint wastes (water- or oil-based) such as rags, slops, sludge, paint solvents, paint and varnish removers and strippers, and paint cans containing paint residue
3. Use, storage, transportation, and disposal of hazardous materials and hazardous wastes will comply with BGAD, state, and federal requirements
4. Chemical handling requirements will comply with all federal, state, and BGAD requirements
5. Stormwater runoff control will comply with the terms of the project's Stormwater Management Plan

6.3 Independent Facilities Construction Certification

During construction, a Professional Engineer (P.E.) licensed in Kentucky will be present at the facility to verify that the hazardous waste management units are being built in accordance with the facility design. Before pilot testing with hazardous waste begins, a registered professional engineer (licensed in Kentucky) will perform facilities construction certification (FCC) of each KHW-regulated building, area, and system that is directly associated with the hazardous waste management unit. The P.E. will certify that each building and system has been constructed as designed and in accordance with the RD&D permit. The FCC process is required by 401 KAR 38:030 Section 1 (12) (b).

6.4 Systemization

The construction sequence described in Section 6.2 results in the individual subsystems being completed in a staged manner. As a subsystem is completed, it will be turned over to the Systemization Group who will test its mechanical ability, liquid and gas containment integrity, and numerous other functions. No chemical agent or any agent-contaminated materials will be processed during systemization. The systemization will be conducted using simulant and surrogate materials in all cases. Although the systemization phase of the program **does not involve the processing of hazardous waste**, it **is** the first part of the overall on-site RD&D program. Its RD&D objective is to assess the system's overall ability to function as an integrated unit and to identify problems in the interfaces between the subsystems.

6.5 Performance of the RD&D Program – Pilot Testing

After all of the subsystems have been subjected to rigorous testing under the Systemization program and the results of systemization have been deemed acceptable by Army, Assembled Chemical Weapons Alternatives (ACWA), and Bechtel Parsons Blue Grass (BPBG), the program will move into the second on-site phase of the RD&D program, termed "pilot testing."

Pilot testing starts by processing the munitions at very slow rates, and a large amount of testing and verification takes place during the processing.

Pilot testing will begin with the processing of GB rockets and projectiles at the rates shown in Table 6-1. Treatment of the GB ton containers (TCs) is not shown in Table 6-1 because they are one-of-a-kind items that may **either** be processed during RD&D **or during subsequent operations under the Part B permit**. It is anticipated that testing with the GB inventory will meet the system integration objectives of the RD&D program. The bases for this conclusion are as follows:

1. All of the components of the BGCAPP, except the projectile/mortar disassembly (PMD) machine, are tested during the RD&D program. The PMD to be used is a derivative of the PMD design that has been successfully used at the Johnston Atoll Chemical Agent Disposal System (JACADS) and the Tooele Chemical Agent Disposal Facility (TOCDF). The PMD machine may be installed during construction for ease of installation along with the other equipment, which will be needed for the RD&D program.

2. The Aberdeen Chemical Agent Disposal Facility (ABCDF) and the Newport Chemical Agent Disposal Facility (NECDF) will have completed operations on mustard and VX, respectively, by the time the BGCAPP operations phase starts; therefore, an RD&D program should not be required for these agents.

Table 6-1 shows that, during the RD&D program, munitions processing will begin slowly. As the system is validated and issues are identified and resolved, the processing rates will increase over a period of approximately 5 months. The 5-month period is based on an assumption that no major problems arise. But the program schedule is designed to allow sufficient time to identify and overcome problems. If problems arise during the RD&D period, the RD&D program may require the full 1-year period allowed by the RD&D regulations that is being requested in this permit application. The RD&D program will end when the BGCAPP is operating at its full daily throughput rate and it has been determined that sufficient data is available to allow full-scale treatment of the remainder of the BGAD inventory.

6.5.1 Purpose and Objectives of RD&D Program

The EPA RD&D Guidance (EPA *Guidance Manual for Research, Development, and Demonstration Permit Units Under 40 CFR Section 270-65*, EPA/530-SW-86-008, July 1986), Section 4-1, advises the applicant to consider eight questions, as applicable, as a basis for preparing the application. Table 6-2 lists the eight questions and cites the sections of the RD&D permit application where they are addressed.

The objectives of the RD&D program are listed in Attachment 4, Section 4.1. The following subsections present additional details, including the justification for conducting the RD&D with hazardous waste, the measurements and observations used to determine success, safety and environmental considerations, and the success criteria that will be used to evaluate the results at each ramp-up rate.

6.5.1.1 System Integration

Conduct a thorough program of system integration including the conveyance of munitions and munition segments from one part of the treatment train to the next up to and including the release of the munition parts from the MDB.

System integration has two components:

1. Ability of the equipment to function as one unit with the actual wastes.
2. Maximizing the operators' proficiency under safe operating conditions.

Optimizing the proficiency of the operators under carefully controlled and supervised conditions has traditionally not been considered as RD&D. However, such human factors research is essential to maximize safety and protect the environment; hence it has been made an important component of the RD&D process.

Before hazardous waste (agent) operations begin, the operators are thoroughly trained in their duties and responsibilities through coursework, simulations, and actual hands-on experience with simulated munitions. However, it must be recognized that handling and processing actual munitions can only be fully addressed by a slow and deliberate process in which the operators handle the munitions at initially very low rates and under the direct supervision of management and system engineers on the day shift. As the operators gain experience, the processing rates are increased in accordance with the ramp-up schedule in Table 6-1. Simulated equipment training hardware (SETH) munitions are constructed to have physical dimensions that are similar to the actual munitions, but they do not contain the chemical agent and energetics. Only operations conducted with actual munitions can provide the required operator experience and proficiency to verify that the process fully addresses human factors and, therefore, minimizes risk to human health and to the environment.

To take advantage of the increased management oversight available during the day shift, initial munition operations will occur on the day shift only. Night shift activities will concentrate on preventive and corrective maintenance activities, monitoring the EBH neutralization process and prestaging of munitions for the next day of operations. The step changes in processing rates are typically scheduled in 4-week intervals to ensure that each of the four rotating operations shifts have an opportunity to process munitions on day shift. The step change in rate also factors in a logical progression to allow operator proficiency. The RD&D with agent munitions is required because of the differences experienced when processing actual munitions as compared to the simulated munitions used in systemization.

1. **Justification for Conducting with Hazardous Waste:** To establish successful system integration, all BGCAPP subsystems must operate as an integrated facility. This requires that the processing include agent, agent hydrolysate, energetics, energetics hydrolysate, munition components, dunnage, and secondary waste. Appropriate development of this process integration requires the processing of real munitions that are unique to BGAD.

2. **Measurements and Observations Required:** Process integration is considered to be achieved when the process successfully operates at the peak munitions processing rate as described in Table 6-1. Process integration is the overarching objective: it describes the process' ability to achieve the necessary results when operating as a unit and when treating the actual hazardous wastes at the peak processing rate. The criteria that are required to assess and demonstrate the integrated process are discussed in Sections 6.5.1.2 through 6.5.1.7.

3. **Safety and Environmental:** Maximum safety and environmental protection is achieved by performing this verification at an initially very slow rate during weeks 1 through 4 and increasing the processing rate as information is gathered. This slow ramp-up ensures adequate time to properly evaluate the agent and energetic destruction results and to verify the operators' knowledge and performance to ensure safe operation. Plant operating rates are progressively increased at the nominal rates shown in Table 6-1.

4. **Success Criteria:** Process integration is considered to be successful at each ramp-up rate when all operators are assessed to be proficient at their functions, and all exit streams meet the safety and environmental requirements as discussed in the following subsections.

6.5.1.2 Demonstrate 99.9999% Destruction Efficiency for GB

Demonstrate that 99.9999% destruction efficiency can be achieved for GB agent in the agent neutralization reactors (ANRs) as required by KRS 224.50-13 and 401 KAR 34:350.

1. **Justification for Conducting Operations with Hazardous Waste:** Agent hydrolysis has been demonstrated to achieve the requisite 99.9999% destruction efficiency for GB in the previous testing conducted by the Program Manager, Assembled Chemical Weapons Assessment (PM ACWA). Agent destruction at BGCAPP must be demonstrated using the BGCAPP equipment with the BGAD munitions as required by KRS 224.50-130(3)(a). This cannot be demonstrated without conducting tests with hazardous waste.
2. **Measurements and Observations Required:** Before GB is processed in the agent neutralization reactor (ANR), the GB drained from the munitions is stored in the ACS until a sufficient quantity of agent has been accumulated. The agent is transferred to an ANR, where it is hydrolyzed; the hydrolysate is analyzed for GB. The destruction efficiency is calculated using the equation presented in Attachment 10, Section 10.1. The number of ANS batches to be tested in this way is established as specified by the test plan, which will be submitted in accordance with the BGCAPP's compliance schedule.
3. **Safety and Environmental:** The ANRs are batch reactors that contain the agent. The ANR's contents are not released from the MDB until the analytical results demonstrate that the target release level has been met. The ANR vents to the MPT offgas treatment system (OTM) and then to the MDB HVAC filter system before release to the atmosphere. These multiple layers of protection provide a high degree of safety and protection of the environment. A slow start of operation (as specified in the test plan) maximizes personnel safety and protection of the environment by minimizing the amount of agent in process while the initial batch of agent is neutralized.
4. **Success Criteria:** The **process** meets the 99.9999% destruction efficiency as specified in Attachment 10, Section 10.1.

6.5.1.3 Demonstrate EBH's Ability to Treat Rocket Energetics

Demonstrate that the rocket energetics can be treated in the EBHs and the energetics neutralization system (ENS).

1. **Justification for Conducting with Hazardous Waste:** EBH performance has been demonstrated to achieve this objective using M61 rockets pieces with energetics during the technical risk reduction program (TRRP) for the EBH. The test also demonstrated that the hydrogen (H_2) levels could be maintained below 25% of the lower flammability limit (LFL). Although energetics neutralization has been demonstrated, it is necessary to verify and demonstrate these results with the BGCAPP equipment and BGAD munitions. This involves system integration and includes the transfer of the rocket warhead segments from the RSM to the EBHs and the transfer of the treated EBH solid residue from the EBH to the MPT. This objective can only be validated by treating agent-contaminated energetic-components from the BGAD stockpile. This verification must be completed on all installed EBHs.

2. **Measurements and Observations Required:** The hydrogen (H_2) gas concentration must be monitored in the EBHs' vent gases to ensure that H_2 gas concentration is below 25% of the LFL. The EBH and vent gas system will demonstrate their ability to handle the increase in hydrogen generation at each processing rate in the ramp-up schedule.

   Hydrolysate leaving each EBH batch goes to the ENRs for further treatment. The solids leaving the EBHs go to the MPT. No specific measurements are made on the EBH solid residue except for observing that the mechanical equipment is operating properly under agent munition operations. The energetics hydrolysate is sampled in the ENR to verify successful treatment.

3. **Safety and Environmental:** Maximum safety and environmental protection is achieved by verifying the system performance at a slow rate during weeks 1 through 4 and progressively increasing the processing rate as the performance objectives are met. This slow ramp-up ensures adequate time to verify that the energetics are hydrolyzed and the agent concentration meets the required target release level to transfer the hydrolysate to the HSA. The rocket feed rate is increased in accordance with the nominal feed rates as shown in Table 6-1.

4. **Success Criteria:**

   a. Hydrogen monitoring system works as designed at all rocket ramp-up processing rates on each EBH.

   b. EBH solids transfer system to the MPT works as the rocket feed rates increase.

   c. Hydrolysate in the ENR meets the required energetics destruction and the agent target release level.

   d. OTE can handle the vent gas from the EBH trains at each of the ramp-up rates.

6.5.1.4 Demonstrate MPT's Ability to Treat Projectiles

Demonstrate that the MPT can thermally treat all projectile bodies in a batch to a minimum of 1,000°F for a minimum of 15 minutes.

1. **Justification for Conducting with Hazardous Waste:** TRRP testing with SETH munitions have demonstrated that the MPT can thermally treat a full tray of projectiles to a minimum of 1,000°F for a minimum of 15 minutes. Thermal treatment in the MPT must be demonstrated to verify the previous results with actual munitions from the BGAD stockpile.

2. **Measurements and Observations Required:** Temperature measurements are performed to confirm the temperature profile previously demonstrated during systemization. The first trays of material are monitored for agent in the discharge airlock to verify that the MPT time and temperature conditions meet or exceed the minimum requirements to process the GB 8-inch projectiles.

3. **Safety and Environmental:** Slow initial operating rates ensure that all material in the MPT achieves the appropriate temperature before it is removed from the MPT. The batch nature of the operation allows the time per batch or the power input to be increased to establish the operating conditions necessary to ensure proper decontamination of the metal. Environmental protection is maintained by discharging the MPT offgas through the **OTM** and then through the MDB HVAC filter system.

4. **Success Criteria:** Verify by temperature measurements of the treated munition bodies that the projectile carcasses in the first trays of material have all been exposed to a minimum of 1,000°F for a minimum of 15 minutes. Further verify the absence of agent residue by testing the air in the discharge airlock for agent.

6.5.1.5 Demonstrate HDC's Ability to Treat Rocket Segments

The heated discharge conveyors (HDCs) have been removed from the BGCAPP design.

6.5.1.6 Demonstrate Performance of SCWO Reactor System

1. **Justification for Conducting with Hazardous Waste:** Tests with the agent and energetic hydrolysates were performed under the PM ACWA engineering design study (EDS) test program. Testing under the RD&D program is required to demonstrate the SCWO treatment of the blended hydrolysate.

   All materials fed to the SCWO have previously been tested for agent and verified to be below the target release level. Processing the hydrolysate ensures that the SCWO effluent meets the expected performance criteria before the water is further treated in the water recovery system (WRS). Because the SCWO performance can be assessed early in the RD&D program, the hydrolysate can either be stored in the HSA or it can continue to be processed through the SCWO units while RD&D continues on the other upstream treatment units.

2. **Measurements and Observations Required:** The operating parameters of the SCWO reactors are monitored to verify that the equipment is performing properly. The SCWO effluent is analyzed for total organic carbon (TOC). The vents from the pressure letdown systems are monitored for carbon monoxide (CO) and total hydrocarbons to establish the criteria that reflect the SCWO's performance.

3. **Safety and Environmental:** SCWO has been demonstrated to have extremely low emissions. According to all available data, the air emissions from the SCWO do not require further treatment prior to release to the environment.

4. **Success Criteria:** These tests are intended to verify the operating parameters such as temperature and pressure that will provide maximum organic constituent destruction and maximize the SCWO's reliability.

6.5.1.7 Characterize and Quantify Emissions from WRS

The brine recovery system has been deleted from the BGCAPP design and therefore there will not be any emissions from the WRS.

6.5.2 Quantities of Waste to be Treated

This section justifies the need for the proposed quantities of waste that are to be treated under this RD&D program. EPA *Guidance Manual for Research, Development, and Demonstration Permit Units under 40 CFR Section 270-65* (EPA/530-SW-86-008, July 1986), page 8, recommends the following limits on the amount of waste that is to be treated under an RD&D permit:

1. Treat a maximum of 15,000 kg of hazardous waste per month for experimental purposes.

2. Store a maximum of 15,000 kg of hazardous waste intended for experimental purposes at any time.

3. Treat a maximum of 400 kg of hazardous waste per hour in any experiment.

Table 6-1 presents the hourly, weekly, and monthly hazardous waste processing rates in the proposed RD&D program. These processing rates are nominal and will be increased only after the success criteria have been achieved as described in Section 6.5.1. The following discussion relates to these three recommendations. Table 6-1 also presents the nominal ramp-up rates (as a percentage of full operation, for the processing of projectiles and rockets.

6.5.2.1 Hourly Operating Rate

The hourly processing rates shown in Table 6-1 are based on the maximum design processing rate for the BGCAPP, which for GB is 20 rockets and 16 projectiles per hour. Each rocket contains a total of 14.3 kg of hazardous waste (chemical agent, propellant, and explosives); each projectile, 6.6 kg. This results in a maximum of (20 x 14.3) + (16 x 6.6) = 391.6 kg/hr. This peak is less than the 400 kg/hr that is allowed by the RD&D guidance.

This is the maximum processing rate for the design during any hour of operation. This value does not correlate to the weekly or monthly operating rates because munitions will not be fed at this rate until week 20, when the nominal throughput (Table 6-1, columns 2 and 3) is increased to 100% because of the feeding of GB projectiles in preparation for the performance test.

6.5.2.2 Quantity of Waste Stored

The Guidance Manual recommends that no more than 15,000 kg of hazardous waste intended for experimental purposes be stored at any one time. The number of munitions to be stored in the BGCAPP at any one time for research will be less than this value. Therefore, the research program does not exceed the storage limitation suggested by the Guidance Manual.

6.5.2.3 Monthly Processing Rates

Table 6-1 also shows the monthly processing rates, which are calculated assuming 4 weeks of operation per month. These values exceed the 15,000 kg recommended by the EPA's Guidance Manual for RD&D. The justification for exceeding the recommended monthly quantity is based on the need to increase the processing rate to the maximum design rate by ramping up in small increments. Section 6.5.1 discusses the rationale for this requirement.

As discussed in Section 6.5.1.1, to safely test the system's integration (including the human factors) at rates approaching the BGCAPP's full operating rate, the hazardous waste must be processed at rates exceeding the 15,000 kg per month.

The hazardous waste (i.e., munitions) processing rates on which Table 6-1 is based are maxima that are based on the assumption that the process integration RD&D will not identify any design issues that require correction. This is an improbable scenario: this RD&D program would not be necessary if it were otherwise. Hence, the most probable scenario will be a slower processing rate than requested.

Regardless of the actual waste processing rates, the RD&D program will not compromise health or the environment. This statement is based on the following design and operating characteristics of the BGCAPP:

1. All agent-related processing is performed in the MDB, which is fully contained by the MDB HVAC filter system. This is a proven system that maintains protection even if an upset or operating anomaly occurs.

2. The MDB HVAC filter system is monitored for agent on a near-real-time basis.

3. Each batch of hydrolysate is tested and found to meet the target release levels for agent before it is transferred to the HSA.

4. The process' ability to achieve 99.9999% destruction efficiency for agent is demonstrated on the first batches of agent processed in the ANR. This initial validation satisfies the requirements of Attachment 10. The testing is performed in accordance with the procedures described in the Test Plan.

In conclusion, the requested processing rates do not pose a risk to health or to the environment, and they are essential to meet the process integration needs of the RD&D program.

6.5.3 Testing Schedule and Criteria for Increasing Processing Rates

Section 6.5.2 explains the reasons for the processing rates proposed for the RD&D program. The explanation is based on the need to demonstrate process integration through research, which is discussed in Section 6.5.1.

The increase in projectile and rocket processing rates will be decided on the basis of all of the applicable success criteria identified in Sections 6.5.1. If all processes are working as designed, all batches of agent and energetics hydrolysate meet their respective target release levels, and all success criteria identified in Section 6.5.1 are satisfied at the given rate, then the munitions processing rate will be increased to the next higher rate.

This cautious approach, which recognizes human factors and provides safeguards at every step, maximizes safety and environmental protection and results in the safe and effective completion of the RD&D program on the chemical agent munitions.

6.6 Operation Subject to Regulation by KHW Part B Permit

During the design and construction phases of the BGCAPP program, the KHW Part B Permit Application will be prepared and submitted to KDEP. These submissions will be made in adequate time to allow KDEP/Division of Waste Management (DWM) to evaluate and approve the KHW Part B before the end of pilot testing.

As shown in Table 6-1, a performance test will be conducted at the conclusion of the RD&D program. This performance test will provide the final validation of the safety and environmental acceptability of the process. After completion of the performance test, operations will continue pending approval of the Part B Permit.

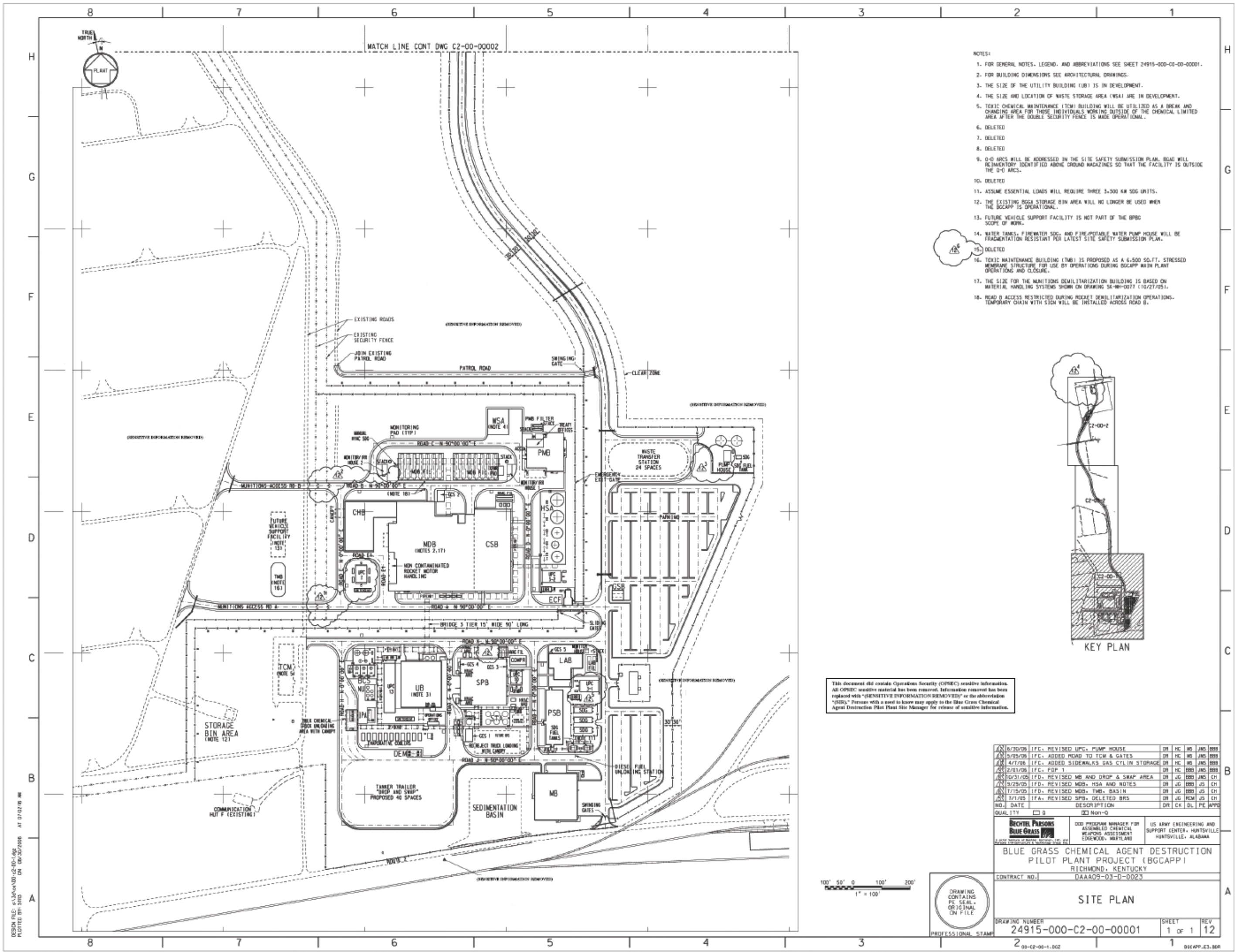
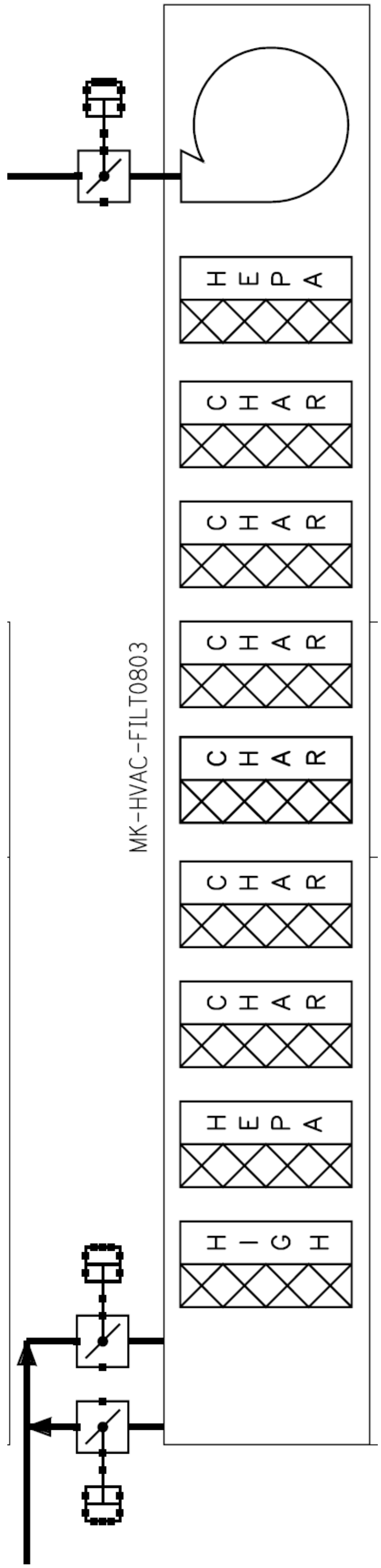


Figure 6-1—BGCAPP Building Layout (R12, 6/30/06)



HIGH – Prefilter
HEPA – HEPA Filter
CHAR – Activated carbon filter

Figure 6-2—MDB HVAC Filter Unit

Table 6-1—BGCAPP Pilot Testing Nominal Feed Rate

Week of RD&D	Nominal Throughput, %[a]		Rounds/Hr[b]		Rounds/Week[a]		Rounds/Month		Hazardous Waste Processed, kg[c]	
	Rockets	Projectiles	Rockets	Projectiles	Rockets	Projectiles	Rockets	Projectiles	Hourly	Monthly
1	1.0	0.0	18	0	18	0			257	
2	2.0	0.0	20	0	36	0			285	
3	4.0	0.0	20	0	72	0			285	
4	4.0	0.0	20	0	72	0	198		285	2,823
5	7.9	0.0	20	0	144	0			285	
6	11.9	0.0	20	0	216	0			285	
7	18.9	0.0	20	0	342	0			285	
8	37.5	0.0	20	0	680	0	1,382		285	19,706
9	37.5	0.0	20	0	680	0			285	
10	37.5	0.0	20	0	680	0			285	
11	37.5	0.0	20	0	680	0			285	
12	50.0	0.0	20	0	907	0	2,947		285	42,022
13	50.0	0.0	20	0	907	0			285	
14	50.0	0.0	20	0	907	0			285	
15	50.0	0.0	20	0	907	0			285	
16	75.0	0.0	20	0	1,360	0	4,081		285	58,192
17	75.0	0.0	20	0	1,360	0			285	
18	75.0	0.0	20	0	1,360	0			285	
19	75.0	0.0	20	0	1,360	0			285	
20	100.0	56.4	20	16	1,814	352	5,894	352	390	86,359
21	100.0	56.4	20	16	1,814	352			390	
22	100.0	56.4	20	16	1,814	352			390	
23	100.0	56.4	20	16	1,814	352			390	
24	100.0	56.4	20	16	1,814	352	7,256	1,408	390	112,726
25	28.6	105.8	20	16	518	660			390	
26[d]	0.0	0.0	0	0	0	0			0	
27-Test[e]	100.0	100.0	20	16	1,814	624			390	
28-Test[e]	100.0	100.2	20	16	1,814	625	4,146	1,909	390	71,675
TOTALS					25,904	3,669	25,904	3,669		393,503

[a] The feed rates shown for the RD&D program are nominal. Actual processing rates will be established on the basis of RD&D.
[b] These are the peak hourly rates that rockets (20/hr) and projectiles (16/hr) can be fed to the system. They do not necessarily correspond to the weekly peak operating rates because the plant can be operating processing agent and/or energetics even though no new munitions are being fed at the time.
[c] Based on 14.3 kg of hazardous waste per rocket and 6.6 kg agent per projectile.
[d] 12-day outage in preparation for performance test.
[e] Test refers to the performance test, which will fully demonstrate the process at full operating rate.

Table 6-2—Cross Walk to Selected Items in Guidance Manual for RD&D Permit

Item[a]	Item	Cross Reference
1	Purpose of Project	Attachment 4
2	Minimum Quantities of Hazardous Waste required to meet the RD&D Objectives	See Section 6.5.2
3	Anticipated Environmental Releases	Attachment 5.
4	Sampling and Analytical Procedures	To be provided as part of the Waste Analysis Plan, and the Performance Test Plan, which are Compliance Schedule item identified in Attachment 12.3.
5	Research Personnel Experience	Attachment 1, Key Personnel
6	Emergency Response Procedures	To be provided under the “Procedures to Prevent Hazard”, which is a Compliance Schedule item identified in Attachment 12.3.
7	Facility Closure at Conclusion of the Research	Attachment 9.
8	Financial Responsibility for Closure	This requirement is not applicable to BGCAPP since it is a federal facility.

[a] The numbers correspond to the item numbers in the EPA’s Guidance Manual for Research, Development, and Demonstration Permit.

Attachment 7 Contents

Attachment 7 Recordkeeping Procedures

In accordance with the requirements of 401 KAR 34:050 Section 4 and 401 KAR 34:290, BGCAPP will develop recordkeeping procedures to maintain the written operating record. An outline of some of these procedures is provided below for the various waste types.

7.1 Munition Waste Tracking

7.1.1 Munition Receipt in Container Handling Building (CHB)

Each pallet of munitions loaded into an enhanced onsite container (EONC) will be recorded onto an Army accountability form to document the required information to track the munitions from the storage igloo through the process.

When the EONC is received at the CHB, the paperwork will be checked by BGCAPP personnel for completeness before the EONC is accepted into CHB storage. The EONC will be stored in the CHB until it is transferred to the unpack area (UPA) for unloading.

7.1.2 Munition Receipt in Unpack Area (UPA)

After the EONC is received in the UPA, the UPA personnel will document the date the EONC is placed in storage in the UPA, and the EONC will be monitored with a near real-time monitor to determine whether the munitions are leaking. If agent is detected in the EONC, additional personnel protective equipment (PPE) will be required to unload the munitions in the UPA or the EONC will be transferred to the toxic maintenance area (TMA) to be unloaded in PPE.

The EONC will be opened in either the UPA or the TMA and the information on the accountability form will be verified before unloading. If there is a discrepancy in count, lot number or munition type, the EONC will be closed and the discrepancy will be resolved with the Blue Grass Chemical Activity (BGCA) before unloading.

After the count is verified, the munitions will be unloaded from the EONC. The following sections discuss the three processing trains.

7.1.2.1 Rocket Processing

The pallet of rockets will be placed on the table by the rocket input assembly, where they will be loaded manually onto the rocket input assembly by the UPA personnel. The control room operator (CRO) monitors the movement of the rockets into the explosive containment vestibule (ECV) and the rocket cutting machine (RCM). Here the rocket motors are separated from the rocket warheads.

The separated warheads are then loaded on the rocket input assembly and into the explosive containment room (ECR) and into the punch-and-drain station. The CRO will then record the processing of each rocket warhead through the rocket shear machine (RSM) on a log sheet.

The separated rocket motors are transferred to the motor processing room (MPR) where they are packed in specially designed boxes for shipment. Operators record the packing of motors on a log sheet. Packed motors are then staged before they are shipped to another location at the Blue Grass Army Depot (BGAD) for further treatment.

7.1.2.2 Energetic Projectile Processing

The energetic projectiles will be loaded one at a time onto the conveyor that will move the projectile into the ECR for processing through the projectile/mortar disassembly machine

(PMD). As with the rocket processing line, the CRO monitors PMD operation as the projectile is processed through the machine. The burster is conveyed to the energetics batch hydrolyzer (EBH) for treatment. The projectile will then be loaded on to a munition tray for processing through the munition washout system (MWS) as outlined in Section 7.1.2.3. The nose closures are placed in the tray and are then conveyed to the metal parts treater (MPT) for thermal treatment. The CRO will record the munition tray number on a log sheet to track the projectile processing through the MWS and MPT.

7.1.2.3 Nonenergetic Projectile Processing

Nonenergetic projectiles are loaded onto a munition tray in the UPA, and the UPA personnel record the tray number on a log sheet. The tray is loaded onto the bypass conveyor where the CRO will move the tray to the nose closure removal station (NCRS). The nose closures are conveyed to the MPT for thermal treatment. The projectile tray is then conveyed to the MWS. The projectile burster tube is pressed into the projectile cavity to remove the agent and wash out any solids in the projectile. The tray of projectiles is then processed through the MPT for thermal treatment.

7.2 Neutralization Process

Each batch of material that is processed through the energetics batch hydrolyzers (EBHs), energetics neutralization system (ENS), and agent neutralization system (ANS) will have a batch processing log sheet. The energetics hydrolysate will be sampled and analyzed before it is transferred into the energetic hydrolysate storage tanks. The analytical results will be attached to the batch processing log sheet. The agent hydrolysate will either be sampled and analyzed before it is transferred to the agent hydrolysate storage tanks or transferred to the agent hydrolysate storage tanks based on statistical process control approach that will be submitted to KDEP as part of the Waste Analysis Plan that is included in the RD&D Permit Compliance Schedule, Appendix B, Item 18.

7.3 Hydrolysate Storage Tanks

As each batch of neutralized agent, energetics, and propellant is transferred into the hydrolysate storage tanks, the source and the amount of material being transferred will be recorded on a transfer log. As each batch is transferred to a supercritical water oxidation (SCWO) unit, the SCWO unit number and the amount transferred will be recorded on a log sheet.

7.4 SCWO Processing Building (SPB)

7.4.1 Aluminum Removal System

Energetic hydrolysate from the HSA is transferred into the Aluminum Precipitation Reactor and recorded on a log sheet. As each batch of filtrate is transferred to the SCWO blend tank, it is recorded on a log sheet. As the aluminum precipitate from each batch is collected in a roll-off box, the batch will be recorded on the roll-off box log sheet for use in manifesting the waste to a TSDF.

7.4.2 SCWO

Each batch of hydrolysate, processed through the SCWOs, will be recorded on a log sheet. The treated waste stream from the SCWO units will be transferred into the SCWO storage tanks and recorded on a log sheet.

7.5 SCWO Storage Tanks

As each batch of SCWO treated water is transferred into the SCWO storage tanks, the transfer will be recorded on the SCWO log sheet. As each batch is transferred to the water recovery system, the amount transferred will be recorded on a log sheet.

7.6 Water Recovery System

The water recovery system concentrates the salts that are present in the SCWO outlet water stream. The waste brine solution from the reverse osmosis (RO) unit will be disposed of at a permitted hazardous waste treatment, storage, and disposal facility (TSDF). The treated water stream will be recycled to the SCWO process or shipped off site to a permitted TSDF.

7.7 Metal Parts Treater (MPT)

A log sheet will be used to track all trays of projectiles that are processed through the MPT. Projectiles and nose closures will be loaded into a roll-off box for disposal at a permitted TSDF.

7.8 Secondary Waste

Agent-contaminated liquid waste streams generated in the BGCAPP (e.g., spent decontamination solution and spilled hydraulic fluid) will be processed through the neutralization system, SCWO, and the water recovery system before they are disposed of at a TSDF.

Agent-contaminated solid wastes will be treated by chemical decontamination. The decontaminated residue will be shipped off site for disposal at a permitted TSDF. If chemical decontamination does not prove successful, the contaminated material will be treated in the MPT and then shipped off site for disposal at a permitted TSDF.

Attachment 8 Contents

Attachment 8 Procedures for Water Monitoring, Groundwater Monitoring, Soil Testing, and Waste Analysis

Before the start of the construction of BGCAPP, a background soil and water investigation will be completed to establish baseline information to be used during the closure phase of the project. This investigation may include surface water and groundwater sampling and analysis as well as soil sampling and analysis.

The wastes treated at BGCAPP will be processed in engineered vessels and facilities designed to contain the wastes and to prevent contamination of the soil and the groundwater. All wastewater generated in the facility is either recycled back into the process or shipped to a permitted treatment, storage, and disposal facility (TSDF). As a result, surface water or groundwater monitoring or soil testing is not needed during the research, development, and demonstration (RD&D) program.

Several munitions types that will be treated at the BGCAPP have been characterized either at Blue Grass Army Depot (BGAD) or at other chemical demilitarization facilities. Attachment 2 provides the available laboratory analyses of the agent contained in the munitions.

The solid wastes that will be produced during the RD&D program will be characterized in accordance with the current edition of SW-846 before they are shipped to a permitted TSDF.

The sampling and analytical methods used at BGCAPP will be based on the following methods:

1. U.S. Army or programmatic agent and agent-related methods
2. USEPA SW-846 methods and procedures
3. Methods for the Examination of Water or Wastewater (20th Ed.)
4. Protocols and techniques that are recognized and accepted by the scientific community.

These methods may require modification to effectively analyze BGCAPP sample matrices. The analytical methods will be validated and documented to show that data and results from BGCAPP are scientifically and technically defensible. **The BGCAPP specific analytical procedures will be referenced in the Waste Analysis Plan required by Compliance Schedule item # 18 of the RD&D Permit.**

Attachment 9 Contents

Attachment 9 Closure Process for BGCAPP

9.1 General Information

The objective of closure for the Blue Grass Chemical Agent Destruction Pilot Plant (BGCAPP) is to render the facility "clean" in accordance with the Kentucky Department for Environmental Protection (KDEP) and Resource Conservation and Recovery Act (RCRA) criteria and to close the facility with no requirement for post-closure care. The lessons learned from the closure of previous demilitarization facilities will be reviewed and incorporated into the BGCAPP design to minimize the rework engineering required during the closure phase. The Closure Plan presented in this attachment is a broad outline; the detailed Closure Plan will address the requirements of 401 KAR 34:070 Section 3, including the treatment and disposal of all contaminated waste residues and components, soils, structures, and equipment. The Closure Plan will be submitted to KDEP DWM in accordance with the Compliance Schedule that is discussed in Attachment 12. The facility owner, Blue Grass Army Depot (BGAD) and the facility operator, Bechtel Parsons Blue Grass (BPBG), will not proceed with the final closure of BGCAPP until the Closure Plan is approved by KDEP.

Any closure activities not related to BGCAPP operations will not be addressed as part of the BGCAPP Closure Plan, but they will be addressed by BGAD as part of the Closure Plan for BGAD.

9.2 Closure Plan

9.2.1 Closure Performance Standard

In accordance with the requirements of 401 KAR 34:070 Section 2, BGCAPP will be closed in a manner that accomplishes the following goals:

1. Minimize the need for further maintenance.
2. Control, minimize, or eliminate, to the extent necessary to protect human health and the environment, post-closure escape of hazardous waste, hazardous constituents, leachate, contaminated runoff, or waste decomposition products to the ground or surface waters or to the atmosphere.
3. Comply with the KDEP closure requirements for containers, tanks, and miscellaneous units.

Waste generated during the closure period will be processed as follows:

1. Solid (physical state) wastes that might be contaminated with chemical agent will be monitored to verify that the waste has been decontaminated **in accordance with the Closure Plan that will be submitted as required by the RD&D Permit Compliance Schedule Item # 28.** These wastes will be containerized and disposed of at a permitted hazardous waste treatment, storage, and disposal facility (TSDF).
2. Solid waste (e.g., metal parts) that can be processed through the metal parts treater (MPT) will be thermally treated to a minimum of 1,000˚F for a minimum of 15 minutes.
3. For buildings and structures (both metal and concrete), the clean closure target levels will be developed and included in the Closure Plan.

4. Prior to shipment of any waste material offsite, wastes will be characterized in accordance with Kentucky Hazardous Waste Regulations.

The closure of the BGCAPP will be accomplished by demonstrating that the clean closure target levels have been achieved in the following locations:

1. On surfaces within the facility and waste storage areas.
2. On surfaces and subsurfaces where surface contamination has been discovered surrounding the facility and waste storage areas.
3. On subsurfaces directly beneath the facility and waste storage areas that have been removed, where necessary.
4. On or within any other area or structure deemed to be included in the BGCAPP closure through the RCRA Facility Assessment (RFA) or other means.

Sampling and analysis will be performed to demonstrate that the clean closure target levels have been met in accordance with EPA's SW-846 (most recent edition) or equivalent methods approved by the KDEP, and as described in the sampling and analysis plan to be provided with the detailed Closure Plan.

9.2.2 Closure Activities

BGCAPP will be closed completely after the chemical agent stockpile has been destroyed and all munitions have been decontaminated. Closure activities will include:

1. Treatment and/or disposal of existing waste inventories [including secondary wastes such as spent carbon, used personnel protective equipment (PPE), etc.]
2. Decontamination of equipment, structures, and soils, as required
3. Dismantling and disposal of contaminated process and support equipment
4. Treatment and/or disposal of wastes generated during closure
5. Demolition of structures that will not be reused by BGAD after the completion of BGCAPP closure activities

9.2.3 General Decontamination Procedures and Techniques

Where liquid chemical agent contamination is suspected (based on operating history) or in monitoring areas where sustained levels of agent vapors are routinely present, chemical agent decontamination procedures will be used. A list of these areas will be included in the Closure Plan.

Agent-contaminated items will be decontaminated **in accordance with the Closure Plan that will be submitted as required by the RD&D Permit Compliance Schedule Item # 28**. In general, decontamination will be accomplished either by wash down with decontamination (decon) solution followed by flushing with water or by heating the item to a minimum of 1,000°F for a minimum of 15 minutes. Items that require additional decontamination will be further treated by one of the following means:

1. Additional chemical decontamination
2. Processed through the MPT

Decontamination will be performed under the direction of the Closure Manager, who will consult regularly with the certifying Registered Engineer.

Items contaminated with hazardous wastes other than agent will be decontaminated onsite, if necessary, with waste-specific techniques or they will be containerized and shipped offsite to a permitted hazardous waste TSDF.

9.3 Maximum Waste Inventory

Section 3 (2) of 401 KAR 34:070 requires that the Closure Plan identify steps necessary to perform partial and final closure of the facility at any point during the facility's active life, including an estimate of the maximum waste inventory that was ever on site and a detailed description of the methods to be used for removal, treatment, storage, and disposal of all hazardous waste at a permitted TSDF. Because this information is used by privately owned facilities to develop closure cost estimates and closure financial requirements from which federal facilities are exempt, this requirement will not be addressed in the BGCAPP Closure Plan. However, the waste inventory will be maintained at the lowest level possible while efficiently operating the plant equipment. As such, the waste inventory at the end of the operations phase will be substantially less than the storage tank design capacity of the plant because the storage tank capacity was designed for the storage of waste generated during the initial campaign (GB).

9.4 Schedule for Closure

Based on the lessons learned from Johnston Atoll Chemical Agent Disposal System (JACADS), closure is expected to take approximately 2 years. The detailed schedule for closure will be provided as part of the Closure Plan. The Closure Plan will also provide a detailed description of the decontamination process that will be used in the BGCAPP. The start of closure is based on the completion of munition processing. Partial closure of some equipment can begin after the completion of the VX rocket and projectile campaigns, respectively.

9.5 Closure Timeline

9.5.1 Time Allowed for Closure

The Closure Plan will delineate the timeline for closure as discussed previously.

9.5.2 Extension for Closure Time

BGCAPP does not expect to request an extension of time for closure beyond what is proposed in the Closure Plan. However, if additional time is required, the proper request will be made in accordance with KDEP regulations.

9.6 Closure Procedures

9.6.1 Removal of Hazardous Waste Inventory

All waste will be removed from BGCAPP tanks and container storage areas and will either be processed through the treatment facilities at BGCAPP or characterized properly, packaged, and transported to a permitted hazardous waste TSDF.

9.6.2 Inventory of Contaminated Buildings, Equipment, and Soils

The final Closure Plan will include a listing of BGCAPP buildings or rooms within buildings [e.g., the munitions demilitarization building (MDB)] and a designation (based on BGCAPP operations' knowledge at the time of Closure Plan submittal) of whether each building has, has not, or may have been contaminated with chemical agent or other hazardous waste. The list will further indicate whether each building will be demolished, stripped of all equipment but left in place, left in place with equipment, or removed from site for salvage (e.g., portable trailers). This list may be updated until completion of operations and in the early stages of closure as additional data become available.

Criteria used to determine the necessity of soil sampling to evaluate contamination will include generator knowledge such as spill history and/or major breaches to any secondary containment (as applicable). Soil removal is not expected to be necessary during closure because any incidents that involve agent release (or other hazardous waste) during the operational life of the facility will be addressed immediately to minimize the potential of migration of hazardous constituents. Hazardous waste operations will occur in totally enclosed buildings with secondary containment to prevent contamination of the surrounding soil if there is an accidental spill.

9.6.3 Decontamination of Tank Systems and Container Storage Areas

Decontamination of equipment and material that was exposed to chemical agent will be performed in accordance with BGCAPP decontamination procedures. After waste, equipment, and materials are removed, walls, floors, and doors will be decontaminated, if necessary, using appropriate mechanical abrasion (e.g., scabbling), physical extraction or chemical extraction technologies (e.g., high-pressure steam and water sprays that include appropriate surfactant, acids, bases, or detergents).

Spent wash and rinse solutions generated as part of decontamination procedures will be treated onsite or will be characterized, containerized, and disposed of at a permitted hazardous waste TSDF. Any solid residues, building components, appurtenances, etc., **will** be decontaminated **in accordance with the Closure Plan that will be submitted as required by the RD&D Permit Compliance Schedule Item # 28.**

9.6.4 Disposal of Contaminated Soil

As discussed in Section 9.6.2, no contaminated soil is expected to be disposed of during closure. If soil removal is necessary, residues that exceed clean closure target levels of hazardous constituents will be containerized and shipped to a permitted hazardous waste TSDF.

9.6.5 Documentation of Closure

After the facility closure is complete, a copy of the certification by the owner/operator and the registered professional engineer (stating that the facility was closed in accordance with the approved closure plan) will be submitted to KDEP. The certification will be accompanied by the appropriate documentation.

9.7 Post-Closure Plans

Post-closure maintenance or monitoring are not anticipated for the BGCAPP because no contaminated equipment, structures, or soils resulting from the BGCAPP operation are expected to remain above closure target levels following final closure. If predetermined closure target levels cannot be achieved, the Closure Plan will be revised accordingly. The facility site will remain under the control of BGAD after closure of BGCAPP.

Attachment 10 Contents

Attachment 10 Process Efficiency and Performance Criteria

As discussed in Attachment 4, Section 4.1, the main purpose of this research, development, and demonstration (RD&D) is to evaluate and demonstrate the integrated process as one operating unit. This will be done by operating the individual (proven) components [e.g., rocket shear machine (RSM) and energetics batch hydrolyzer (EBH) first with surrogates (during systemization) and then with agent-bearing wastes under this RD&D program. In this way, it will be possible to fully assess the process efficiency and performance.

During the RD&D program, the integrated process will be assessed for its ability to meet all efficiency and performance criteria that are discussed in Attachment 6, Section 6.5. The process will be tested to:

1. Demonstrate 99.9999% destruction efficiency for agent via hydrolysis on the first batches of agent processed.

2. Demonstrate sufficient destruction of energetics by hydrolysis to ensure that the solids exiting the energetics neutralization system (ENS) meet the 401 KAR 37:040 treatment standard for D003 waste streams (Deactivation).

3. Verify that all emission sources meet the environmental requirements as defined by the health and environmental risk assessments that will be performed as part of the RD&D program.

4. Validate the plant's anticipated overall hazardous waste generation rates and assess the wastes' characteristics to allow evaluation and approval by offsite disposal facilities.

5. Identify the individual process parameters and their ranges to ensure successful simultaneous operation of systems and processes while meeting all applicable environmental standards.

6. Confirm and validate the procedures of support services such as environmental compliance and hazardous waste management.

7. **Verify that the MPT can treat the materials to a minimum of 1000°F for a minimum of 15 minutes and that the OTM performs as designed.**

8. **Verify that the EBH and the OTE perform as designed.**

9. **Verify proper operation of the SCWO system on actual hydrolysate**

The environmental impact of the BGCAPP is very small**, consisting primarily of air emissions.** All wastes that are generated in the MDB will be characterized during the RD&D program to assess the type of disposal facility that is appropriate for each.

The following sections discuss how these criteria will be met. Section 10.1 presents the method to be used to demonstrate 99.9999% destruction efficiency for agent. The remaining sections show how the RD&D objectives will be met for each of the air emission sources and the polychlorinated biphenyls (PCBs). Process-specific RD&D objectives and performance criteria are discussed throughout Attachments 4 and 6. Although the results demonstrate that the process can be made safe, they should not be construed as the maximum safe emissions from the BGCAPP. The maximum safe—and hence allowable—emissions under the RD&D program and other permits will be based on an environmental assessment of the BGCAPP, which will be performed in sufficient time prior to the start of testing with agent to allow a full evaluation of the results.

10.1 Calculation Method for 99.9999% Destruction Efficiency

Destruction efficiency will be calculated according to the equation described in BGCAPP permit KY8-213-820-105, condition T-9.

10.2 Munitions Demilitarization Building (MDB)

Except for the processes listed below, all processes within the MDB perform mechanical processes on the munitions (e.g., punching, draining, washing, and shearing of the munitions):

1. **EBH, which vents to the EBH offgas treatment system (OTE)**
2. **Energetics Neutralization Reactor which normally vents to the MPT offgas treatment system (OTM), but may vent to the OTE if the OTM is shutdown for maintenance.**
3. **The Agent Collection System (ACS) tanks, Agent Neutralization System (ANS) reactors and sampling tanks and the Spent Decontamination Solution Tanks and Metal Parts Treaters (MPT), which vent to the MPT offgas treatment system (OTM).**

The emissions from these processes will be discharged into the MDB heating, ventilating, and air conditioning (HVAC) filter system.

All air emissions from the MDB are filtered through the HVAC filter system described in Attachment 6. The HVAC filter system is a proven system with over 20 years of combined operation at other chemical demilitarization sites[1].

10.3 Agent and Energetics Hydrolysate Storage

These storage tanks form a buffer between the treatment operations in the MDB and the SCWO process. The hydrolysates' vapor pressures are very low. However, as a precaution and to control possible vapors, the hydrolysate tanks are vented to activated carbon adsorbers. The RD&D program will identify the frequency of replacement that these filters will require to ensure that vapor control can be achieved during normal operation.

10.4 Supercritical Water Oxidation (SCWO) Processing Building (SPB)

This building includes the SCWO reactors and the water recovery system. All materials that enter this building have been analyzed and shown to be below the target release level for agent and the emissions from these sources pose no agent hazard. The processing may produce small quantities of other emissions. Extensive tests have been conducted on SCWO systems treating agent and energetics hydrolysates and hydrolysate simulants as part of the Program Manager for Alternative Technologies and Approaches (PMATA) and Program Manager, Assembled Chemical Weapons Alternatives (PM ACWA) programs. These tests were reviewed and evaluated by a number of National Research Council (NRC) panels. The panels findings and conclusions and an extensive list of references containing the data on which their

[1] At JACADS, TOCDF, ANCDF, and ABCDF, the same type of system is also installed or planned for the remaining chemical demilitarization sites.

conclusions are based are presented in the reports that are listed in Attachment 4, Table 4-1. The reports all concluded that the emissions from the General Atomics Design SCWO reactor were extremely low. The RD&D program will further characterize these emissions and verify their levels for the actual wastes found in the Blue Grass Army Depot (BGAD).

The SCWO system selected at BGAD has been successfully demonstrated at a scale comparable to that to be used at BGCAPP during the extensive demonstration under ACWA. The demonstrations were performed at increasingly longer time frames and culminated in a series of long-term tests, termed the 500-hour tests, on the materials that will be treated by SCWO at BGAD. These tests included GB, VX, and mustard hydrolysates and energetic hydrolysates. All tests demonstrated extremely and consistently high levels of organic chemical destruction. The tests were documented and critiqued by internal Department of Defense (DOD) groups and independently reviewed by many NRC panels. Table 4-1 lists the major reports in which the NRC panels chronicled and critiqued the progress of the evaluation and selection process. The NRC reports cite the numerous internal government reports that document all of the demonstration programs.

The evaluation process first examined numerous alternative technologies (NRC 1993) and in NRC 2002 and NRC 2002a identified two technologies that had been demonstrated. It identified the General Atomics Total Solution (GATS) process, on which the BGCAPP design is based, as the one with lower total hydrocarbon and carbon monoxide (CO) emissions. The Final Environmental Impact Statement (EIS) for BGCAPP (December 2002) also discusses alternate technologies and draws the same conclusion.

Based on the testing referenced above, the gas streams exiting the SCWO unit[2] are typically very low in total hydrocarbons (less than 1 ppm). The CO concentration has been demonstrated to be consistently less than 2 ppm and particulates less than 4 mg/dry standard cubic meter (DSCM). Cadmium (Cd) + lead (Pb) are less than 0.015 mg/DSCM, and antimony (Sb) + Arsenic (As) + Beryllium (Be) + Chromium (Cr) are less than 0.045 mg/DSCM[3]. Most of these values are below the lower limit of detection of the measurement method[4]. These results support the conclusion that the SCWO technology has a negligible impact on the environment.

The concentrations identified above were measured during the system demonstration programs. Although they do demonstrate that the system is safe and protective of the environment, they should not be construed as the requested performance limits on the final system. The actual emission limits for the BGCAPP will be established on the basis of the environmental and health evaluations that will be performed during the RD&D program.

10.5 Polychlorinated Biphenyls (PCBs)

PCBs have been found in the rocket shipping and firing tubes. These materials are part of the matrix of the shipping and firing tubes. They exit the process as part of the rocket solids and this waste stream will be disposed of at a permitted Toxic Substances Control Act (TSCA) offsite disposal facility.

[2] The only gas releases from the SCWO are through the gas-liquid separators and pressure reducers.

[3] They are presented as uncorrected for dilution because the oxygen concentration in the SCWO gas streams is below 7%.

[4] Quantities at or below the method detection limit are typically reported as less than the method detection limit.

Attachment 11 Contents

Attachment 11 Criteria to be Used to Determine Effects on Human Health and Environment

The research, development, and demonstration (RD&D) program that will be performed under the requested permit will not have an adverse effect on human health and the environment.

During malfunctions, upsets, or unplanned shutdowns, any agent compounds (including degradation products) will be contained, reprocessed, or controlled to prevent agent release as required by KRS 224.50-130(3)(a).

It is critical to keep the following in mind when assessing the BGCAPP's impact on health and the environment:

1. Its projected period of operation is approximately 36 months. The permit for the RD&D program is requested for 1 year of agent testing as allowed by 401 KAR 38:060 Section 6 (a).
2. Its total store of material is fixed so that its chronic impact is best assessed on the basis of total plant impact over the life of the plant rather than as an hourly or yearly impact.
3. **The BGCAPP has three emissions points:**
    a. **The MDB which is controlled by redundant air pollution control equipment**
    b. **The SCWO System which vents to the SPB HVAC filters**
    c. **The HSA which has carbon filters on the tank vents**
4. All emission points that can contain chemical agent are monitored by systems that have been proven to detect levels of chemical agent below the established maximum safe ambient air concentration.
5. Groundwater and soil are not plausible pathways for contaminant release from the BGCAPP.
6. The plant produces no process wastes discharged to sewer, groundwater or to surface water.
7. **The Standby Diesel Generators which are used to provide emergency backup power to critical systems in the BGCAPP.**
8. **The process boilers, which provide process and space heat steam.**
9. **The tanker load and unload stations, which are used for receipt of raw materials and shipment of RO reject**

Before the start of agent operation**s**, a risk assessment will be performed for the facility, using a risk assessment protocol that will be established through discussions with the Kentucky Department for Environmental Protection (KDEP).

11.1 Anticipated Composition of Exit Streams from BGCAPP

The BGCAPP process produces solid effluents, treated air, and recyclable water. The effluent type, its constituents, and each effluent's final treatment and disposal method are described in the following sections.

The estimated anticipated releases from the BGCAPP are found in the material balances presented in Appendix C. It is noteworthy that the material balances are based on the proposed peak rates for the BGCAPP.

11.2 Waste Solids

Waste solids include thermally decontaminated metal parts, energetics batch hydrolyzer (EBH) residues and leaker rocket shipping and firing tubes (SFTs) from the EBHs, dewatered aluminum compound filter cake from the aluminum filtration system (AFS), and the brine solution (reverse osmosis [RO] reject water) from the water recovery system (WRS). The brine solution will include sodium chloride, sodium phosphate, sodium sulfate, sodium fluoride, metal oxides from the hydrolysate feeds, and bound water. The solids production rates and composition are given in the material balance calculations in Appendix C. All of these wastes will be characterized during the RD&D program and will be managed by appropriate methods to minimize waste. The SFTs from the rocket warheads and the overpacked leaker rockets are assumed to contain polychlorinated biphenyls (PCBs); they will be sent to a treatment, storage, and disposal facility TSDF that is approved for PCB disposal.

11.3 Process Liquid Effluents

The BGCAPP is a closed-loop, zero-discharge plant. It does not release any process effluent to surface or groundwater or to onsite wastewater treatment plants. Any liquid waste that might be shipped offsite will be shipped to an appropriate hazardous waste TSDF.

11.4 Nonprocess Liquid Effluents

Clean water from tanks used during systemization that never contained hazardous materials may be discharged into the sanitary sewer system. Except for sanitary sewage and stormwater, no liquid effluent is discharged to the surface- or ground waters of the Commonwealth or to the sanitary sewer system of the BGAD.

11.5 Gaseous Emissions

The emission points are listed below:

1. Munitions demilitarization building (MDB) HVAC filter
2. Hydrolysate storage tank vent filters
3. SCWO
4. Metal parts treater (MPT) offgas treatment system (OTM)
5. EBH offgas treatment system (OTE)

For the purposes of the RD&D program, all emissions from the MPT and the EBH offgas treatment systems will be ducted to the MDB HVAC filter system (FIL). This arrangement will ensure a redundant level of protection of health and of the environment, because the gaseous emissions from these sources will first be treated by their respective offgas treatment systems and then again by the extremely efficient multiple high-efficiency particulate air (HEPA) filters and activated carbon adsorption banks of the FIL.

As discussed in Attachment 10, Section 10.1, hydrolysate will have been sampled and analyzed for residual agent, before it is released from the MDB to the hydrolysate storage tanks.

Nevertheless, the vents on the hydrolysate storage tanks will be filtered through activated carbon adsorbers.

The SCWO system and the WRS treat only the hydrolysates and spent decontamination solution. As discussed in Attachment 10, these systems produce inherently low emissions and do not require additional air pollution control equipment. During startup, they will be vented to the SCWO process building (SPB) filtration system as a precautionary measure. After the process is validated, they will vent directly to the atmosphere.

The following criteria will be used to assess the impact of the air emissions on health and the environment:

1. Measure the actual emissions from all sources and apply them to the risk assessment methodology that will have been developed.

2. Demonstrate that the emissions do not exceed risk-based values for acceptable risk and environmental protection.

Attachment 12 Contents

Attachment 12 Additional Information Pertinent to Proposed Operation of Experimental Waste Facility or Process

In addition to the information contained in this RD&D Permit Application, additional information is referenced in previously published documents and attached appendixes. These information sources are listed below.

12.1 Previously Published Documents

1. Final Environmental Impact Statement, Destruction of Chemical Munitions at Blue Grass Army Depot (BGAD), Kentucky, December 2002.
2. Chemical Weapon Storage Permit Application, Blue Grass Army Depot, January 2002. BGAD previously submitted this document to the Kentucky Department for Environmental Protection (KDEP). This document contains more detailed weapon descriptions, the contingency plan, and the procedure to prevent hazards.

12.2 Appendixes

Appendix A	Site Topographic Map
Appendix B	Wind Rose for BGAD
Appendix C	Process Flow Diagrams (PFDs) and Material Balances for BGCAPP
Appendix D	Material Safety Data Sheets (MSDSs)
Appendix E	(Deleted)
Appendix F	RD&D Permit Pre-Application Meeting Documentation

12.3 Additional Information to Be Provided to KDEP

Currently, detailed design for the Blue Grass Chemical Agent Destruction Pilot Plant (BGCAPP) has not been completed. Additional information will be submitted to KDEP in accordance with the Compliance Schedule provided in RD&D Permit KY8-213-820-105, Appendix B.

12.4 Regulatory Waiver Requests

To maximize safety during the RD&D program and operation of the facility, BGCAPP requested a waiver from the permitting requirements listed below. These requests were made under 401 KAR 38:060 Section 6 (2) and incorporated into BGCAPP permit KY8-218-820-105:

1. 401 KAR 34:180 Section 4 (3) – “A container holding hazardous waste shall be labeled "Hazardous Waste" upon the date that hazardous waste is first added to the container.”

   The enhanced onsite container (EONC) will be labeled upon receipt at the container handling building (CHB). The labeling of the individual munitions will not be done as this would require additional handling of the munitions prior to destruction, increasing the risk to human health and the environment.

The above request was incorporated into RD&D Permit KY8-213-820-105, Condition T-72.

2. 401 KAR 34:180 Section 5 – "Inspections. At least weekly, the owner or operator must inspect areas where containers are stored, looking for leaking containers and for deterioration of containers and the containment system caused by corrosion or other factors."

In lieu of visual inspections of chemical munitions and containers inside of EONCs, BGCAPP proposes that for any EONC containing hazardous wastes that are stored at the CHB more than 7 days, chemical agent monitoring of the air in the EONC will be performed. This request maximizes safety of workers at the facility while allowing BGCAPP personnel to detect leaking munitions.

The above request was incorporated into RD&D Permit KY8-213-820-105, Condition T-73.

3. 401 KAR 34:350 – Chemical Munitions
401 KAR 34:350 requires permit applicants to demonstrate "…99.9999 percent destruction or neutralization of each substance proposed to be treated or destroyed." The regulation further defines this destruction efficiency by the equation listed below.

$$DE\ \% = \frac{(W_{in} - W_{out} - W_{res}) \times 100\%}{W_{in}}$$

Where:

Win = Mass feed rate of waste to the incinerator.

Wout = Mass emission rate of the same waste present in exhaust emissions prior to release to the atmosphere.

Wres = Mass removal rate of waste via the incinerator residues.

Because this equation is more applicable to incinerators (hence the reference to removal rate of incinerator residues), this equation is not appropriate for the proposed neutralization process. The following equation is proposed as a more appropriate method of calculating the destruction efficiency for the BGCAPP:

% Destruction Efficiency = 100% x (M_{in} – M_{out}) / M_{in}

M in = Mass of agent per reactor batch into the agent neutralization system (ANS) reactor (also called the "agent hydrolyzer" in Figure 4-1)

M_{out} = Mass of agent per reactor batch exiting the ANS in the hydrolysate

The above request was incorporated into RD&D Permit KY8-213-820-105, Condition T-9.

DEP 7094B (35/92)

Attachment 13 Public Notice

PURSUANT TO APPLICATION NUMBER: ____________________

The Natural Resources and Environmental Protection Cabinet, Division of Waste Management, has received a special waste, research, development, and demonstration permit application from:

Name of Applicant __Blue Grass Army Depot___________________________________

Name of Facility ____See Above____

Address __________2091 Kingston Highway____ ______________________________

City ___Richmond_______________State ______KY________Zip Code _40475-5001_

This application, if approved, would allow the construction of the facility to accept the following types of waste and the following activities:

This facility would be used to conduct Research, Development and Demonstration on technology selected to be used to destroy the chemical weapon stockpile at the BGAD

____

The proposed facility may be accessed from _KY Route 52_______________________

by traveling east from Richmond toward Waco__________________________________

____

Additional information regarding this application may be obtained from:

Contact Person ___Mr. Dave Easter[1]____

Address _________2091 Kingston Hwy____ __________________________________

City _____Richmond_____________ State ______KY_________Zip Code _40475-5007

Phone No. (859)_779-6221____

The permit application is being processed at the following location:

Division of Waste Management
Solid Waste Branch
14 Reilly Road
Frankfort, Kentucky 40601

[1] All correspondence and questions regarding this notice may also be directed to Sandra Plant, 301 Highland Park Drive, Richmond, KY 40475 – (859) 625-1291.

Within thirty (30) days of the publication of this notice, any person who wishes to comment on the application may submit written comments, and, if desired, request from the Cabinet a public meeting.

Please refer to Application No.______________________on all correspondence.

Publication pursuant to KRS 224.40-310.

DEP 7094B(3/92)

Attachment 14 Public Notice

Pursuant to Application Number: _____________________

The Natural Resources and Environmental Protection Cabinet, Division of Waste Management, has received a special waste, research, development, and demonstration permit application from, and has prepared a draft permit for:

Name of Applicant _____Blue Grass Army Depot_____________________________

Name of Facility ____

Address _____________2091 Kingston Highway________________________________

City ___Richmond____________State ____KY_____ Zip Code __40475-5001______

This application, if approved, would allow the construction of the facility to accept the following types of waste and the following activities: _No offsite waste would be accepted; the facility would only be used to destroy chemical weapons stored onsite___

The proposed facility may be accessed from _KY Route 52_______________________

by traveling east from Richmond toward Waco___________________________________

____

Additional information regarding this application may be obtained from:

Contact Person _____Mr. Dave Easter[1]____

Address ___________2091 Kingston Hwy ________________ ____________________

City_____Richmond____________ State _____KY________ Zip Code _40475-5007___

Phone No. (_859___)__779-6221_________________________________

All data submitted by the applicant and other documents concerning this application are available for public inspection during normal business hours at the following location:

Office __Blue Grass Chemical Stockpile Outreach Office________________________

Address _ 1000 Gibson Bay Dr., Suite 2 ____________________________________

City __Richmond_____________ State _____KY_______ Zip Code _40475__________

The permit application is being processed at the following location:

Division of Waste Management
Solid Waste Branch

[1] All correspondence and questions regarding this notice may also be directed to Sandra Plant, 301 Highland Park Drive, Richmond, KY 40475 – (859) 625-1291.

14 Reilly Road
Frankfort, Kentucky 40601
10

DEP 7094B(3/92)

A public hearing has been scheduled to receive public comments and will be conducted at the following location and time:

Place____

Address____

City_________________________ State ______________ Zip Code ___________

From_________________________________ to ________________________________

Any person who wishes to comment on the draft permit decision for this special waste site or facility may file comments with the Cabinet and, if desired request a public hearing within thirty (30) days of the publication of this notice pursuant to Section 6 of 401 KAR 45:050.application may submit written comments, and, if desired, request from the Cabinet a public meeting.

Please refer to Application No.________________________on all correspondence.

Publication pursuant to KRS 224.40-310.