

**Blue Grass Chemical Agent-Destruction Pilot Plant**

**Resource Conservation and Recovery Act**

**Research, Development and Demonstration Permit Application**



This document did contain Operations Security (OPSEC) sensitive information. All OPSEC sensitive material has been removed. Information removed has been replaced with "(SENSITIVE INFORMATION REMOVED)" or the abbreviation "(SIR)." Persons with a need to know may apply to the Blue Grass Chemical Agent Destruction Pilot Plant Site Manager for release of sensitive information.

**Blue Grass Chemical Agent-Destruction Pilot Plant**

*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  
Bechtel Parsons Blue Grass  
301 Highland Park Drive  
Richmond, Kentucky 40475**

*Prepared By:*

**Bechtel Parsons Blue Grass  
301 Highland Park Drive  
Richmond, Kentucky 40475**



**September 2006  
Revision 3**

**Volume I**

**VOLUME I****Contents****Submittal Letter****Part A**

<b>Acronyms .....</b>	<b>i</b>
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REPLY TO  
ATTENTION OF:

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

September 26, 2006

Environmental Office

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

Subject: Revised Permit Application (Revision 3)  
Research, Development, and Demonstration (RD&D) Permit  
Blue Grass Chemical Agent-Destruction Pilot Plant (BGCAPP) Facility  
Blue Grass Army Depot, Richmond, Kentucky  
EPA ID # KY8-213-820-105, AI 2805

Dear Mrs. Webb:

Blue Grass Army Depot (BGAD) and Bechtel Parsons Blue Grass Joint Venture (BPBG), the permit owner and operator, respectively, for the Blue Grass Chemical Agent-Destruction Pilot Plant (BGCAPP) facility received a letter dated June 30, 2006 requesting submittal of the revised Research, Development, and Demonstration (RD&D) Permit application within 90 days. The original RD&D permit was issued by the Division of Waste Management (DWM), Kentucky Department for Environmental Protection (KDEP) on September 30, 2005. In accordance with KDEP's request and Kentucky Administrative Regulations, 401 KAR 38:060, Section 6, BGAD and BPBG hereby submit three (3) copies of the revision to BGCAPP RD&D Permit Application (Revision 3).

The RD&D Permit Application is incorporated by reference in Conditions T-157 and T-158 of the RD&D Permit. This revised RD&D Permit Application incorporates the Design Considerations into the facility design as well as other design changes that have been made as the design has matured. The changes that have been included are identified by a right hand border change line and any new text is **bolded** for easy identification.

The changes that have been incorporated into this revision include the following:

1. The revised Part A of the application with the updated list of treatment and storage units (Part A)
2. New Key Personnel forms (Attachment 1)
3. The addition of analytical information on the H munitions (Attachment 2)
4. The addition of the Rocket Cutting Machine (RCM), the modification of the Rocket Shear Machine (RSM) for processing bare warheads and a revised rocket processing sequence. The treatment of the non-contaminated rocket motors (NCRM) is not included in the RD&D permit application. The text reflects that the treatment of the NCRMs will occur elsewhere on the Blue Grass Army Depot or they will be shipped off-site for recycling or disposal at a permitted facility. (Attachment 4)
5. The deletion of the Heated Discharge Conveyor (HDC) and the addition of the treatment of Energetic Batch Hydrolyzer (EBH) solid residues in the Metal Parts Treater (MPT). (Attachment 4)
6. The deletion of the Brine Reduction System (BRS) and the addition of shipping of the Reverse Osmosis (RO) reject waste stream to a permitted Treatment Storage and Disposal Facility (TSDF) (Attachment 4)
7. The revision to the EBH and MPT Offgas Treatment Systems (OTE and OTM, respectively) (Attachment 4)
8. The deletion of the Dunnage Shredding and Handling System including the Dunnage Carbon System. The agent contaminated secondary waste will be either be decontaminated or treated in the MPT except for agent contaminated carbon which will be sent offsite for treatment at a permitted TSDF. (Attachment 4).
9. The use of validated process controls and statistical testing in lieu of performing analyses on hydrolysate released from the Munition Demilitarization Building for further treatment in the Supercritical Water Oxidation units.(Attachment 4 & 7)
10. An updated construction sequence (Attachment 6)
11. A revised ramp-up schedule and justification for the quantity of waste needed for pilot testing (Attachment 6)
12. The revised site plan and building descriptions (Attachment 6)
13. An updated set of BGAD Wind Roses (Appendix B)
14. An updated set of Process Flow Diagrams (PFDs) and Material and Energy Balances (M&EBs) (Appendix C)
15. Updated MSDSs for GB, VX and H (Appendix D).

As discussed in the letter dated August 21, 2006 to KDEP, the basis for BGCAPP design continues to be neutralization followed by supercritical water oxidation (SCWO), consistent with the currently issued RD&D Permit. The revised design basis is the same as originally proposed, albeit in a smaller overall BGCAPP facility.

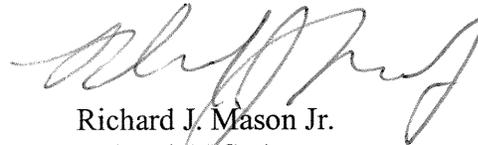
BGAD and BPBG would welcome the opportunity to meet and discuss this revised document with KDEP at the earliest convenience. If you have any questions or require additional information, please do not hesitate to contact Mr. Todd Williams, BGAD Environmental Coordinator at (859) 779-6280 or Mr. Tom Kurkjy, 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,



Christopher S. Haynes, P.E.  
Bechtel Parsons Blue Grass  
Project Manager  
BGCAPP Operator



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

Enclosure

RD&D Permit Application, Revision 3

Copy Furnished:

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





PAGE <u>3</u> OF <u>12</u>							Facility's EPA ID Number										
							K	Y	8	2	1	3	8	2	0	1	0
11. PROCESS DESCRIPTION. <i>See Instructions</i>																	
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	5,500	G	1	BC	Store various secondary wastes									
4	Munition Washout System (MWS) Storage Area *	RD	S01	5,500	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									

\* Unit(s) located in Munitions Demilitarization Building

PAGE <u>4</u> OF <u>12</u>							Facility's EPA ID Number											
							K	Y	8	2	1	3	8	2	0	1	0	5
11. PROCESS DESCRIPTION. <i>See Instructions</i>																		
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	Toxic Maintenance Area (TMA) Storage Area *	RD	S01	5,500	G	1	BC	Store drums of various waste, contaminated equipment and/or leaking munitions										
4	Explosive Containment Vestibule (ECV) Storage Area *	RD	S01	500	G	2	BC	Store various secondary wastes										
4	Unpack Area (UPA) *	RD	S01	9,800	G	2	BC	Store munitions and various secondary wastes										
4	Motor Storage 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 Processing 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	EBH Offgas Treatment System (OTE) Storage Area *	RD	S01	550	G	1	BC	Store various secondary wastes										
4	Energetics Neutralization System (ENS) Storage Area *	RD	S01	550	G	1	BC	Store various secondary wastes										
4	Energetics Batch Hydrolyzer (EBH) Storage Area *	RD	S01	550	G	1	BC	Store various secondary wastes										

\* Unit(s) located in Munitions Demilitarization Building

PAGE <u>5</u> OF <u>12</u>							Facility's EPA ID Number											
							K	Y	8	2	1	3	8	2	0	1	0	5
11. PROCESS DESCRIPTION. <i>See Instructions</i>																		
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 Room (ECR) Storage Area *	RD	S01	1,200	G	2	BC	Store various secondary wastes										
4	Metal Parts Treater Offgas Treatment System (OTM) Storage Area *	RD	S01	550	G	1	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										
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.										

PAGE <u>6</u> OF <u>12</u>							Facility's EPA ID Number										
							K	Y	8	2	1	3	8	2	0	1	0
11. PROCESS DESCRIPTION. <i>See Instructions</i>																	
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 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									
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									

\* Unit(s) located in Munitions Demilitarization Building

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	Energetics Batch Hydrolyzer (EBH) *	RD	X99	10,100	J	6	BC	Treatment of waste energetics
4	Water Recovery System	RD	X99	26	D	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 Precipitate
3	155,000	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	9,000	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	840	TONS	D001, D003 and/or D008	S01 NCRM
		TONS		

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

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: \_\_\_\_\_

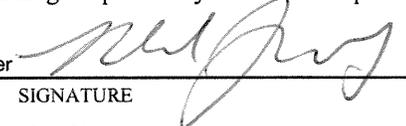
**15 PHOTOGRAPHS, DRAWING AND MAP - See INSTRUCTIONS**

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.

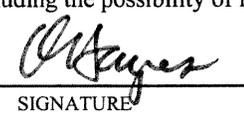
**Owner Certification** - I certify under penalty of law that I have personally examined and am familiar with the information submitted in this and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted 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

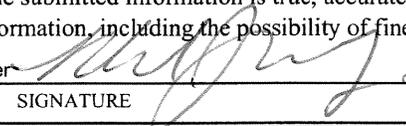
Richard J. Mason Jr., Colonel, U.S. Army, Commanding Officer  26 Sep 2006  
 NAME (PRINT OR TYPE) SIGNATURE DATE SIGNED

**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

Christopher S. Haynes, P.E., General Manager, BPPG  19 SEP 2006  
 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  26 Sep 2006  
 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	1 = Accepts waste from off-site generators
INDICATOR:	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

“Use any code from the tables below that applies”

<b>TREATMENT CONTINUED</b>		
<b>PROCESS CODE</b>	<b>PROCESS DESCRIPTION</b>	<b>UNIT OF MEASURE CODE</b>
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

<b>STORAGE</b>		
<b>PROCESS CODE</b>	<b>PROCESS DESCRIPTION</b>	<b>UNIT OF MEASURE CODE</b>
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

<b>DISPOSAL</b>		
<b>PROCESS CODE</b>	<b>PROCESS DESCRIPTION</b>	<b>UNIT OF MEASURE CODE</b>
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

“Use any code from the table below that applies”

MISCELLANEOUS		
PROCESS CODE	PROCESS DESCRIPTION	UNIT OF MEASURE 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           | L = liters                 |
| B = acres               | N = short tons per day     |
| C = cubic meters        | Q = hectares               |
| D = short tons per hour | R = kilograms per hour     |
| E = gallons per hour    | S = metric tons per day    |
| F = hectare-meter       | U = gallons per day        |
| G = gallons             | V = liters per day         |
| H = liters per hour     | W = metric tons per hour   |
| I = BTUs per hour       | X = million BTU’s per hour |
| J = pounds 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                     | CR = Conducting Activities not Requiring a Permit      |
| BC = Before Construction           | IN = Inactive/Closing but not yet RCRA Closed          |
| CC = Cleaned Closed                | OP = Operating, Actively Managing RCRA-Regulated Waste |
| CO = Completed Post-Closure Care   | PF = Protective Filer                                  |
| CP = Closed with waste in place    | SF = Referred to CERCLA                                |
| DC = Delay of Closure              | UC = Under Construction                                |
| CV = Converted but Not RCRA Closed | 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:** 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 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:
- 17. OPERATOR CERTIFICATION:**
- 18. LAND OWNER CERTIFICATION:**

- (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 general 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
<b>AFB</b>	<b>aluminum filtration building</b>
<b>AFS</b>	<b>aluminum filtration system</b>
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
<b>ANR</b>	<b>agent neutralization reactor</b>
ANS	agent neutralization system
APE	area project engineer
APP	accident prevention plan
<b>APS</b>	<b>aluminum precipitation system</b>
AQS	agent quantification system
AR	Army Regulation
<b>ARP</b>	<b>access road and parking lot</b>
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
<b>BOX</b>	<b>bulk oxidizer</b>
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
<b>C<sub>3</sub>H<sub>8</sub>O</b>	<b>isopropyl alcohol</b>
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
<b>CO</b>	<b>carbon monoxide</b>
CO <sub>2</sub>	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
<b>CRM</b>	<b>contaminated rocket motor</b>
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
<b>DAT</b>	<b>drill and transfer</b>
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
<b>DSCM</b>	<b>dry standard cubic meter</b>
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
<b>ESS</b>	<b>electronic security system</b>
ETAP	Electrical Transient and Analysis Program
ETC	estimate to complete
eTRACK	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
<b>FEM</b>	<b>fire extinguishing medium</b>
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 <sub>4</sub> H <sub>10</sub> FO <sub>2</sub> P)
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 Leivinstein process, bis(2-chloroethyl) sulfide or 2,2'-dichlorodiethyl sulfide (C <sub>4</sub> H <sub>8</sub> Cl <sub>2</sub> S)

Acronym	Definition
<b>H<sub>2</sub></b>	<b>hydrogen</b>
<b>H<sub>2</sub>SO<sub>4</sub></b>	<b>sulfuric acid</b>
<b>H<sub>3</sub>PO<sub>4</sub></b>	<b>phosphoric acid</b>
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
<b>IBC</b>	<b>intermediate bulk container</b>
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
<b>IPA</b>	<b>isopropyl alcohol</b>
IPT	integrated product team
IS	information systems
IS&T	information systems and technology
<b>ISO</b>	<b>International Organization for Standardization</b>
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
<b>LFL</b>	<b>lower flammability limit</b>
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
<b>MCS</b>	<b>metal parts treater (MPT) cooling system</b>
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
<b>MPR</b>	<b>motor processing room</b>
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
<b>MSR</b>	<b>motor storage room</b>

Acronym	Definition
MTBF	mean time between failures
MTO	material takeoff
MTTR	mean time to repair
MWR	material withdrawal request
MWS	munitions washout system
<b>N<sub>2</sub></b>	<b>nitrogen</b>
N <sub>2</sub> O	nitrous oxide
Na <sub>2</sub> SO <sub>4</sub>	sodium sulfate
NaCl	sodium chloride
NaF	sodium fluoride
NaH <sub>2</sub> PO <sub>4</sub>	sodium monophosphate
NaOCl	sodium hypochlorite
NaOH	sodium hydroxide
NCA	National Construction Agreement
NCR	nose closure removal
<b>NCRM</b>	<b>noncontaminated rocket motor</b>
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
<b>OTE</b>	<b>energetics batch hydrolyzer (EBH) offgas treatment system</b>
<b>OTM</b>	<b>metal parts treater (MPT) offgas treatment system</b>
OTS	offgas treatment system
P&A	precision and accuracy
P&ID	pipng 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
<b>PHS</b>	<b>projectile handling system</b>
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
<b>RCM</b>	<b>rocket cutting machine</b>
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
<b>RHA</b>	<b>residue handling area</b>
<b>RHS</b>	<b>rocket handling system</b>
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
<b>SFT</b>	<b>shipping and firing tube</b>
SHA	system hazard analysis
SME	subject matter expert
SOP	standard operating procedure
SOW	scope of work
SP	site preparation
<b>SP</b>	<b>site plan</b>

Acronym	Definition
SPB	supercritical water oxidation (SCWO) processing building
SPI	schedule performance index
SR	service requisition
<b>SRC</b>	<b>single round container</b>
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
TDP	technical data package
TEAD	Tooele Army Depot, Utah
TF	total float
TM	technical manager
TMA	toxic maintenance area
<b>TMB</b>	<b>toxic maintenance building</b>
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
<b>UBK</b>	<b>utility block building</b>
UMCDF	Umatilla Chemical Agent Disposal Facility
UPA	unpack area

Acronym	Definition
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
<b>WSA</b>	<b>waste storage area</b>
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

<p>RESEARCH DEVELOPMENT, AND DEMONSTRATION PERMIT APPLICATION DEP 7094B (3/92)</p>
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## 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.

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**A. GENERAL INFORMATION**

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Application No. \_\_\_\_\_ (To be assigned by Cabinet)

Fee Submitted \$ \_\_\_\_\_ County \_\_\_\_\_ Date \_\_\_\_\_

Method of Payment: \_\_\_\_\_ Check \_\_\_\_\_ Certified Check \_\_\_\_\_ Money Order

No. \_\_\_\_\_

Type of application:  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 <sup>1</sup>

Address \_\_\_\_\_ 2091 Kingston Highway

City \_\_\_\_\_ Richmond \_\_\_\_\_ State \_\_\_\_\_ KY \_\_\_\_\_ Zip Code \_\_\_\_\_ 40475-5001

Telephone Number \_\_\_\_\_ (859) 625-6280

4. Applicant legal status:  Government \_\_\_\_\_ Private

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<sup>1</sup> Please copy all correspondence regarding permit application to Thomas A Kurkky, 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				

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**B. OWNERSHIP INFORMATION**

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

\_\_\_\_\_ Proprietorship

\_\_\_\_\_ Partnership \_\_\_\_\_ General \_\_\_\_\_ Limited

\_\_\_\_\_ Corporation

\_\_\_\_\_ Joint venture

Governmental agency

\_\_\_\_\_ Other. Describe \_\_\_\_\_

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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.



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**D. DESCRIPTION OF PROPOSED RESEARCH, DEVELOPMENT OR DEMONSTRATION PROCESS**

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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**.

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**E. DESCRIPTION OF CONSTRUCTION AND OPERATION OF FACILITY**

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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**.

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**F. PERFORMANCE CRITERIA**

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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**

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\* 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. Kurkijy

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<sup>2</sup>

Address 2091 Kingston Highway

City Richmond State KY Zip Code 40475-5001

Company Affiliation Blue Grass Army Depot

Telephone Number (859) 625-6280

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**H. OTHER INFORMATION**

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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).

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<sup>2</sup> Please copy all correspondence regarding permit application to Thomas A. Kurkijy, 301 Highland Park Drive, Richmond, KY 40475

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**I. PUBLIC NOTICES**

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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.

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**J. CERTIFICATION**

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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  
NAME (PRINT OR TYPE)

  
SIGNATURE

1 mar 04  
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  
NAME (PRINT OR TYPE)

  
SIGNATURE

3/1/04  
DATE

1 **Attachment 1 Contents**

2 **Attachment 1 Key Personnel Disclosure Forms**

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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, Richmond, KY 40475  
Business Address (Do not use P.O. Box Number)  
  
301 Highland Park Drive, Richmond, KY 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.)
  - a. Christopher Scott Haynes General Manager  
Name Title/Position
  
  - b. Paul Edward Wojciechowski Deputy General Manager  
Name Title/Position
  
  - c. \_\_\_\_\_  
Name Title/Position
  
  - d. \_\_\_\_\_  
Name Title/Position
  
  - e. \_\_\_\_\_  
Name Title/Position
  
  - f. \_\_\_\_\_  
Name Title/Position
  
  - g. \_\_\_\_\_  
Name Title/Position

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







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 SHEETS 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

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- 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

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"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."

*Christopher S. Haynes*

Original Signature of Responsible Official

Date

16 AUG 2006

Christopher S. Haynes

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 Christopher S. Haynes

this the 16th day of August, 2006

Notary Public Signature

*Kevin M. Regan*

My Commission Expires: 23 May 2009

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

ATTACHMENT NO. \_\_\_\_\_

PERMIT/APPLICATION NO. \_\_\_\_\_

DATE \_\_\_\_\_

### PART B

#### PAST PERFORMANCE INFORMATION FOR KEY PERSONNEL

1. Chistopher Scott Haynes  
Complete Name  
  
301 Highland Park Drive, Richmond, KY 40475  
Business Address (Do not use P.O. Box Number)  
  
301 Highland Park Drive, Richmond, KY 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.  
  
Bechtel Parsons Blue Grass Joint Venture General Manager  
  
\_\_\_\_\_  
  
\_\_\_\_\_

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 \_\_\_\_\_





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 SHEETS 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

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- 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

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"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."

*CS Haynes*

16 AUG 2006

Original Signature of Responsible Official

Date

Christopher S. Haynes

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 Christopher S. Haynes

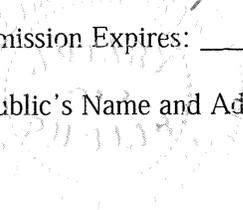
this the 16th day of August, ~~XX~~ 2006

Notary Public Signature

*Kevin M. Regan*

My Commission Expires: 23 May 2009

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



ATTACHMENT NO. \_\_\_\_\_

PERMIT/APPLICATION NO. \_\_\_\_\_

DATE \_\_\_\_\_

### PART B

#### PAST PERFORMANCE INFORMATION FOR KEY PERSONNEL

1. Paul Edward Wojciechowski  
Complete Name  
  
301 Highland Park Drive, Richmond, Kentucky 40475  
Business Address (Do not use P.O. Box Number)  
  
100 W. Walnut Street, Pasadena, CA 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 \_\_\_\_\_





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 SHEETS 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.

NOT APPLICABLE

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- 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.

NOT APPLICABLE

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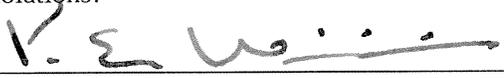
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"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted in. 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."

  
Original Signature of Responsible Official

7 August 2006  
Date

Paul E. Wojciechowski  
Typed Name or Responsible Official

Deputy 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 Paul E. Wojciechowski

this the 7th day of August, ~~XX~~ 2006

Notary Public Signature 

My Commission Expires: 23 May 2009.

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

## Attachment 2 Contents

2	<b>Attachment 2 Laboratory Analysis of Waste to be Processed</b> .....	<b>2-1</b>
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6	2.4 VX 155-mm Projectiles.....	2-1
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20	2-4 155-mm H Projectile Sample Summary Results .....	2-6

## 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<sup>1</sup> 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.**

<sup>1</sup> 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
<b>Metals (mg/kg)</b>			
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)			

1 **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
<b>Metals, ppm</b>		
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		

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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
<b>Metals (mg/L)</b>			
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
<b>Organic Compounds, wt%</b>			
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
<b>Organic Compounds, mg/kg</b>			
Lewisite	< 4.9	< 5.3	< 5.1
<b>Metals, mg/kg</b>			
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			

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**Attachment 3 Contents**

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## 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.

##### 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<sup>1</sup>).

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.**

<sup>1</sup> 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.

### 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 and rubber) 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 and gas mask carbon 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 ( $\text{Na}_2\text{SO}_4$ ), sodium chloride ( $\text{NaCl}$ ), sodium fluoride ( $\text{NaF}$ ), and sodium monophosphate ( $\text{NaH}_2\text{PO}_4$ ). 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, 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 by appropriate methods to minimize waste.

## 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.

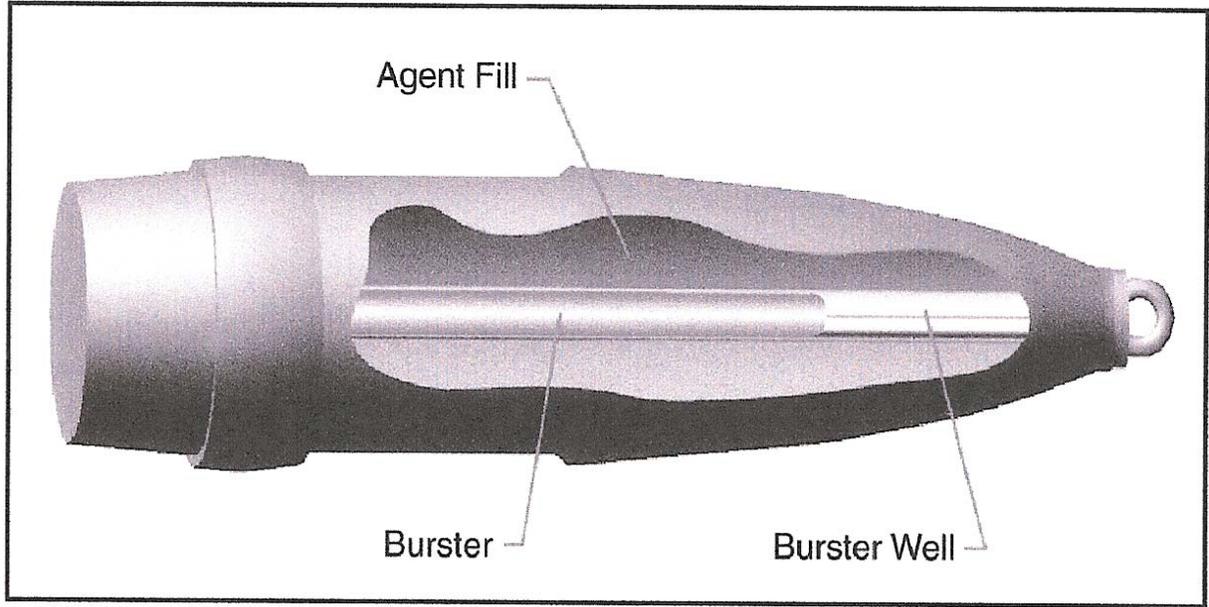
## 3.3 Total Estimated Quantity of Waste to be Disposed of per Year

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

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

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

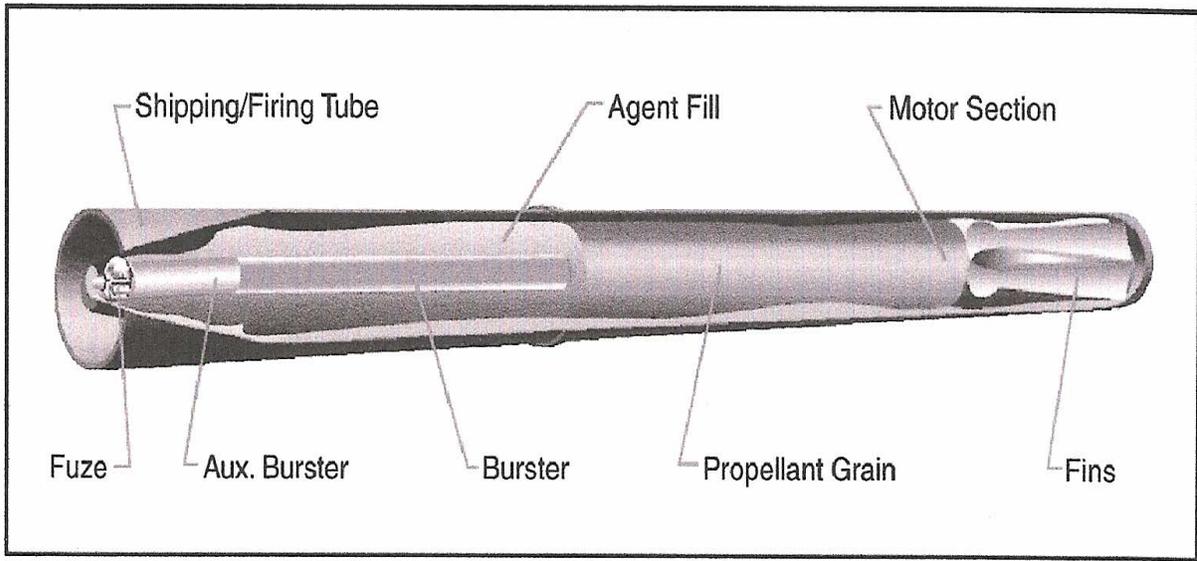
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**Figure 3-1—155-mm Projectile**

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Figure 3-2—155-mm Rocket

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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	24 rockets	576 rockets
Rocket shear machine (RSM)	M55 rockets / M56 warheads	24 rockets	576 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	24 rockets	576 rockets
Agent neutralization system (ANS)	All	6,626 gal	159,024 gal
Energetics neutralization system (ENS)	All	24 rockets	576 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			Total (Tons)
	1 (tons)	2 (tons)	3 (tons)	
MPT Residue	830	2,400	510	3,740
AFS Precipitate	1,417	1,001	290	2,708
Water Recovery RO Reject Stream	39,980	38,022	14,689	92,691
Total Solid Wastes	42,227	41,423	15,489	99,139
Note: These numbers do not include closure wastes.				

## Attachment 4 Contents

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## 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<sup>1</sup>.

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<sup>2</sup> 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

<sup>1</sup> 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.

<sup>2</sup> All tables and figures are presented at the end of this attachment.

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

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

## 8 **4.1 Justification for Research**

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

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

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

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

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<sup>3</sup> *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](http://www.nap.edu).

1 are fed back to the design team so that the information can be used to improve and validate the  
2 process. Process, equipment, and operating procedure modifications that are made under the  
3 RD&D program, and that result in performance that meets or exceeds the RD&D goals and  
4 objectives as outlined herein and in Attachment 10, will not require modification to the RD&D  
5 permit. No changes will be made that could increase risk or environmental releases. In fact, the  
6 likely outcome of the RD&D program will be further reductions in risk.

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

16 The information that is included in the **RD&D permit** compliance schedule (**Appendix B to the**  
17 **RD&D Permit issued on 30 September 2005**) is equivalent to the information that would be  
18 required by a Part B permit application for a hazardous waste treatment facility. Therefore, the  
19 compliance schedule corresponds to the submission of the components that constitute the Part  
20 B permit application.

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

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

## 31 4.2 Process Description

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

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

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

- 45 1. Agent and energetics access (mechanical).

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

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

27 The munition bodies and other metallic components of the munitions are washed using high-  
28 pressure water **and thermally treated in the MPT** at a minimum of 1,000°F for a minimum of  
29 15 minutes. At this point, they will be released from the containment system.

30 The facility has been designed to safely treat all chemical weapons, chemical warfare agent,  
31 and ancillary materials.<sup>5</sup> However, certain ancillary (secondary) wastes may be decontaminated  
32 with sodium hydroxide (NaOH), sodium hypochlorite (NaOCl), or other appropriate  
33 decontamination (decon) solutions. These wastes, PPE, and other plastic/rubber items, will be  
34 decontaminated to the Army decontamination standard and then shipped off site to a permitted  
35 TSDF. **If they cannot be decontaminated to the Army decontamination standard, these**  
36 **wastes will be treated in the MPT before they are shipped off site for disposal in a**  
37 **permitted TSDF.**

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<sup>4</sup> 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..."

<sup>5</sup> For example, metal, agent contaminated wooden pallets, agent-contaminated PPE, and any other agent-contaminated secondary waste streams generated from these activities.

1 To the maximum extent possible, process liquid streams are recycled to conserve water and to  
2 prevent discharge to ground or surface water. Water is recycled via a water recovery system  
3 that produces water of a quality suitable to recycle back into the process during the pilot testing  
4 and operations phases. **Waste brine solution (reverse osmosis [RO] reject) generated in  
5 the water recovery system (WRS) will be managed by appropriate means to minimize  
6 waste.**

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

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

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

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

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

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

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<sup>6</sup> Figures are presented at the end of this attachment.

<sup>7</sup> 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.

<sup>8</sup> **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.**

<sup>9</sup> 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.

1. Rocket input subsystem
2. Projectiles input subsystem

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 Army Decontamination Standard. Wastes that have been tested to meet Army decontamination levels 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**

1 the agent concentration is below the target release level, the hydrolysate is transferred to  
2 the HSAs before it is transferred to the SPB for further treatment.

3 Once the 99.9999% destruction efficiency has been demonstrated on agent hydrolysate,  
4 validated process controls and statistical testing may be used in lieu of analyzing all  
5 batches of agent hydrolysate. This alternative analytical approach will be submitted to  
6 KDEP as part of the Waste Analysis Plan that is included in the RD&D Permit Compliance  
7 Schedule, Appendix B, Item # 18.

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

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

## 21 4.3 Waste Processing Sequences

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

### 24 4.3.1 GB Nerve Agent Munitions

#### 25 4.3.1.1 GB 8-Inch Projectile (no energetics are associated with this munition)

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

- 1 12. Pump the stored agent and washout water to the agent neutralization system (ANS)  
2 **hydrolyzers, which** use water and caustic to **destroy the agent. (For H, only water**  
3 **is used to destroy the agent.)**
- 4 13. Transfer the agent hydrolysate to the **agent hydrolysate sampling** tanks where the  
5 hydrolysate is sampled and analyzed to verify that it is below the target release level  
6 for agent. **The sampling and verification of agent destruction for VX agent may be**  
7 **done in the reactor and the sampling tank may be bypassed for VX hydrolysate.**
- 8 14. After the hydrolysate is verified to be below the target release level for agent, pump the  
9 hydrolysate to the HSA before SCWO treatment.

#### 10 4.3.1.2 GB M55 Rockets

11 **The majority of the M55 rockets are stored in the BGCA igloos on pallets in their shipping**  
12 **and firing tubes (SFTs). These rockets are termed “nonleakers.” A small number of the**  
13 **M55 rockets have been overpacked because of leaks that were identified during routine**  
14 **agent monitoring in the igloos; these rockets are termed “leaker” rockets. Section**  
15 **4.3.1.2.1 presents the processing sequence for the nonleaker rockets ; Section 4.3.1.2.2,**  
16 **the overpacked rockets (also termed leaker rockets).**

#### 17 4.3.1.2.1 Nonleaker Rocket Processing Sequence

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

- 20 1. Remove the pallet of rockets from the EONC (UPA).
- 21 2. Place each rocket individually onto the rocket **input assembly, which conveys it**  
22 **through the airlock to the ECV and to the rocket cutting machine (RCM). The**  
23 **RCM separates the rocket into three pieces: the warhead, the warhead’s SFT and**  
24 **the NCRM.**
- 25 3. **Transfer the NCRM (still contained in its section of the SFT) to a container for**  
26 **further treatment at another location on BGAD or an offsite TSDF.**
- 27 4. **Transfer the warhead’s SFT to a container for disposal at a permitted Toxic**  
28 **Substances Control Act (TSCA) landfill.**
- 29 5. Convey the rocket **warhead** to the punch-and-drain station of the rocket shear machine  
30 (RSM) in the explosive containment room (ECR).
- 31 6. Punch holes in the top and bottom of the rocket **warhead** agent cavity with the punch-  
32 and-drain station.
- 33 7. Drain the agent through the lower clamp. Send the drained agent into an agent storage  
34 tank in the agent neutralization room (see Section 4.10 for a discussion of the ANS).
- 35 8. Introduce high-pressure water. Flush the agent cavity (the optimum flush duration,  
36 pressure and flow rate will be the subjects of simulant, surrogate, and agent testing  
37 during the RD&D program), maintaining suction at a slightly higher flow rate than the  
38 inflow.
- 39 9. **Send the washout water to a storage tank in the agent neutralization room (refer**  
40 **to Section 4.10 for a discussion of the ANS).**

10. Transfer the agent hydrolysate to the hydrolysate **sampling** tanks where the hydrolysate is sampled and analyzed to verify that it is below the target release level for agent.
11. After the hydrolysate is verified to be below the target release level for agent, pump it to the HSA before SCWO treatment.
12. Move the rocket to the shear station for cutting.
13. Cut the warhead portion into segments. The warhead includes the fuze, the burster, and the washed agent cavity.
14. Send the warhead segments to the EBHs.
15. **Send the energetics hydrolysate from** the EBH to the energetics neutralization system (ENS) for **further** hydrolysis, as required.
16. 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.
17. Transfer the energetics hydrolysate from the HSA to the **APS and the AFS in the SPB**.
18. 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.
19. 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.

- 1       **2. For unknown rocket leakers (nonoverpacked leaker rockets that are identified in**  
2       **EONCs and at the RCM):**
  - 3       **a. Leaking rocket(s) could be detected when monitoring EONCs for agent in**  
4       **the UPA. The EONC that has been found to contain leaking rockets will be**  
5       **transported to the EONC leaker airlock so that the leaking rockets can be**  
6       **moved from the EONC to the ECV. Personnel in appropriate PPE will place**  
7       **each potentially contaminated rocket onto the RCM conveyor system.**
  - 8       **b. A leaking rocket could be detected when monitoring for agent at the RCM**  
9       **or while observing the RCM. The leaking rocket that is found at the RCM**  
10       **may either be stored for a short duration, overpacked, and sent back to the**  
11       **igloo for later processing; or it can be processed immediately if the number**  
12       **of stored leaking rockets in the ECV is sufficient to justify stopping normal**  
13       **rocket processing to process the stored leakers. Personnel in appropriate**  
14       **PPE will place the rockets onto the RCM conveyor system.**
- 15       **3. The RCM separates the rocket into three pieces: warhead, warhead's SFT, and**  
16       **CRM.**
- 17       **4. The warhead is processed in one of the two ECRs, following steps 4 through 18**  
18       **in Section 4.3.1.2.1.**
- 19       **5. The agent-contaminated SFT is removed from the conveyor in the ECV and**  
20       **transferred to the TMA for chemical decontamination to the Army**  
21       **Decontamination Standard and disposed of at an off-site permitted TSCA TSDF.**  
22       **If chemical treatment proves unsuccessful, the SFT may be thermally treated in**  
23       **the MPT.**
- 24       **6. The CRM is conveyed to the ECR for processing at the RSM, which shears the**  
25       **rocket motor into four (approximately) 8-inch pieces and the tailfin using cuts 5,**  
26       **6, 7, and 8 following the original baseline design. Cut 8 is located at a point that**  
27       **isolates the tailfin section from the propellant.**
- 28       **7. The tailfin section and the segments of rocket propellant are transferred to and**  
29       **processed in separate EBHs.**
- 30       **8. The energetics hydrolysate is sent from the EBHs to the ENS for further**  
31       **hydrolysis, as required.**
- 32       **9. Before the energetics hydrolysate is transferred to the HSA, it is sampled and**  
33       **analyzed to verify that it no longer exhibits the characteristic of reactivity and**  
34       **that the agent concentration is below the target release level for agent.**
- 35       **10. The energetics hydrolysate is transferred from the HSA to the APS and AFS in**  
36       **the SPB.**
- 37       **11. The aluminum is chemically precipitated and the precipitate is removed by**  
38       **filtration. The aluminum precipitate is characterized and sent off site to a**  
39       **permitted disposal facility. The filtrate is sent to the SCWO for further treatment.**
- 40       **12. Solid material (rocket sections and pieces) from the EBHs is sent through the**  
41       **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<sup>10</sup> 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.

#### 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.

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<sup>10</sup> ABCDF and NECDF.

#### 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 the Army Decontamination Standard. Wastes that have been confirmed to meet Army decontamination levels 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 be 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.

- 1           c.    a.       If the agent concentration is below the target release level for agent, **send**  
2                   **the SDS to the HSA for further treatment in the SPB.**
- 3           b.       If the residual agent concentration is above **the target release level for agent,**  
4                   **treat the SDS in the SDS tank with caustic and resample or** send the SDS to  
5                   the **ANS** for further treatment.

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

## 10 4.4 Munitions Unpacking

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

21 In **addition to the RCM operations**, the overpacked rockets and overpacked projectiles are  
22 removed from the overpacks and placed on **their respective conveyors** for processing as  
23 described in Sections 4.3.1.2 and 4.3.1.1, respectively. **Overpacked** unburstered projectiles are  
24 loaded onto a munition tray for processing through the nose closure removal station (NCRS) as  
25 described in Section 4.3.1.1.

26 **The following subsections describe the munitions unpacking subsystems.**

### 27 4.4.1 Projectile Input Subsystem

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

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

### 33 4.4.2 Rocket Input Subsystem

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

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<sup>11</sup> Evaluation of process integration will require the operation and testing of all of the equipment identified in Sections 4.4 through 4.14 with the exception of Section 4.5.1.

### 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.

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

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

## 6 **4.8 Dunnage Treatment**

7 **Dunnage will be managed in accordance with the procedures described in Sections 4.3.4,**  
8 **4.3.5, 4.3.6, and 4.4.3.**

## 9 **4.9 Energetics Treatment (Drawings 24915-07-M5-EBH-00001, -ENS-00001,** 10 **-OTE-00001, and 24915-11-M5-HSS-00002)**

### 11 **4.9.1 Energetics Batch Hydrolyzer**

12 Explosives and **CRM propellant** contained in the rockets and explosives contained in the  
13 155-mm H projectiles are treated in EBHs as shown in the PFD for the EBH system.

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

22 Hydrogen gas generated by the reaction of aluminum with sodium hydroxide is monitored, and  
23 an air or nitrogen purge is provided to ensure that hydrogen levels are maintained below the  
24 25% of the lower flammability limit (LFL). The EBH room is designed as an explosion  
25 containment room (ECR).

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

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

### 36 **4.9.2 Heated Discharge Conveyors**

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

### 39 **4.9.3 Energetics Neutralization System**

40 The energetics hydrolysate is not released from the MDB until it has been tested for agent and  
41 verified to have met all requirements for release from engineering controls. The hydrolysate is

1 transferred to the energetic hydrolysate storage tanks in the HSA. If the residual agent  
2 concentration is above the target release level, additional reaction time will be required in the  
3 ENRs before transfer to the HSA. **Gases from the ENS are sent to the MPT offgas treatment**  
4 **system (OTM). After treatment in the OTM, the gases are released to the MDB HVAC filter**  
5 **system. The ENS gases can also be sent to the EBH OTE if the OTM is not in operation.**

#### 6 **4.9.4 EBH Offgas Treatment System (OTE)**

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

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

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

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

19 **The offgas from the filter is passed through an electric heater, which raises its**  
20 **temperature and reduces its relative humidity to below 55%. The gases from the OTE**  
21 **discharge to the MDB HVAC filter system.**

#### 22 **4.10 Aluminum Precipitation System (APS)/Aluminum Filtration** 23 **System (Drawings 24915-07-M5-APS-00001, -AFS-00001)**

24 **The energetics hydrolysate is transferred from the HSA to the APS in the SPB, where pH**  
25 **of the hydrolysate is adjusted to precipitate the aluminum compounds before it is sent to**  
26 **the AFS to remove the precipitated aluminum compounds.**

27 **The AFS filtrate is transferred to the SCWO feed tanks for blending with the agent**  
28 **hydrolysate. The filter cake is removed and disposed of at a permitted TSDF.**

#### 29 **4.11 Agent Neutralization by Hydrolysis (Drawing 24915-07-M5-ACS-00001,** 30 **-ANS-00001, and 24915-11-M5-HSS-00001)**

31 **The agent drained from the munitions, as well as the wash liquid from the drain-and-wash**  
32 **operation, is hydrolyzed in the ANS reactors. Hot water will be used to neutralize H; hot NaOH**  
33 **solution will be used to neutralize VX and GB.**

34 **In the neutralization process, the agent will be destroyed to at least 99.9999% on a mass basis**  
35 **(i.e., the mass of agent entering the ANS versus mass of agent leaving the hydrolysis system).**  
36 **Attachment 10, Section 10.1, discusses how the destruction efficiency is determined.**

37 **SDS will be analyzed for agent; if agent concentration is below the target release level,**  
38 **the SDS will be transferred to the HSA. If the agent concentration is not below the target**  
39 **release level, the SDS either be treated in the SDS Tanks with caustic and resampled or**  
40 **will be sent to the agent hydrolysis reactors for further treatment.** The agent hydrolysis  
41 reactors are kept under a nitrogen purge and the reactors' vent gas is treated in the OTM (as  
42 described in Section 4.12) before it is released to the MDB HVAC filter system.

1 Before the hydrolysate is discharged from the agent reactors **for VX or the sampling tanks for**  
2 **GB and H**, it **may be** sampled and analyzed to ensure that it is below the target release level for  
3 agent **or it may be released based on validated process controls and statistical testing.**  
4 **This alternative analytical approach will be submitted to KDEP as part of the Waste**  
5 **Analysis Plan that is included in the RD&D Permit Compliance Schedule, Appendix B,**  
6 **Item # 18.** Only after **one of these criteria** have been met is the hydrolysate released from the  
7 reactor **or the sampling tank** and pumped to the HSA prior to further treatment by the SCWO  
8 treatment process.

#### 9 **4.12 Metal Parts Treater, MPT Cooling System (MCS), and Offgas** 10 **Treatment System** 11 **(Drawings 24915-07-M5-MPT-00001, -MCS-00001, and -OTM-00001)**

12 Washed munition bodies from MWS, **EBH solid residues**, and secondary wastes are thermally  
13 decontaminated in the MPT units. **These items are placed on trays and are conveyed to** the  
14 MPT; the chamber is sealed, purged with nitrogen gas, and **inductively** heated until all  
15 components have been thermally treated to a minimum of 1,000°F for **a minimum of 15**  
16 **minutes; they are then cooled in a nitrogen atmosphere to approximately 400°F.**

17 **The MCS cools the trays exiting the MPT to a temperature at which it is safe to handle.**

18 **The OTM treats the offgases from the MPT and the vent gases from the ACS, ANS, ENS,**  
19 **and SDS tank systems** before the offgases are released to the MDB HVAC filter system.

20 **The following subsections describe these three systems.**

##### 21 **4.12.1 MPT (Drawing 24915-07-M5-MPT-00001)**

22 **The MPT thermally decontaminates the munitions bodies of 155-mm and 8-in. projectiles**  
23 **using inductive heating and superheated steam. Air is excluded from the system through**  
24 **the use of airlocks and nitrogen purges.**

25 **Trays of projectiles and other materials are processed by placing them on a conveyor,**  
26 **which carries them through the first door<sup>12</sup> into the inlet airlock. The tray is staged in the**  
27 **inlet airlock, which is purged with nitrogen, until the trays in the MPT have completed**  
28 **processing and have been moved downstream. The tray is conveyed through the gate**  
29 **into MPT zone 1, where it is held until it reaches the desired initial temperature<sup>13</sup>. It is**  
30 **then moved into MPT zone 2 where it is further heated for a sufficient time to ensure that**  
31 **the complete mass of material has achieved a minimum of 1,000°F for a minimum of 15**  
32 **minutes. After these conditions have been achieved, the tray from zone 2 is moved into**  
33 **the exit airlock where it is kept for a sufficient period to ensure that it has cooled to a**  
34 **temperature of 400°F or lower. Cooling in the nitrogen atmosphere of the exit airlock**  
35 **prevents the formation of dioxins and related compounds. This type of sequential**  
36 **operation allows for continuous treatment of trays of material while ensuring that the**  
37 **material in each tray has been heated to a minimum of 1,000°F for a minimum of 15**  
38 **minutes.**

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<sup>12</sup> **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.**

<sup>13</sup> **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 OTE.**

#### 4.12.2 MCS (Drawing 24915-07-M5-MCS-00001)

The material exits the MPT outlet airlock at approximately 400°F; 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.

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.

1 The gas reheater reheats the OTM outlet gases to maintain the relative humidity of the  
2 blower effluent stream below 55% to avoid condensation in the HVAC ducts. The treated  
3 offgases from the OTM then go to the MDB HVAC filter system.

#### 4 4.13 Decontamination Solution Supply and Spent Decontamination 5 Solution Capture/Storage System (Drawing 24915-07-M5-SDS-00001)

6 Decontamination solution is used in the following activities:

- 7 1. Wash down any spills of agent that may have occurred.
- 8 2. Decontaminate equipment.
- 9 3. Decontaminate PPE that may have been contaminated during toxic area entries.<sup>14</sup>

10 Decontamination solution is used by applying it to an area of contamination, allowing sufficient  
11 contact time, and then rinsing the area with water. The wash water drains to sumps in the MDB.

12 The decontamination solution is based on NaOH, NaOCl, or other decon solutions. Other  
13 possible decon solutions will be evaluated and used if their overall performance and  
14 environmental health impacts prove to be equal to or better than current decon solutions.

15 The SDS is managed as described in Section 4.3.8.

#### 16 4.14 SCWO Units (Drawing 24915-10-M5-SCWO-00001)

17 The SCWO units are used to treat the agent and energetics hydrolysates and spent  
18 decontamination fluid. The various waste streams may be processed through the SCWO units  
19 either individually or as blends. All materials that are fed to the SCWO units have been  
20 previously verified to be below the target release level for agent; therefore, the SCWO and  
21 downstream operations do not require engineering controls. **Tests conducted as part of the  
22 TRRP have provided data on the appropriate ratios of caustic and salt transport  
23 additives. The SCWO TRRP reports have been submitted to KDEP as required by the  
24 RD&D Permit, Appendix B, Compliance Schedule Item 1.**

25 The SCWO process is based on the unique properties of water at conditions above its  
26 thermodynamic critical point of 374°C (705°F) and 3,206 psia. At these supercritical conditions,  
27 organic materials and oxidant gases are generally completely miscible in water and the elevated  
28 pressure increases the mixture density in the reactor, thus allowing rapid and complete  
29 oxidation reactions.

30 The SCWO reactor is a vertical down-flow high-pressure cylindrical vessel. Its general  
31 configuration is shown in Figure 4-4. A replaceable annular liner is fitted into the vessel as  
32 shown. A small flow of air or nitrogen is maintained in the annulus between the liner and the  
33 pressure vessel to inhibit the ingress of process fluid into the annulus.

34 The material to be reacted (hydrolysate or spent decontamination solution) along with air is  
35 pumped through the feed-nozzle at the top of the reactor. The feed material will be  
36 supplemented with additional organic feed (supplemental fuel) in order to increase its heating

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<sup>14</sup> 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.

1 value, as required to maintain an autogenous<sup>15</sup> reaction. Isopropyl alcohol (IPA), fuel oil, or  
2 kerosene may be used as supplemental fuels at the BGCAPP.

3 In the SCWO reactor, the organic constituents of the waste are converted to carbon dioxide  
4 (CO<sub>2</sub>), water (H<sub>2</sub>O), nitrogen (N<sub>2</sub>), or nitrous oxide (N<sub>2</sub>O), and sulfates and phosphates (if sulfur  
5 or phosphorus is present in the feed). Halogens are converted to their respective acids. The  
6 acids react with the caustic to form sodium salts such as sodium chloride (NaCl), sodium  
7 fluoride (NaF), monosodium phosphate (NaH<sub>2</sub>PO<sub>4</sub>), and sodium sulfate (Na<sub>2</sub>SO<sub>4</sub>), depending on  
8 the agent being processed. The salts are not soluble in the supercritical fluid and they are  
9 carried through the reaction zone (from the injector to the quench region) as solids or as  
10 slurries. At the bottom of the reactor, quench water is introduced, lowering the temperature  
11 below the critical point and converting the supercritical fluid to a liquid into which the salts  
12 dissolve. All of the reaction products flow out of the bottom of the SCWO reactor.

13 During system startup, an electric feed preheater is used to heat the SCWO reactor to the fuel  
14 initiation temperature at the nominal operating pressure of about 3,400 psi. At this point, flows of  
15 oxidant and fuel are begun, and reaction is initiated. Oxidation of the fuel brings the SCWO  
16 system to the full operating temperature before the hydrolysate is introduced. After the  
17 hydrolysate flow is initiated, fuel flow is reduced to accommodate the heat released by  
18 hydrolysate oxidation. As the hydrolysate feed rate is ramped up to the target throughput, the  
19 fuel, water, and air flow rates are adjusted as required to maintain the desired operating  
20 conditions.

21 The quenched reactor effluent is passed through a series of heat exchangers to cool it to near-  
22 ambient temperature, passed through a high-pressure gas/liquid separator (GLS), and then  
23 passed through pressure reduction control valves. The gas stream and the liquid stream are  
24 depressurized separately. The liquid stream goes to a second GLS to further remove gases that  
25 were soluble at high pressure, principally residual CO<sub>2</sub>. The gas is combined with the main gas  
26 stream exiting the high-pressure GLS. The SCWO aqueous effluent exits the bottom of the low-  
27 pressure gas/liquid separator and is pumped to the **SCWO effluent tank for storage before it  
28 is transferred to the reverse osmosis (RO) system.**

#### 29 **4.15 Reverse Osmosis (RO) (Drawing 24915-10-M5-RO-00001)**

30 **The RO unit processes the effluents from the SCWO units. SCWO effluents are first fed to**  
31 **the feed preparation subsystem, consisting of a clarifier for removing suspended solids,**  
32 **a multimedia filter, and a cartridge filter. This water stream from the preparation stage is**  
33 **then fed to an RO unit for brine concentration. The RO system creates a permeate**  
34 **stream, which is of suitable quality for reuse in the SCWO system. All residues from the**  
35 **clarifier and the filters are injected into the RO reject stream. Reject from the RO unit**  
36 **combines with blowdown from processing units, stored in the RO reject tanks, and then**  
37 **shipped off site to a permitted TSDF.**

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<sup>15</sup> 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.

1 **Table 4-1—Major NRC Reports Relevant to Destruction of Weapons at BGAD**

NRC 1993	<i>Alternative Technologies for the Destruction of Chemical Agents and Munitions</i>
NRC 1995	<i>Review of Alternative Chemical Disposal Technologies</i>
NRC 1999	<i>Review and Evaluation of Alternative Technologies for Demilitarization of Assembled Chemical Weapons</i>
NRC 2000	<i>Evaluation of Demonstration Test Results of Alternative Technologies for Demilitarization of Assembled Chemical Weapons, a Supplemental Review for Demonstration II</i>
NRC 2000a	<i>Integrated Design of Alternative Technologies for Bulk-Only Chemical Agent Disposal Facilities</i>
NRC 2001	<i>Analysis of Engineering Design Studies for Demilitarization of Assembled Chemical Weapons at Pueblo Chemical Depot</i>
NRC 2001a	<i>Disposal of Neutralent Wastes</i>
NRC 2002	<i>Analysis of Engineering Design Studies for Demilitarization of Assembled Chemical Weapons at Blue Grass Army Depot, 2002</i>
NRC 2002a	<i>Update Engineering Design Studies for Demilitarization of Assembled Chemical Weapons at Blue Grass Army Depot</i>
All NRC reports are available for purchase or download at <a href="http://www.nap.edu">www.nap.edu</a> .	

2  
3  
4 **Table 4-2—Hydrolysis Types to be Used at BGCAPP**

Hydrolysis Type	Agent
Hot water	H, blister agent mustard <sup>a</sup> : bis(2-chloroethyl) sulfide or ,2'-dichlorodiethyl sulfide (C <sub>4</sub> H <sub>8</sub> Cl <sub>2</sub> S)
Hot sodium hydroxide solution	GB [nerve agent sarin: isopropyl methyl phosphonofluoridate (C <sub>4</sub> H <sub>10</sub> FO <sub>2</sub> P)]
	VX [nerve agent: O-ethyl S-(2-diisopropyl-aminoethyl) methylphosphonothiolate (C <sub>11</sub> H <sub>26</sub> NO <sub>2</sub> PS)]
	Energetic materials (explosives and rocket propellants)
<sup>a</sup> Levinstein mustard.	

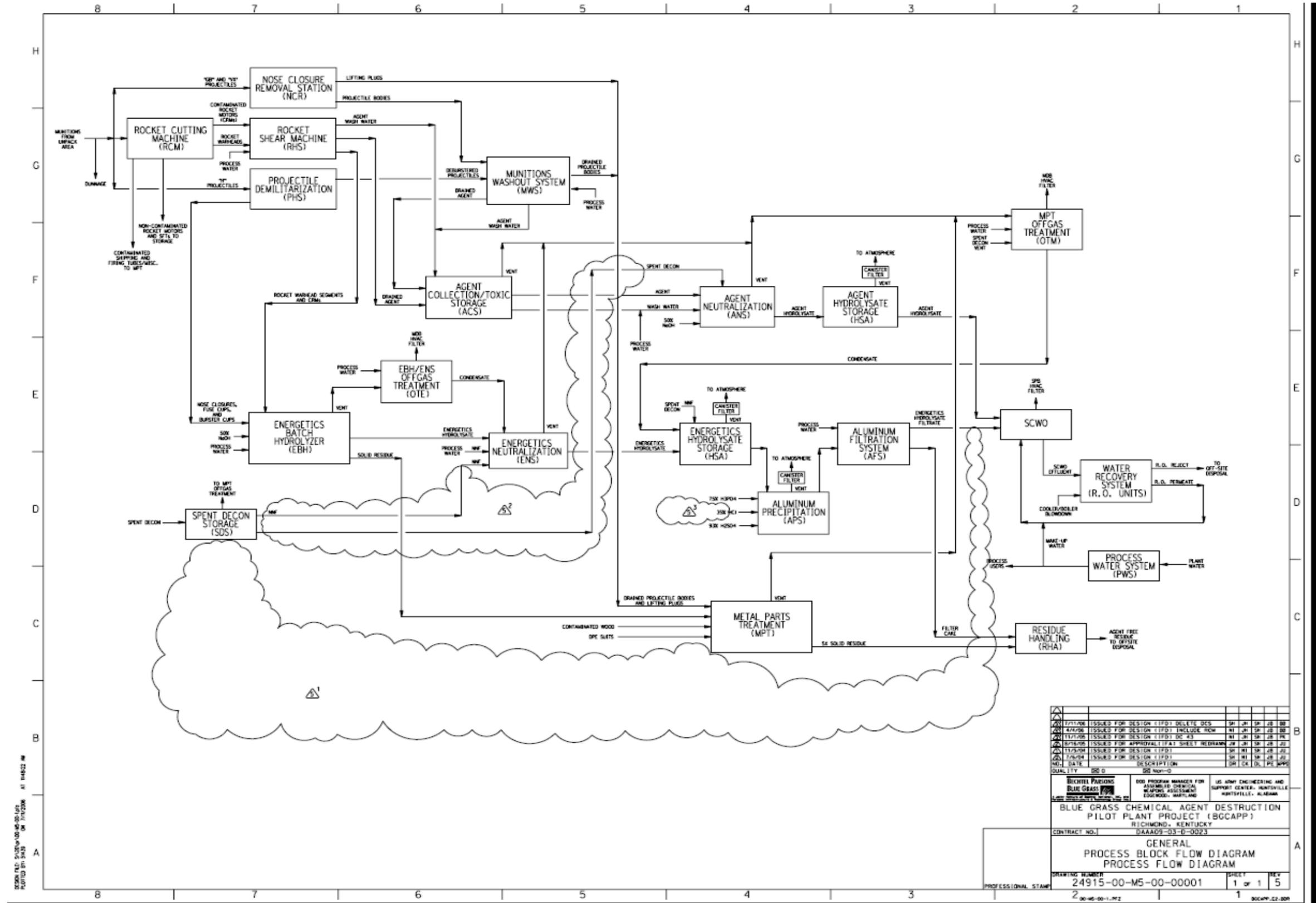


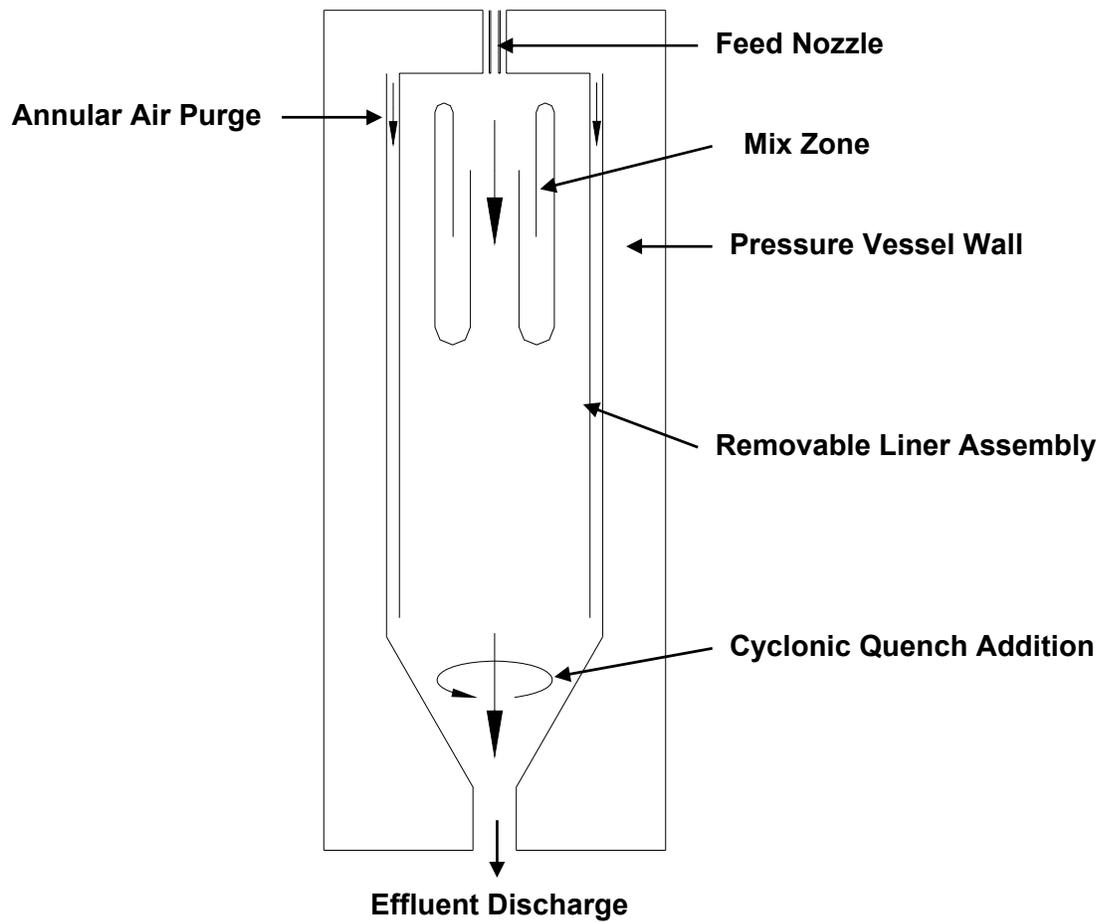
Figure 4-1— Block Flow Diagram



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

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## 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 runoff 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

1 Facilities.” Each regulated area or unit is discussed below with the appropriate regulatory  
2 requirements from 401 KAR Chapter 34.

3 1. *Container Storage*

4 This section describes the areas in which BGCAPP will manage containers of  
5 hazardous waste and some of the types of containers managed, and briefly describes  
6 the hazardous waste. Containers listed below and additional containers selected and  
7 used during systemization and the RD&D program at BGCAPP meet the definition and  
8 requirements of 401 KAR 38:005, 401 KAR 34:180, and 401 KAR 38:150.

9 2. *Hazardous Waste Containers*

10 Several different containers will be used to manage, store, and transport hazardous  
11 waste within BGCAPP, in addition to the munitions themselves. Several of these  
12 containers are described below, but this listing is not all inclusive. As additional types of  
13 containers are identified, they will be incorporated into BGCAPP procedures in  
14 compliance with 401 KAR 34:180 and 401 KAR 38:150. **Only compatible wastes will**  
15 **be containerized together.**

16 a. *Single Round Container (SRC)*

17 M55 rockets that have been found to be leaking are containerized in a single  
18 round container (SRC). The SRC was specifically developed to contain the M-55  
19 in a substantial steel shell, which has been subjected to a helium leak test as part  
20 of the acceptance process. Leaking M-55 rockets, which were containerized  
21 before the development of the SRC, are stored in a modified M-1 container. The  
22 modified M-1 is a heavy steel cylinder bolted on with a gasket seal with eight  
23 bolts. All munitions are stored on specialized pallets designed to store the  
24 overpacked unit securely.

25 b. *M16 Series Overpack Container*

26 The M16 series containers are cylindrical steel containers designed to be air  
27 tight, designated for the over-pack of projectiles. Overpacked 155-mm projectiles  
28 are stored in wooden “egg crates” specifically designed to store the M16  
29 overpack container.

30 c. *M10 Series Overpack Container*

31 The M10 series container is a cylindrical steel container that is designed to be  
32 airtight and is designated for use as an overpack container for leaking or  
33 deteriorated M16 containers and as an overpack container for 8-in. projectiles.

34 d. *DOT Bottle*

35 DOT bottles are cylindrical containers of steel. Each bottle contains  
36 approximately 3 gallons of chemical warfare agent.

37 e. *One-Ton Containers*

38 **Three one-ton containers hold unserviceable mixtures of GB agent and liquid**  
39 **from drill and transfer (DAT) operations and Surveillance Program, Lethal**  
40 **Chemical Agents and Munitions [SUPLECAM] operation. The one-ton containers**  
41 **are cylindrical steel containers. All valves and pipes have been replaced with**  
42 **steel plugs.**

43 f. *ISO 55-Gallon Steel Drum*

44 Some secondary waste generated during the RD&D process will be  
45 containerized in 55-gallon steel drums. The lids will be kept closed except during

1 filling. Each drum is manufactured with 18-gauge cold rolled steel in accordance  
2 with 49 CFR 178.54. Maximum volume of each drum is 55 gallons and has an  
3 empty weight of approximately 38 pounds. All drums are approximately 35 inches  
4 tall with a diameter of 22½ in.

5 g. *Intermediate Bulk Containers (IBCs)*

6 IBCs may be used throughout the process to collect various liquid waste  
7 streams. Each IBC will have a capacity of 300 gallons with nominal dimensions  
8 of 42 by 48 by 41 in. (LxWxH). IBCs are manufactured from various materials  
9 including carbon steel, stainless steel and polymers in accordance with DOT  
10 regulations.

11 h. *Enhanced Onsite Container (EONC)*

12 The Department of the Army uses EONCs to store and transport the munitions  
13 and bulk containers for the time period immediately preceding demilitarization  
14 activities. The EONC is designed to provide vaportight containment of agent; all  
15 seals on the containers are impervious to agent and are able to withstand  
16 decontamination solutions. The EONC will provide secondary containment for the  
17 munitions or containers stored within. The EONCs and any components mounted  
18 on the surface will fit within an envelope that is 8.5 ft by 8.5 ft by 12 ft high. The  
19 combined weight of the EONC and munition holding trays will not exceed  
20 26,000 lb.

21 3. *Container Management*

22 Containers at BGCAPP will be managed in accordance with 401 KAR 38:005, 401  
23 KAR 34:180 and 401 KAR 38:150<sup>1</sup>. Munitions destined for demilitarization are  
24 described in Attachment 3. The munitions are transported to the container handling  
25 building (CHB) for storage prior to processing during the RD&D program. The Blue  
26 Grass Chemical Activity (BGCA) is responsible for the safe storage and delivery to  
27 BGCAPP of these munitions, including, but not limited to:

- 28 a. Loading specified chemical munition types into EONCs.
- 29 b. Transporting the EONCs from the CLA to the CHB of BGCAPP.
- 30 c. Completing required record keeping for transfer of custody of munitions to  
31 BGCAPP.
- 32 d. Returning unloaded EONCs to the CLA.

33 This activity will be completed under a BGCA Work Plan approved by KDEP in  
34 accordance with the requirements of KRS 224.50.130 (Chemical Munitions).

35 Each truck used by BGCA can transport one EONC of munitions. The number of trucks  
36 per day and the loading configuration in the EONCs will differ with the specific goal of  
37 scheduled research. EONC movement from the CHB to the munitions demilitarization  
38 building (MDB) continues 24 hr/day, 7 days/week.

39 When the truck enters the BGCAPP perimeter, it will move to an off-loading area at the  
40 CHB. A bridge crane or similar device will be used to unload the EONC. All containers  
41 present in the CHB will contain the same agent because the facility will process only

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<sup>1</sup> Attachment 12 provides a list of specific regulatory waivers BGCAPP is requesting, along with justification for each request.

1 one lethal chemical agent at a time. In accordance with the Kentucky Hazardous  
2 Waste regulation 401 KAR 34:180 Section 5, the vapor space of the EONCs containing  
3 waste that remain in the CHB for more than 1 week will be monitored using an agent  
4 monitor port in the EONC on a weekly basis for agent vapor in lieu of visual inspections  
5 of the hazardous waste containers (munitions).

6 Wastes generated during the RD&D program and construction will be placed in  
7 containers whose materials of construction is compatible with the contents. The  
8 selection will be made on a case-by-case basis consistent with generator knowledge of  
9 the stream. In cases of uncertainty, the stream's pH or other relevant parameters will  
10 be evaluated and the container material selected on the basis of this analysis. All  
11 waste containers will always be kept closed during storage except when adding or  
12 removing waste.

13 All containers will be handled in a manner to avoid rupturing or leaking. All handling will  
14 be performed with drum dollies, forklifts, overhead cranes, or other means, as  
15 appropriate. One of the goals of the process integration RD&D will be to evaluate the  
16 safety and suitability of the handling procedures.

17 Development of container management will continue throughout systemization and the  
18 RD&D program.

19 4. *Hazardous Waste Container Storage Areas*

20 Several areas within BGCAPP will have permitted container storage areas. These  
21 areas will be designed, constructed and managed in accordance with all applicable  
22 standards of 401 KAR 38:005, 401 KAR 34:180, and 401 KAR 38:150. Table 5-1  
23 summarizes the areas within BGCAPP to be permitted for container storage; more  
24 detailed descriptions follow.

25 a. *CHB*

26 The CHB is a steel-frame building with insulated metal roofing and insulated siding  
27 panels. **A side loader truck will be used to move the EONCs into the CHB and**  
28 **also to transfer them to the unpack area (UPA).**

29 The EONC storage area is sized to store **53** EONCs.

30 Permitted storage will be limited to the storage of containers inside of EONCs. The  
31 EONC meets secondary containment requirements of 401 KAR 34:180 Section 6 for  
32 the munitions contained within.

33 The floor of the CHB is constructed of reinforced concrete. The CHB-MDB transition  
34 structure is metal siding with a reinforced concrete floor. The number of construction  
35 and expansion joints will be kept to a minimum. All joints between floors and walls will  
36 be covered and sealed.

37 b. *MDB*

38 The MDB is the primary **treatment facility** in the chemical weapons destruction  
39 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	
<b>Metal Parts Treater (MPT) Cooling Conveyor Area</b>	
<b>Munition Washout System (MWS) Storage Area</b>	
<b>Tray/Container Transfer Room</b>	
<b>Energetics Batch Hydrolyzer (EBH) Room</b>	
<b>Agent Neutralization System (ANS) Room</b>	
<b>Energetic Neutralization System (ENS) Room</b>	
<b>EBH Offgas Treatment System (OTE) Area</b>	
<b>Motor Processing Room (MPR) Area</b>	
<b>Motor Storage Room (MSR)/Covered Loading Area</b>	
<b>Box Storage Area</b>	
<b>MPT Offgas Treatment System (OTM) Area</b>	
<b>SCWO Processing Building (SPB) Area</b>	
<b>Waste Storage Area (WSA)</b>	
Laboratory Waste Handling Area	

1           1.    *Unpack Areas (UPAs)*

2           Containers and munitions will be brought from the CHB into the MDB via the  
3           UPAs. **Each UPA is a** transition area between the CHB and the hazardous  
4           waste processing in the MDB. Permitted storage will be limited to the storage  
5           of containers inside of EONCs or on secondary containment pallets. The  
6           EONC meets secondary containment requirements of 401 KAR 34:180  
7           Section 6 for the munitions contained within. This area will also provide a  
8           means to monitor the EONCs for leakers, provides an unpack station, and  
9           provides a means to return empty EONCs to the CHB for temporary storage.  
10          The floor of **each** UPA is constructed of reinforced concrete. The number of  
11          construction and expansion joints will be kept to a minimum. All joints  
12          between floors and walls will be covered and sealed.

13           2.    *Explosive Containment Vestibules (ECVs)*

14          Munitions will be stored on the conveyors in **these** rooms and the munitions  
15          will also be stored on the reject systems located in **these** rooms. In addition,  
16          leaking or reject projectiles that have been placed in overpacks may be  
17          stored on the floor in **these** rooms. Storage of projectiles or rockets, in or out  
18          of EONCs, will not exceed the maximum number allowable determined by  
19          the net explosive weight. Secondary containment will be provided by a  
20          coated, reinforced concrete floor, sumps, and perimeter curbs/walls. The  
21          number of construction and expansion joints has been kept to a minimum in  
22          this area and the floor, sumps, and curbs have been coated.

23           3.    *Explosive Containment Rooms (ECRs)*

24          Munitions containing explosives (projectiles with bursters and rockets) are  
25          processed in ECRs. The number of projectiles in an explosive contaminant  
26          room at any time is limited by the explosive force contained in the aggregate  
27          projectiles as determined by the net explosive weight. Munitions will be  
28          stored on the conveyors in this room and the munitions will also be stored on  
29          the reject systems located in this room. In addition, leaking projectiles that  
30          have been placed in overpacks may be stored on the floor in this room.  
31          Secondary containment will be provided by a coated and reinforced concrete  
32          floor, sumps, and perimeter curbs/walls. The number of construction and  
33          expansion joints will be kept to a minimum in this area and the floor, sumps,  
34          and curbs have been coated.

35           4.    *Toxic Maintenance Area (TMA)*

36          The TMA is located within the MDB and a portion of the Category A section  
37          of the TMA is designated as the TMA container storage area. This TMA  
38          container storage area is sized to store one hundred 55-gallon drums. The  
39          TMA airlock/decon area is sized to store one EONC. Secondary containment  
40          will be provided by a coated and reinforced concrete floor, sumps, and  
41          perimeter curbs/walls. The number of construction and expansion joints has  
42          been kept to a minimum in these areas and the floor, sumps, and curbs have  
43          been coated.

44           5.    *Residue Handling Area (RHA)*

45          BGCAPP process residues consist of metal parts associated with the  
46          munitions from the metal parts treaters (MPTs), various solid **dunnage**.  
47          **Also, dunnage** scheduled to be processed through the **BGCAPP** will be  
48          stored in the **RHA** container storage area. Typical containers include

1 55-gallon drums, rolloff boxes, and plastic bags used to hold contaminated  
2 personnel protective equipment (PPE) prior to treatment.

3 **6. MPT Cooling Conveyor Area**

4 BGCAPP process residues stored in this area include metal parts  
5 associated with the treatment of the munitions and secondary waste  
6 from the MPTs. Typical containers include 55-gallon drums and rolloff  
7 boxes.

8 **7. MWS Storage Area**

9 Miscellaneous secondary waste will be stored in this area until it is  
10 removed for disposal. Typical containers include 55-gallon drums,  
11 plastic bags, and boxes.

12 **8. Tray/Container Transfer Room**

13 Miscellaneous secondary waste will be stored in this room until it is  
14 removed for disposal. Typical containers include 55-gallon drums,  
15 plastic bags, and boxes.

16 **9. EBH Room**

17 Miscellaneous secondary waste will be stored in this room until it is  
18 removed for disposal. Typical containers include 55-gallon drums,  
19 plastic bags, and boxes.

20 **10. ANS Room**

21 Miscellaneous secondary waste will be stored in this room until it is  
22 removed for disposal. The room may also used to store spent decon  
23 solution (SDS) on a contingency basis. Typical containers include  
24 IBCs, 55-gallon drums, plastic bags, and boxes.

25 **11. ENS Room**

26 Miscellaneous secondary waste will be stored in this room until it is  
27 removed for disposal. Typical containers include 55-gallon drums,  
28 plastic bags, and boxes.

29 **12. OTE Area**

30 Miscellaneous secondary waste will be stored in this area until it is  
31 removed for disposal. Typical containers include 55-gallon drums,  
32 plastic bags, and boxes.

33 **13. MPR**

34 Separated rocket motors will be stored in this room prior to their  
35 ultimate disposal. In addition to the rocket motors, empty warhead  
36 shipping and firing tubes (SFTs) will also be stored here. Typical  
37 containers include Department of Transportation (DOT)-approved  
38 shipping boxes.

39 **14. MSR/Covered Loading Area**

40 Separated rocket motors will be stored in this room prior to their  
41 ultimate disposal. In addition to the rocket motors, empty warhead  
42 SFTs will also be stored here. Typical containers include DOT-  
43 approved shipping boxes.

1                    **15. *Box Storage Area***

2                    **Separated rocket motors will be stored in this room prior to their**  
3                    **ultimate disposal. In addition to the rocket motors, empty warhead**  
4                    **SFTs will also be stored here. Typical containers include DOT-**  
5                    **approved shipping boxes.**

6                    **16. *OTM Area***

7                    **Miscellaneous secondary waste will be stored in this area until it is**  
8                    **removed for disposal. Typical containers include 55-gallon drums,**  
9                    **plastic bags, and boxes.**

10                    **e.    c.        *SPB Area***

11                    **Miscellaneous secondary waste will be stored in this area until it is**  
12                    **removed for disposal. Typical containers include rolloff bins, 55-gallon**  
13                    **drums, plastic bags, and boxes.**

14                    **f.    d.        *Waste Storage Area***

15                    **Various liquid and solid hazardous wastes will be stored in this area until it**  
16                    **is shipped off site for disposal. Typical containers include rolloff bins and**  
17                    **55-gallon drums.**

18                    **e.    *Laboratory Waste Handling Area***

19                    **Various liquid and solid hazardous waste generated from lab operations.**  
20                    **Typical containers include IBCs and 55-gallon drums.**

21                    **5.    *Hazardous Waste Tank Storage Areas***

22                    **Several tank systems within BGCAPP will be permitted for storage of hazardous**  
23                    **wastes. These areas are located outside, within the MDB, **and** within the SPB. These**  
24                    **tank systems will be designed, constructed, and operated in accordance with all**  
25                    **applicable standards of 401 KAR 38:005, 401 KAR 34:190 and 401 KAR 38:160.**  
26                    **Table 5-2 shows areas within BGCAPP to be permitted for storage of hazardous**  
27                    **wastes in tanks.**

28                    **6.    *Hazardous Waste Treatment Units***

29                    **Numerous hazardous waste treatment units will be used to destroy the chemical**  
30                    **weapons stockpile at BGCAPP. All the units will be installed during the RD&D program,**  
31                    **although the PMD machine will only be used to process the mustard 155-mm**  
32                    **projectiles which are not the subject of this RD&D Permit Application. Each hazardous**  
33                    **waste treatment unit will be designed, constructed, and operated in accordance with**  
34                    **the applicable standards from 401 KAR Chapter 34 (Standards for Owners and**  
35                    **Operators of Hazardous Waste Storage, Treatment and Disposal Facilities). Table 5-3**  
36                    **describes the hazardous waste treatment units as well as the applicable sections of**  
37                    **Chapter 34.**

38                    **See Attachment 4 for the process description of these treatment units. Materials of construction**  
39                    **and dimensions of miscellaneous treatment units will be provided to KDEP in sufficient time**  
40                    **before the start of construction of the miscellaneous treatment units to allow full evaluation of**  
41                    **their adequacy.**

1

**Table 5-2—Tank Systems Regulatory Standards**

Tank Storage	Tank System Regulatory Standard
Tank <b>storage</b> systems within MDB:	
Agent collection/toxic storage <b>(agent holding tank)</b>	401 KAR 34:190 (Tanks)
<b>Agent and energetics hydrolysate storage tanks</b>	
Tank storage systems within SPB:	
<b>Hydrolysate blend tank</b>	401 KAR 34:190 (Tanks)
<b>Batch hydrolysate holding tank</b>	
<b>SCWO effluent tank</b>	
<b>Reverse osmosis (RO) permeate tank</b>	
<b>RO reject tank</b>	

2

Table 5-3—Treatment Unit Regulatory Standards

Hazardous Waste Treatment Unit	Applicable Standard
Munitions demilitarization building (MDB):	
<b>Rocket cutting machine system (RCM)</b>	<b>401 KAR 34:250 (Miscellaneous Units - Mechanical)</b>
Rocket shear machine (RSM) system	401 KAR 34:250 (Miscellaneous Units - Mechanical); applicable portions of 401 KAR 34:190 (Tanks)
Projectile/mortar disassembly (PMD) system	401 KAR 34:250 (Miscellaneous Units - Mechanical); applicable portions of 401 KAR 34:190 (Tanks)
Energetics batch hydrolyzer (EBH)	<b>401 KAR 34:250 (Miscellaneous Units - Other)</b>
Energetics neutralization system	401 KAR 34:190 (Tanks)
Aluminum <b>precipitation and filtration</b> system	401 KAR 34:250 (Miscellaneous Units - Other); applicable portions of 401 KAR 34:190 (Tanks)
Munition washout system (MWS)	401 KAR 34:250 (Miscellaneous Units - Mechanical); applicable portions of 401 KAR 34:190 (Tanks)
Metal <b>parts</b> treaters (MPTs)	401 KAR 34:250 (Miscellaneous Units - Thermal); applicable portions of 401 KAR 34:190 (Tanks)
Nose closure removal system (NCRS)	401 KAR 34:250 (Miscellaneous Units - Mechanical)
Agent neutralization system ( <b>agent hydrolyzers, agent hydrolysis sampling</b> )	<b>401 KAR 34:190 (Tanks)</b>
<b>SDS holding/agent washout treatment tanks (including Category A &amp; B sumps)</b>	<b>401 KAR 34:190 (Tanks)</b>
SCWO processing building (SPB):	
<b>SCWO units</b>	<b>401 KAR 34:250 (Miscellaneous Units - Other); applicable portions of 401 KAR 34:190 (Tanks)</b>
<b>RO system</b>	<b>401 KAR 34:250 (Miscellaneous Units - Other); applicable portions of 401 KAR 34:190 (Tanks)</b>

## 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 is being successfully treated by hot water hydrolysis (the process that will be used at BGCAPP) at the Aberdeen Chemical Agent Disposal Facility (ABCDF). ABCDF operation is scheduled to be concluded before the start of the BGCAPP RD&D program.
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

- 1           2. Integrity to ensure the absence of punctures and cracks
- 2           3. Integrity of the protective coatings to ensure that it has not been scraped through or
- 3           otherwise removed in locations
- 4           4. Lack of corrosion
- 5           5. Other structural damage or inadequate construction/installation.

6 All discrepancies will be repaired by appropriate methods. The tank will not be placed into  
7 service until it has passed all appropriate inspections.

8 All tanks and ancillary equipment will be tested for tightness to liquid and vapor as appropriate  
9 before being placed in use. All discrepancies will be repaired by appropriate methods. The tank  
10 will not be placed into service until it has passed all appropriate inspections.

11 Ancillary equipment will be supported and protected against physical damage and excessive  
12 stress due to settlement, vibration, expansion, or contraction.

### 13 **401 KAR 38:160 Section 2: Dimensions and Capacity of Each Tank**

14 The capacity and number of tanks is specified in the Part A permit application. The tank  
15 dimensions will be submitted to KDEP as part of the Tank Assessment Report prior to the start  
16 of tank construction.

- 17           1. *Description of Feed Systems, Safety Cutoff, Bypass Systems, and Pressure Controls*  
18           This information will be **submitted to KDEP 24 months prior to the receipt of**  
19           **hazardous waste as specified in the BGCAPP RD&D Permit KY8-213-820-105,**  
20           **Appendix B.**
- 21           2. *Diagram of Piping, Instrumentation, and Process Flow*  
22           The P&IDs will be **submitted to KDEP 24 months prior to the receipt of hazardous**  
23           **waste as specified in the BGCAPP RD&D Permit KY8-213-820-105, Appendix B.**

### 24 **401 KAR 34:190 Section 4: Containment and Detection of Releases**

- 25           1. *Plans and Description of Design, Construction, and Operation of Secondary*  
26           *Containment System*  
27           This information will be provided in sufficient time to KDEP before the start of  
28           construction to allow full evaluation of their adequacy.

### 29 **401 KAR 34:190 Section 4(4)&(5): Requirements for External Liner,** 30 **Vault, Double-Walled Tank or** 31 **Equivalent Device**

- 32           1. *External liner system.*  
33           The external liner (secondary containment) system will be sized to contain as a  
34           minimum 100 percent of the capacity of the largest tank within its boundary. The  
35           containment will also be sufficient size to contain precipitation from a 25-year, 24-hour  
36           rainfall (5.3 in). The containment will be
  - 37           a. Free of cracks or gaps



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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<sup>1</sup> 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 Potentially Subject to KHW Regulation

#### 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.

<sup>1</sup> Figures and tables are presented at the end of this attachment.

- 1           3.   **Major Equipment:** Enhanced onsite containers (EONCs)

2   **6.1.2.2   Munitions Demilitarization Building (MDB)**

- 3           1.   **Description:** Pre-engineered building shell with an inner, field-fabricated reinforced  
4           concrete building that contains explosive containment rooms (ECRs).

- 5           2.   **Method of Construction:** Field Fabrication

- 6           3.   **Major Equipment:**

- 7           a.   **Rocket cutting machine (RCM)**
- 8           b.   Rocket shear machine (RSM)
- 9           c.   Metal parts treater (MPT)
- 10          d.   Energetics batch hydrolyzer (EBH)
- 11          e.   Agent neutralization system (ANS)
- 12          f.   Energetics neutralization system (ENS)
- 13          g.   Projectile mortar disassembly machine (PMD)
- 14          h.   Munition washout system (MWS)
- 15          i.   Offgas treatment units (**OTE and OTM**)
- 16          j.   Material handling systems and components
- 17          k.   Blast gates and doors
- 18          l.   Agent monitoring system

19   **6.1.2.3   SCWO Processing Building (SPB)**

- 20          1.   **Description:** Pre-engineered building. SCWO chemical storage tanks.

- 21          2.   **Method of Construction:** Pre-engineered metal building.

- 22          3.   **Major Equipment:**

- 23          a.   SCWO units
- 24          b.   **Reverse osmosis (RO) system**
- 25          c.   Chemical storage tanks
- 26          d.   Recycled water storage

27   **6.1.2.4   Hydrolysate Storage Tanks and Tank Area**

- 28          1.   **Description:** Large carbon steel tanks and liquid transfer equipment for the agent and  
29          energetics hydrolysate from the MDB. Serves as buffer storage for processing  
30          hydrolysate feeds to the **SPB**.

- 31          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. 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.

1 The HVAC system controls any contaminants that might be released from the process whether  
2 as a point source or as a fugitive emission. Each filter unit consists of the following stages:

- 3 1. A row of prefilters, which remove the larger particulate matter
- 4 2. A row of high-efficiency particulate air (HEPA) filters, which remove very fine  
5 particulate matter
- 6 3. Six rows of carbon filters, which remove agent and other gaseous contaminants such  
7 as organic vapors
- 8 4. A final row of HEPA filters, which capture any particulate that may be released from the  
9 carbon filters

10 Figure 6-2 shows the typical configuration of a HVAC filter unit. **Process Flow Diagrams**  
11 **(PFDs)** 24915-08-M5-HVAC-00001 and -00002 in Appendix C show the process flow of the  
12 HVAC filter.

### 13 **6.1.4 Buildings and Structures not Potentially Subject to KHW Regulation**

#### 14 **6.1.4.1 Access Control Building (ACB)**

15 The ACB is a freestanding building that will be located at the entrance of the Blue Grass Army  
16 Depot (BGAD) and will be used to control access to the BGAD.

- 17 1. **Description:** Facility size and shape will depend on outcome of security requirement  
18 talks with BGAD and recent code changes for installations.
- 19 2. **Method of Construction:** Modular or field fabricated (decision pending).
- 20 3. **Major Equipment:** Standby diesel generator (SDG).

#### 21 **6.1.4.2 Badging Facility**

- 22 1. **Description:** Houses **security personnel who issue badges for site access.**
- 23 2. **Method of Construction:** Prefabricated modular building.
- 24 3. **Major Equipment:** None.

#### 25 **6.1.4.3 Control and Support Building (CSB) and Integrated Control System** 26 **(ICS)**

- 27 1. **Description:** Control room and ICS used to operate BGCAPP, some storage and  
28 change facility, and breathing air auxiliary systems, **MDB/CSB air handlers** and  
29 demilitarization protective ensemble (DPE) storage. The ICS includes all of the  
30 programming, graphics, wiring, and devices located throughout BGCAPP for the facility  
31 control system (FCS) and facility protection system (FPS).
- 32 2. **Method of Construction:** Pre-engineered metal building included as part of the MDB  
33 separated by an accessway.
- 34 3. **Major Equipment:** Control room, consoles, cabinets, **MDB/CSB air handlers.**

#### 35 **6.1.4.4 Entry Control Facility (ECF)**

- 36 1. **Description:** Provides access to the new BGCAPP chemical limited area (CLA).

1        2.    **Method of Construction:** Modular.

2        3.    **Major Equipment:** Standby diesel generator (SDG).

3    **6.1.4.5    Gas Mask Storage Building (GSB)**

4        1.    **Description:** Modular building with no major systems or equipment. Its only  
5        requirement is to store gas masks within their storage requirements. Lighting and  
6        lockers are the only other known requirements.

7        2.    **Method of Construction:** Modular building.

8        3.    **Major Equipment:** None.

9    **6.1.4.6    Modular Laboratory (LAB)**

10       1.    **Description:** Modular building used to house shift lab personnel and to conduct  
11       procedures to support the neutralization operations and documentation requirements.

12       2.    **Method of Construction:** Modular building.

13       3.    **Major Equipment:** Laboratory instrumentation and hoods.

14   **6.1.4.7    LAB Filter Area (LFA)**

15       1.    **Description:** Activated carbon filters to control emissions from laboratory hoods.

16       2.    **Method of Construction:** Field fabricated.

17       3.    **Major Equipment:** HVAC filter system.

18   **6.1.4.8    Maintenance Building (MB)**

19       1.    **Description:** Pre-engineered building with utility system. It is expected to house a  
20       shop area, tool crib, and a supply of operational material and spares. The maintenance  
21       shop has areas for welding, small metal fabrication, conduit bending, tool storage, and  
22       maintenance consumables and flammable material storage.

23       2.    **Method of Construction:** Pre-engineered metal building.

24       3.    **Major Equipment:** None.

25   **6.1.4.9    Personnel Maintenance Building (PMB)**

26       1.    **Description:** Baseline facility expected to be a pre-engineered building with only utility  
27       systems being supplied. It will house the medical facilities, personnel **lockers,**  
28       **showers, lunchroom,** and equipment required to support operations. It will also house  
29       Treaty inspectors.

30       2.    **Method of Construction:** Pre-engineered metal building.

31       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)<sup>2</sup>

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.
  - 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<sub>2</sub>SO<sub>4</sub>)
2. Sodium hypochlorite (NaOCl)
3. Sodium hydroxide (NaOH)
4. Phosphoric acid (H<sub>3</sub>PO<sub>4</sub>)

<sup>2</sup> Subject to regulation as possible air pollution control source.

1 5. Isopropyl alcohol (C<sub>3</sub>H<sub>8</sub>O)

2 6. **Liquid nitrogen**

### 3 **6.1.4.15 Temporary Construction Facilities**

4 During construction, **systemization, and possibly during pilot testing**, the following  
5 temporary facilities will be provided to effectively manage and perform the construction of  
6 BGCAPP:

7 1. Field offices (trailers)

8 2. Warehouses – storage handling

9 3. Change houses

10 4. Fabrication shops

11 5. Welder's test shop

12 6. First aid trailer

13 7. Temporary toilet facilities

### 14 **6.1.4.16 Toxic Maintenance Building (TMB)**

15 1. **Description: Fabric on metal framed structure on a concrete slab with finished**  
16 **office space. The building is expected to house a shop area, tool crib, and a**  
17 **supply of operational material and spares. The maintenance shop has areas for**  
18 **welding, small metal fabrication, conduit bending, tool storage, and maintenance**  
19 **consumables for use inside the restricted area.**

20 2. **Method of Construction: Field fabricated.**

21 3. **Major Equipment: None.**

### 22 **6.1.5 Plant Systems and Subsystems not Potentially Subject to KHW** 23 **Regulation**

24 The following systems are an integral part of the plant, but they are not subject to regulation  
25 under the RD&D permit. They are included here only to provide a complete description of the  
26 construction of the facility.

27 1. Process water system

28 2. Cooling water system

29 3. Compressed air and nitrogen

30 a. Instrument air system

31 b. Plant air system

32 c. Life support air system

33 d. Nitrogen supply system

- 1 4. Fire protection systems:
  - 2 a. **Wet and/or dry pipe sprinkler system, through all permanent buildings**
  - 3 b. Dry chemical system
  - 4 c. ECR deluge fire system
  - 5 d. **CSB fire extinguishing medium (FEM) (inert gas) fire protection system**
- 6 5. Fire detection systems for the following buildings:
  - 7 a. MDB
  - 8 b. UB
  - 9 c. SPB
  - 10 d. CHB
  - 11 e. LAB
  - 12 f. PMB
  - 13 g. CSB
  - 14 h. PSB
  - 15 i. ECF
- 16 6. Site communication systems (site communication meets all requirements of 401 KAR  
17 34:020)
  - 18 a. Site public address (PA) and paging system
  - 19 b. Closed circuit television (CCTV) system
  - 20 c. Site radio system
  - 21 d. Agent alarm lights
- 22 7. Process steam supply system
- 23 8. Site utilities (above- and underground)
- 24 9. Intrusion prevention system
  - 25 a. CCTV system
  - 26 b. Motion detectors

## 27 **6.2 Construction Sequence**

28 **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)<sup>3</sup>
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)

<sup>3</sup> 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.

- 1 12. **Lab filter area (LFA)**
- 2 13. **Integrated process and facility control system (ICS)**
- 3 14. **Modular laboratory (LAB)**
- 4 15. **Container handling building (CHB)<sup>3</sup>**
- 5 16. **SCWO processing building (SPB)<sup>3</sup>**
- 6 17. **Hydrolysate storage area (HSA)<sup>3</sup>**
- 7 18. **Entry control facility (ECF)**
- 8 19. **Personnel and maintenance building (PMB)**
- 9 20. **Standby diesel generators (SDGs)**
- 10 21. **Personnel support building (PSB)**
- 11 22. **Electronic security system (ESS)**
- 12 23. **Toxic maintenance building (TMB)**
- 13 24. **Gas mask storage building (GSB)**

### 14 **6.2.3 Environmental Compliance During Construction**

15 The environmental safety and health (E&SH) construction safety plan includes specific details  
16 relating to compliance with federal, state, and BGAD environmental regulations. BGCAPP will  
17 comply with the requirements of the permits as applicable to the construction portion of the  
18 project. This portion of the E&SH plan addresses the following issues:

- 19 1. Uncontaminated construction waste, including:
  - 20 a. Packing material
  - 21 b. Machinery components
  - 22 c. General household waste
  - 23 d. Landscape waste
  - 24 e. Construction or demolition debris
- 25 2. Hazardous waste, including:
  - 26 a. Waste lubricating oil, motor fuel, hydraulic oils, and cutting oils
  - 27 b. Cleaning solvents such as those used by pipefitters, millwrights, and electricians
  - 28 c. Paint wastes (water- or oil-based) such as rags, slops, sludge, paint solvents,  
29 paint and varnish removers and strippers, and paint cans containing paint  
30 residue
- 31 3. Use, storage, transportation, and disposal of hazardous materials and hazardous  
32 wastes will comply with BGAD, state, and federal requirements

- 1 4. Chemical handling requirements will comply with all federal, state, and BGAD  
2 requirements
- 3 5. Stormwater runoff control will comply with the terms of the project's Stormwater  
4 Management Plan

### 5 **6.3 Independent Facilities Construction Certification**

6 During construction, a Professional Engineer (P.E.) licensed in Kentucky will be present at the  
7 facility to verify that the hazardous waste management units are being built in accordance with  
8 the facility design. Before pilot testing with hazardous waste begins, a registered professional  
9 engineer (licensed in Kentucky) will perform facilities construction certification (FCC) of each  
10 KHW-regulated building, area, and system that is directly associated with the hazardous waste  
11 management unit. The P.E. will certify that each building and system has been constructed as  
12 designed and in accordance with the RD&D permit. The FCC process is required by 401 KAR  
13 38:030 Section 1 (12) (b).

### 14 **6.4 Systemization (not subject to KHW regulation)**

15 The construction sequence described in Section 6.2 results in the individual subsystems being  
16 completed in a staged manner. As a subsystem is completed, it will be turned over to the  
17 Systemization Group who will test its mechanical ability, liquid and gas containment integrity,  
18 and numerous other functions. No chemical agent or any agent-contaminated materials will be  
19 processed during systemization. The systemization will be conducted using simulant and  
20 surrogate materials in all cases. Although the systemization phase of the program is not subject  
21 to KHW regulation, it does form the first part of the overall on-site RD&D program. Its RD&D  
22 objective is to assess the system's overall ability to function as an integrated unit and to identify  
23 problems in the interfaces between the subsystems.

### 24 **6.5 Performance of the RD&D Program – Pilot Testing**

25 After all of the subsystems have been subjected to rigorous testing under the Systemization  
26 program and the results of systemization have been deemed acceptable by Army, Assembled  
27 Chemical Weapons Alternatives (ACWA), and Bechtel Parsons Blue Grass (BPBG), the  
28 program will move into the second on-site phase of the RD&D program, termed "pilot testing."  
29 Pilot testing starts by processing the munitions at very slow rates, and a large amount of testing  
30 and verification takes place during the processing.

31 Pilot testing will begin with the processing of GB rockets and projectiles at the rates shown in  
32 Table 6-1. Treatment of the GB ton containers (TCs) is not shown in Table 6-1 because **they**  
33 **are one-of-a-kind items that may not be processed during RD&D.** It is anticipated that testing  
34 with the GB inventory will meet the system integration objectives of the RD&D program. The  
35 bases for this conclusion are as follows:

- 36 1. All of the components of the BGCAPP, except the projectile/mortar disassembly (PMD)  
37 machine, are tested during the RD&D program. The PMD to be used is a derivative of  
38 the PMD design that has been successfully used at the Johnston Atoll Chemical Agent  
39 Disposal System (JACADS) and the Tooele Chemical Agent Disposal Facility  
40 (TOCDF). The PMD machine may be installed during construction for ease of  
41 installation along with the other equipment, which will be needed for the RD&D  
42 program.
- 43 2. The Aberdeen Chemical Agent Disposal Facility (ABCDF) and the Newport Chemical  
44 Agent Disposal Facility (NECDF) will have completed operations on mustard and VX,

1           respectively, by the time the BGCAPP operations phase starts; therefore, an RD&D  
2           program should not be required for these agents.

3           Table 6-1 shows that, during the RD&D program, munitions processing will begin slowly. As the  
4           system is validated and issues are identified and resolved, the processing rates will increase  
5           over a period of approximately 5 months. The 5-month period is based on an assumption that  
6           no major problems arise. But the program schedule is designed to allow sufficient time to  
7           identify and overcome problems. If problems arise during the RD&D period, the RD&D program  
8           may require the full 1-year period allowed by the RD&D regulations that is being requested in  
9           this permit application. The RD&D program will end when the BGCAPP is operating at its full  
10          daily throughput rate and it has been determined that sufficient data is available to allow full-  
11          scale treatment of the remainder of the BGAD inventory.

## 12   **6.5.1     Purpose and Objectives of RD&D Program**

13          The EPA RD&D Guidance (*EPA Guidance Manual for Research, Development, and*  
14          *Demonstration Permit Units Under 40 CFR Section 270-65*, EPA/530-SW-86-008, July 1986),  
15          Section 4-1, advises the applicant to consider eight questions, as applicable, as a basis for  
16          preparing the application. Table 6-2 lists the eight questions and cites the sections of the RD&D  
17          permit application where they are addressed.

18          The objectives of the RD&D program are listed in Attachment 4, Section 4.1. The following  
19          subsections present additional details, including the justification for conducting the RD&D with  
20          hazardous waste, the measurements and observations used to determine success, safety and  
21          environmental considerations, and the success criteria that will be used to evaluate the results  
22          at each ramp-up rate.

### 23   **6.5.1.1    System Integration**

24          Conduct a thorough program of system integration including the conveyance of munitions and  
25          munition segments from one part of the treatment train to the next up to and including the  
26          release of the munition parts from the MDB.

27          System integration has two components:

- 28           1.    Ability of the equipment to function as one unit with the actual wastes.
- 29           2.    Maximizing the operators' proficiency under safe operating conditions.

30          Optimizing the proficiency of the operators under carefully controlled and supervised conditions  
31          has traditionally not been considered as RD&D. However, such human factors research is  
32          essential to maximize safety and protect the environment; hence it has been made an important  
33          component of the RD&D process.

34          Before hazardous waste (agent) operations begin, the operators are thoroughly trained in their  
35          duties and responsibilities through coursework, simulations, and actual hands-on experience  
36          with simulated munitions. However, it must be recognized that handling and processing actual  
37          munitions can only be fully addressed by a slow and deliberate process in which the operators  
38          handle the munitions at initially very low rates and under the direct supervision of management  
39          and system engineers on the day shift. As the operators gain experience, the processing rates  
40          are increased in accordance with the ramp-up schedule in Table 6-1. Simulated equipment  
41          training hardware (SETH) munitions are constructed to have physical dimensions that are  
42          similar to the actual munitions, but they do not contain the chemical agent and energetics. Only  
43          operations conducted with actual munitions can provide the required operator experience and

1 proficiency to verify that the process fully addresses human factors and, therefore, minimizes  
2 risk to human health and to the environment.

3 To take advantage of the increased management oversight available during the day shift, initial  
4 munition operations will occur on the day shift only. Night shift activities will concentrate on  
5 preventive and corrective maintenance activities, monitoring the EBH neutralization process and  
6 prestaging of munitions for the next day of operations. The step changes in processing rates are  
7 typically scheduled in 4-week intervals to ensure that each of the four rotating operations shifts  
8 have an opportunity to process munitions on day shift. The step change in rate also factors in a  
9 logical progression to allow operator proficiency. The RD&D with agent munitions is required  
10 because of the differences experienced when processing actual munitions as compared to the  
11 simulated munitions used in systemization.

- 12 1. **Justification for Conducting with Hazardous Waste:** To establish successful system  
13 integration, all BGCAPP subsystems must operate as an integrated facility. This  
14 requires that the processing include agent, agent hydrolysate, energetics, energetics  
15 hydrolysate, munition components, dunnage, and secondary waste. Appropriate  
16 development of this process integration requires the processing of real munitions that  
17 are unique to BGAD.
- 18 2. **Measurements and Observations Required:** Process integration is considered to be  
19 achieved when the process successfully operates at the peak munitions processing  
20 rate as described in Table 6-1. Process integration is the overarching objective: it  
21 describes the process' ability to achieve the necessary results when operating as a unit  
22 and when treating the actual hazardous wastes at the peak processing rate. The  
23 criteria that are required to assess and demonstrate the integrated process are  
24 discussed in Sections 6.5.1.2 through 6.5.1.7.
- 25 3. **Safety and Environmental:** Maximum safety and environmental protection is  
26 achieved by performing this verification at an initially very slow rate during weeks 1  
27 through 4 and increasing the processing rate as information is gathered. This slow  
28 ramp-up ensures adequate time to properly evaluate the agent and energetic  
29 destruction results and to verify the operators' knowledge and performance to ensure  
30 safe operation. Plant operating rates are progressively increased at the nominal rates  
31 shown in Table 6-1.
- 32 4. **Success Criteria:** Process integration is considered to be successful at each ramp-up  
33 rate when all operators are assessed to be proficient at their functions, and all exit  
34 streams meet the safety and environmental requirements as discussed in the following  
35 subsections.

### 36 **6.5.1.2 Demonstrate 99.9999% Destruction Efficiency for GB**

37 Demonstrate that 99.9999% destruction efficiency can be achieved for GB agent in the agent  
38 neutralization reactors (ANRs) as required by KRS 224.50-13 and 401 KAR 34:350.

- 39 1. **Justification for Conducting Operations with Hazardous Waste:** Agent hydrolysis  
40 has been demonstrated to achieve the requisite 99.9999% destruction efficiency for  
41 GB in the previous testing conducted by the Program Manager, Assembled Chemical  
42 Weapons Assessment (PM ACWA). Agent destruction at BGCAPP must be  
43 demonstrated using the BGCAPP equipment with the BGAD munitions as required by  
44 KRS 224.50-130(3)(a). This cannot be demonstrated without conducting tests with  
45 hazardous waste.

- 1       2.    **Measurements and Observations Required:** Before GB is processed in the agent  
2       neutralization reactor (ANR), the GB drained from the munitions is stored in the ACS  
3       until a sufficient quantity of agent has been accumulated. The agent is transferred to an  
4       ANR, where it is hydrolyzed; the hydrolysate is analyzed for GB. The destruction  
5       efficiency is calculated using the equation presented in Attachment 10, Section 10.1.  
6       The number of ANS batches to be tested in this way is established as specified by the  
7       test plan, which will be submitted in accordance with the BGCAPP's compliance  
8       schedule.
- 9       3.    **Safety and Environmental:** The ANRs are batch reactors that contain the agent. The  
10       ANR's contents are not released from the MDB until the analytical results demonstrate  
11       that the target release level has been met. The ANR vents to the **MPT offgas**  
12       **treatment system (OTM)** and then to the MDB HVAC filter system before release to  
13       the atmosphere. These multiple layers of protection provide a high degree of safety  
14       and protection of the environment. A slow start of operation (as specified in the test  
15       plan) maximizes personnel safety and protection of the environment by minimizing the  
16       amount of agent in process while the initial batch of agent is neutralized.
- 17       4.    **Success Criteria:** The **process** meets the 99.9999% destruction efficiency as  
18       specified in Attachment 10, Section 10.1.

### 19   6.5.1.3    **Demonstrate EBH's Ability to Treat Rocket Energetics**

20   Demonstrate that the rocket energetics can be treated in the EBHs and the energetics  
21   neutralization system (ENS).

- 22       1.    **Justification for Conducting with Hazardous Waste:** EBH performance has been  
23       demonstrated to achieve this objective using M61 rockets pieces with energetics during  
24       the technical risk reduction program (TRRP) for the EBH. The test also demonstrated  
25       that the hydrogen (H<sub>2</sub>) levels could be maintained below 25% of the lower flammability  
26       limit (LFL). Although energetics neutralization has been demonstrated, it is necessary  
27       to verify and demonstrate these results with the BGCAPP equipment and BGAD  
28       munitions. This involves system integration and includes the transfer of the rocket  
29       **warhead** segments from the RSM to the EBHs and the transfer of the treated **EBH**  
30       **solid residue** from the EBH to the **MPT**. This objective can only be validated by  
31       treating agent-contaminated energetic-components from the BGAD stockpile. This  
32       verification must be completed on all installed EBHs.
- 33       2.    **Measurements and Observations Required:** The hydrogen (H<sub>2</sub>) gas concentration  
34       must be monitored in the EBHs' vent gases to ensure that H<sub>2</sub> gas concentration is  
35       below 25% of the LFL. The EBH and vent gas system will demonstrate their ability to  
36       handle the increase in hydrogen generation at each processing rate in the ramp-up  
37       schedule.  
38       Hydrolysate leaving each EBH batch goes to the ENRs for further treatment. The  
39       solids leaving the EBHs go to the **MPT**. No specific measurements are made on the  
40       EBH solid residue except for observing that the mechanical equipment is operating  
41       properly under agent munition operations. The energetics hydrolysate is sampled in  
42       the ENR to verify successful treatment.
- 43       3.    **Safety and Environmental:** Maximum safety and environmental protection is  
44       achieved by verifying the system performance at a slow rate during weeks 1 through 4  
45       and progressively increasing the processing rate as the performance objectives are  
46       met. This slow ramp-up ensures adequate time to verify that the energetics are  
47       hydrolyzed and the agent concentration meets the required target release level to

1 transfer the hydrolysate to the HSA. The rocket feed rate is increased in accordance  
2 with the nominal feed rates as shown in Table 6-1.

#### 3 **4. Success Criteria:**

- 4 a. Hydrogen monitoring system works as designed at all rocket ramp-up processing  
5 rates on each EBH.
- 6 b. EBH solids transfer system to the **MPT** works as the rocket feed rates increase.
- 7 c. Hydrolysate in the ENR meets the required energetics destruction and the agent  
8 target release level.
- 9 d. OTE can handle the vent gas from the EBH trains at each of the ramp-up rates.

#### 10 **6.5.1.4 Demonstrate MPT's Ability to Treat Projectiles**

11 Demonstrate that the MPT can thermally treat all projectile bodies in a batch to a minimum of  
12 1,000°F for a minimum of 15 minutes.

- 13 1. **Justification for Conducting with Hazardous Waste:** TRRP testing with SETH  
14 munitions have demonstrated that the MPT can thermally treat a full tray of projectiles  
15 to a minimum of 1,000°F for a minimum of 15 minutes. Thermal treatment in the MPT  
16 must be demonstrated to verify the previous results with actual munitions from the  
17 BGAD stockpile.
- 18 2. **Measurements and Observations Required:** Temperature measurements are  
19 performed to confirm the temperature profile previously demonstrated during  
20 systemization. The first trays of material are monitored for agent in the discharge  
21 airlock to verify that the MPT time and temperature conditions meet or exceed the  
22 minimum requirements to process the GB 8-inch projectiles.
- 23 3. **Safety and Environmental:** Slow initial operating rates ensure that all material in the  
24 MPT achieves the appropriate temperature before it is removed from the MPT. The  
25 batch nature of the operation allows the time per batch or the power input to be  
26 increased to establish the operating conditions necessary to ensure proper  
27 decontamination of the metal. Environmental protection is maintained by discharging  
28 the MPT offgas through the MPT OTS and then through the MDB HVAC filter system.
- 29 4. **Success Criteria:** Verify by temperature measurements of the treated munition bodies  
30 that the projectile carcasses in the first trays of material have all been exposed to a  
31 minimum of 1,000°F for a minimum of 15 minutes. Further verify the absence of agent  
32 residue by testing the air in the discharge airlock for agent.

#### 33 **6.5.1.5 Demonstrate HDC's Ability to Treat Rocket Segments**

34 **The heated discharge conveyors (HDCs) have been removed from the BGCAPP design.**

#### 35 **6.5.1.6 Demonstrate Performance of SCWO Reactor System**

- 36 1. **Justification for Conducting with Hazardous Waste:** Tests with the agent and  
37 energetic hydrolysates were performed under the PM ACWA **engineering design  
38 study (EDS)** test program. Testing under the RD&D program is required to  
39 demonstrate **the SCWO treatment of the blended hydrolysate.**

40 All materials fed to the SCWO have previously been tested for agent and verified to be  
41 below the target release level. Processing the hydrolysate ensures that the SCWO  
42 effluent meets the expected performance criteria before the water is further treated in

1 the **water recovery system (WRS)**. Because the SCWO performance can be  
2 assessed early in the RD&D program, the hydrolysate can either be stored in the HSA  
3 or it can continue to be processed through the SCWO units while RD&D continues on  
4 the other upstream treatment units. The continued processing of hydrolysate through  
5 SCWO is an important aspect of maintaining the plant water balance by recycling  
6 water to the ANRs and the EBHs; therefore, it is the preferred alternative.

- 7 2. **Measurements and Observations Required:** The operating parameters of the  
8 SCWO reactors are monitored to verify that the equipment is performing properly. The  
9 SCWO effluent is analyzed for total organic carbon (TOC). The vents from the pressure  
10 letdown systems are monitored for carbon monoxide (CO) and total hydrocarbons to  
11 establish the criteria that reflect the SCWO's performance.
- 12 3. **Safety and Environmental:** SCWO has been demonstrated to have extremely low  
13 emissions. According to all available data, the air emissions from the SCWO do not  
14 require further treatment prior to release to the environment.
- 15 4. **Success Criteria:** These tests are intended to verify the operating parameters such as  
16 temperature and pressure that will provide maximum organic constituent destruction  
17 and maximize the SCWO's reliability.

### 18 **6.5.1.7 Characterize and Quantify Emissions from WRS**

19 **The brine recovery system has been deleted from the BGCAPP design and therefore**  
20 **there will not be any emissions from the WRS.**

### 21 **6.5.2 Quantities of Waste to be Treated**

22 This section justifies the need for the proposed quantities of waste that are to be treated under  
23 this RD&D program. EPA *Guidance Manual for Research, Development, and Demonstration*  
24 *Permit Units under 40 CFR Section 270-65* (EPA/530-SW-86-008, July 1986), page 8,  
25 recommends the following limits on the amount of waste that is to be treated under an RD&D  
26 permit:

- 27 1. Treat a maximum of 15,000 kg of hazardous waste per month for experimental  
28 purposes.
- 29 2. Store a maximum of 15,000 kg of hazardous waste intended for experimental purposes  
30 at any time.
- 31 3. Treat a maximum of 400 kg of hazardous waste per hour in any experiment.

32 Table 6-1 presents the hourly, weekly, and monthly hazardous waste processing rates in the  
33 proposed RD&D program. These processing rates are nominal and will be increased only after  
34 the success criteria have been achieved as described in Section 6.5.1. **The following**  
35 **discussion relates to these three recommendations. Table 6-1 also presents the nominal**  
36 **ramp-up rates (as a percentage of full operation, for the processing of projectiles and**  
37 **rockets.**

#### 38 **6.5.2.1 Hourly Operating Rate**

39 **The hourly processing rates shown in Table 6-1 are based on the maximum design**  
40 **processing rate for the BGCAPP, which for GB is 20 rockets and 16 projectiles per hour.**  
41 **Each rocket contains a total of 14.3 kg of hazardous waste (chemical agent, propellant,**  
42 **and explosives); each projectile, 6.6 kg. This results in a maximum of  $(20 \times 14.3) + (16 \times$   
43 **6.6) = 391.6 kg/hr. This peak is less than the 400 kg/hr that is allowed by the RD&D**  
44 **guidance.****

1 **This is the maximum processing rate for the design during any hour of operation. This**  
2 **value does not correlate to the weekly or monthly operating rates because munitions will**  
3 **not be fed at this rate until week 20, when the nominal throughput (Table 6-1, columns 2**  
4 **and 3) is increased to 100% because of the feeding of GB projectiles in preparation for**  
5 **the performance test.**

### 6 **6.5.2.2 Quantity of Waste Stored**

7 The Guidance Manual recommends that no more than 15,000 kg of hazardous waste intended  
8 for experimental purposes be stored at any one time. The number of munitions to be stored **in**  
9 **the BGCAPP** at any one time for research will be less than this value. Therefore, the research  
10 program does not exceed the storage limitation suggested by the Guidance Manual.

### 11 **6.5.2.3 Monthly Processing Rates**

12 Table 6-1 also shows the monthly processing rates, which are calculated assuming 4 weeks of  
13 operation per month. These values exceed the 15,000 kg recommended by the EPA's Guidance  
14 Manual for RD&D. The justification for exceeding the recommended monthly quantity is based  
15 on the need to increase the processing rate to the maximum design rate by ramping up in small  
16 increments. Section 6.5.1 discusses the rationale for this requirement.

17 As discussed in Section 6.5.1.1, to safely test the system's integration (including the human  
18 factors) at rates approaching the BGCAPP's full operating rate, the hazardous waste must be  
19 processed at rates exceeding the 15,000 kg per month.

20 The hazardous waste (i.e., munitions) processing rates on which Table 6-1 is based are maxima  
21 that are based on the assumption that the process integration RD&D will not identify any design  
22 issues that require correction. This is an improbable scenario: this RD&D program would not be  
23 necessary if it were otherwise. Hence, the most probable scenario will be a slower processing  
24 rate than requested.

25 Regardless of the actual waste processing rates, the RD&D program will not compromise health  
26 or the environment. This statement is based on the following design and operating  
27 characteristics of the BGCAPP:

- 28 1. All agent-related processing is performed in the MDB, which is fully contained by the  
29 MDB HVAC filter system. This is a proven system that maintains protection even if an  
30 upset or operating anomaly occurs.
- 31 2. The MDB HVAC filter system is monitored for agent on a near-real-time basis.
- 32 3. Each batch of hydrolysate is tested and found to meet the target release levels for  
33 agent before it is transferred to the HSA.
- 34 4. The process' ability to achieve 99.9999% destruction efficiency for agent is  
35 demonstrated on the first batches of agent processed in the ANR. This initial validation  
36 satisfies the requirements of Attachment 10. The testing is performed in accordance  
37 with the procedures described in the Test Plan.

38 In conclusion, the requested processing rates do not pose a risk to health or to the environment,  
39 and they are essential to meet the process integration needs of the RD&D program.

### 40 **6.5.3 Testing Schedule and Criteria for Increasing Processing Rates**

41 Section 6.5.2 explains the reasons for the processing rates proposed for the RD&D program.  
42 The explanation is based on the need to demonstrate process integration through research,  
43 which is discussed in Section 6.5.1.

1 The increase in projectile and rocket processing rates will be decided on the basis of all of the  
2 applicable success criteria identified in Sections 6.5.1. If all processes are working as designed,  
3 all batches of agent and energetics hydrolysate meet their respective target release levels, and  
4 all success criteria identified in Section 6.5.1 are satisfied at the given rate, then the munitions  
5 processing rate will be increased to the next higher rate.

6 This cautious approach, which recognizes human factors and provides safeguards at every  
7 step, maximizes safety and environmental protection and results in the safe and effective  
8 completion of the RD&D program on the chemical agent munitions.

## 9 **6.6 Operation Subject to Regulation by KHW Part B Permit**

10 During the design and construction phases of the BGCAPP program, the KHW Part B Permit  
11 Application will be prepared and submitted to KDEP. These submissions will be made in  
12 adequate time to allow **KDEP/Division of Waste Management (DWM)** to evaluate and approve  
13 the **KHW Part B** before the end of pilot testing.

14 As shown in Table 6-1, a performance test will be conducted at the conclusion of the RD&D  
15 program. This performance test will provide the final validation of the safety and environmental  
16 acceptability of the process. After completion of the performance test, operations will continue  
17 pending approval of the Part B Permit.

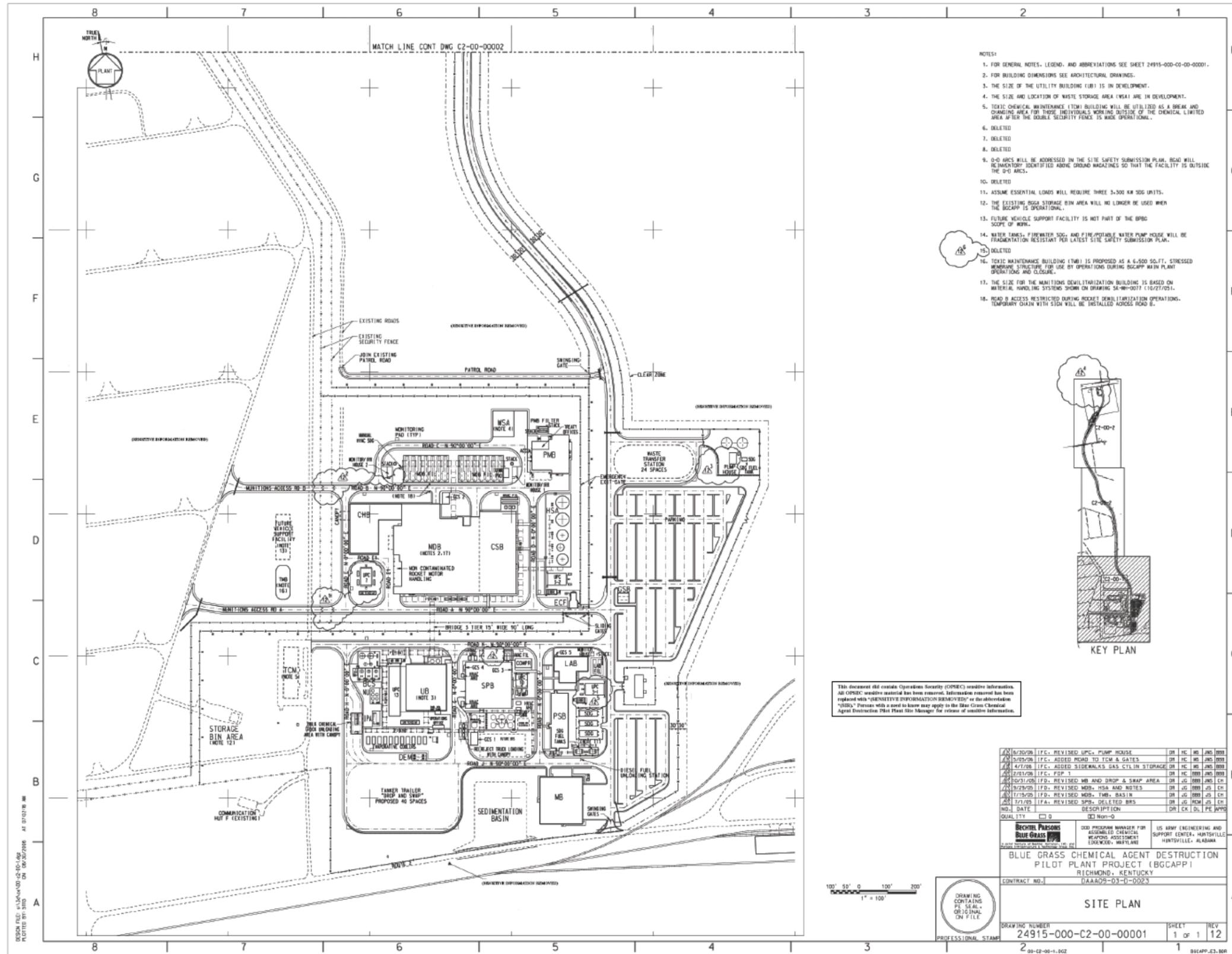
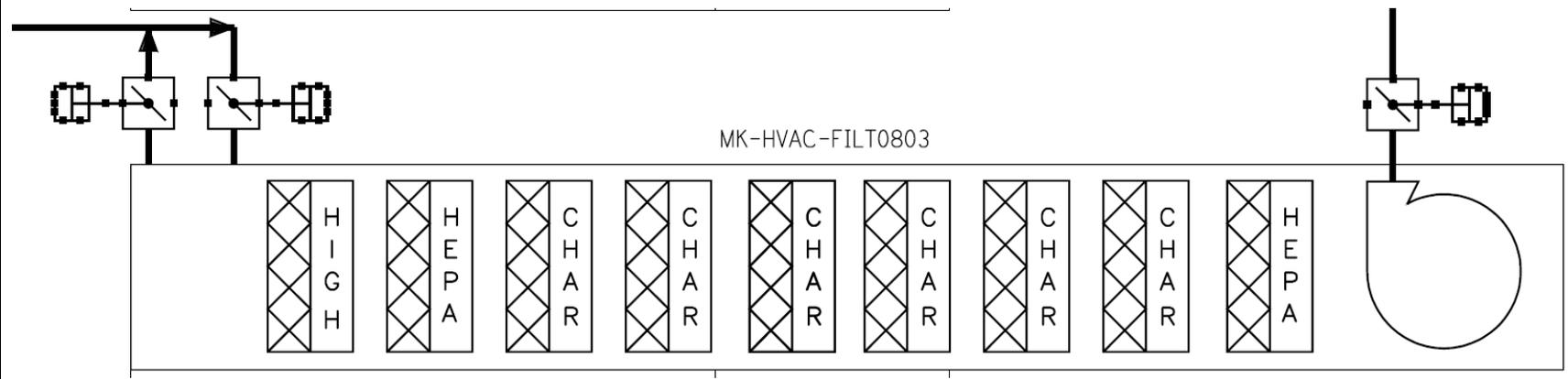


Figure 6-1—BGCAPP Building Layout (R12, 6/30/06)

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- 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, % <sup>a</sup>		Rounds/Hr <sup>b</sup>		Rounds/Week <sup>a</sup>		Rounds/Month		Hazardous Waste Processed, kg <sup>c</sup>	
	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 <sup>d</sup>	0.0	0.0	0	0	0	0			0	
27-Test <sup>e</sup>	100.0	100.0	20	16	1,814	624			390	
28-Test <sup>e</sup>	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

<sup>a</sup> The feed rates shown for the RD&D program are nominal. Actual processing rates will be established on the basis of RD&D.

<sup>b</sup> 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.

<sup>c</sup> Based on 14.3 kg of hazardous waste per rocket and 6.6 kg agent per projectile.

<sup>d</sup> 12-day outage in preparation for performance test.

<sup>e</sup> 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&amp;D Permit

Item <sup>a</sup>	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	<b>This requirement is not applicable to BGCAPP since it is a federal facility.</b>
<sup>a</sup> 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 .....7-1**

- 7.1 Mmunition Waste Tracking .....7-1
  - 7.1.1 Mmunition Receipt in Container Handling Building (CHB) .....7-1
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## 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 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.**

## 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 SCWOs

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.**

1 **Attachment 8 Contents**

2 **Attachment 8 Procedures for Water Monitoring, Groundwater Monitoring, Soil**

3 **Testing, and Waste Analysis .....8-1**

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5

## 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. These analytical procedures will be provided to KDEP for review when they have been developed.

**Attachment 9 Contents**

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**Attachment 9 Closure Process for BGCAPP.....9-1**

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# 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 (BPPG), 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 to the Army Decontamination Standard. These wastes will be containerized and disposed of at a permitted hazardous waste

1 treatment, storage, and disposal facility (TSDF). Any waste materials that have not  
2 been decontaminated to the Army Decontamination Standard will be decontaminated  
3 again or treated in one of the hazardous waste management units in the facility.

- 4 2. Solid waste (e.g., metal parts) that can be processed through the metal parts treater  
5 (MPT) will be thermally treated to a minimum of 1,000°F for a minimum of 15 minutes.
- 6 3. For buildings and structures (both metal and concrete), the clean closure target levels  
7 will be developed and included in the Closure Plan.
- 8 4. Prior to shipment of any waste material offsite, wastes will be characterized in  
9 accordance with Kentucky Hazardous Waste Regulations.

10 The closure of the BGCAPP will be accomplished by demonstrating that the clean closure target  
11 levels have been achieved in the following locations:

- 12 1. On surfaces within the facility and waste storage areas.
- 13 2. On surfaces and subsurfaces where surface contamination has been discovered  
14 surrounding the facility and waste storage areas.
- 15 3. On subsurfaces directly beneath the facility and waste storage areas that have been  
16 removed, where necessary.
- 17 4. On or within any other area or structure deemed to be included in the BGCAPP closure  
18 through the RCRA Facility Assessment (RFA) or other means.

19 Sampling and analysis will be performed to demonstrate that the clean closure target levels  
20 have been met in accordance with EPA's SW-846 (most recent edition) or equivalent methods  
21 approved by the KDEP, and as described in the sampling and analysis plan to be provided with  
22 the detailed Closure Plan.

### 23 **9.2.2 Closure Activities**

24 BGCAPP will be closed completely after the chemical agent stockpile has been destroyed and  
25 all munitions have been decontaminated. Closure activities will include:

- 26 1. Treatment and/or disposal of existing waste inventories [including secondary wastes  
27 such as spent carbon, used personnel protective equipment (PPE), etc.]
- 28 2. Decontamination of equipment, structures, and soils, as required
- 29 3. Dismantling and disposal of contaminated process and support equipment
- 30 4. Treatment and/or disposal of wastes generated during closure
- 31 5. Demolition of structures that will not be reused by BGAD after the completion of  
32 BGCAPP closure activities

### 33 **9.2.3 General Decontamination Procedures and Techniques**

34 Where liquid chemical agent contamination is suspected (based on operating history) or in  
35 monitoring areas where sustained levels of agent vapors are routinely present, chemical agent  
36 decontamination procedures will be used. A list of these areas will be included in the Closure  
37 Plan.

1 Agent-contaminated items will be decontaminated to the Army Decontamination Standard. In  
2 general, decontamination will be accomplished either by wash down with decontamination  
3 (decon) solution followed by flushing with water or by heating the item to a minimum of 1,000°F  
4 for a minimum of 15 minutes. Items that require additional decontamination will be further  
5 treated by one of the following means:

- 6 1. Additional chemical decontamination
- 7 2. Processed through the MPT

8 Decontamination will be performed under the direction of the Closure Manager, who will  
9 consult regularly with the certifying Registered Engineer.

10 Items contaminated with hazardous wastes other than agent will be decontaminated onsite, if  
11 necessary, with waste-specific techniques or they will be containerized and shipped offsite to a  
12 permitted hazardous waste TSDF.

### 13 **9.3 Maximum Waste Inventory**

14 Section 3 (2) of 401 KAR 34:070 requires that the Closure Plan identify steps necessary to  
15 perform partial and final closure of the facility at any point during the facility's active life,  
16 including an estimate of the maximum waste inventory that was ever on site and a detailed  
17 description of the methods to be used for removal, treatment, storage, and disposal of all  
18 hazardous waste at a permitted TSDF. Because this information is used by privately owned  
19 facilities to develop closure cost estimates and closure financial requirements from which  
20 federal facilities are exempt, this requirement will not be addressed in the BGCAPP Closure  
21 Plan. However, the waste inventory will be maintained at the lowest level possible while  
22 efficiently operating the plant equipment. As such, the waste inventory at the end of the  
23 operations phase will be substantially less than the storage tank design capacity of the plant  
24 because the storage tank capacity was designed for the storage of waste generated during the  
25 initial campaign (GB).

### 26 **9.4 Schedule for Closure**

27 Based on the lessons learned from Johnston Atoll Chemical Agent Disposal System (JACADS),  
28 closure is expected to take approximately 2 years. The detailed schedule for closure will be  
29 provided as part of the Closure Plan. The Closure Plan will also provide a detailed description of  
30 the decontamination process that will be used in the BGCAPP. The start of closure is based on  
31 the completion of munition processing. Partial closure of some equipment can begin after the  
32 completion of the VX rocket and projectile campaigns, respectively.

### 33 **9.5 Closure Timeline**

#### 34 **9.5.1 Time Allowed for Closure**

35 The Closure Plan will delineate the timeline for closure as discussed previously.

#### 36 **9.5.2 Extension for Closure Time**

37 BGCAPP does not expect to request an extension of time for closure beyond what is proposed  
38 in the Closure Plan. However, if additional time is required, the proper request will be made in  
39 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., 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.

### 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

1 approved closure plan) will be submitted to KDEP. The certification will be accompanied by the  
2 appropriate documentation.

### 3 **9.7 Post-Closure Plans**

4 Post-closure maintenance or monitoring are not anticipated for the BGCAPP because no  
5 contaminated equipment, structures, or soils resulting from the BGCAPP operation are  
6 expected to remain above closure target levels following final closure. If predetermined closure  
7 target levels cannot be achieved, the Closure Plan will be revised accordingly. The facility site  
8 will remain under the control of BGAD after closure of BGCAPP.

**Attachment 10 Contents**

**Attachment 10 Process Efficiency and Performance Criteria ..... 10-1**

10.1 Calculation Method for 99.9999% Destruction Efficiency ..... 10-2

10.2 Munitions Demilitarization Building (MDB) ..... 10-2

10.3 Agent and Energetics Hydrolysate Storage..... 10-2

10.4 Supercritical Water Oxidation (SCWO) Processing Building (SPB) ..... 10-2

10.5 Polychlorinated Biphenyls (PCBs)..... 10-3

## 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.<sup>1</sup>
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.

The environmental impact of the BGCAPP is very small: it consists primarily of air emissions. All air emissions that may contain agent pass through redundant banks of filters, including the **munitions demilitarization building (MDB)** HVAC filter system, which is discussed in Section 10.2 and Attachment 6, Section 6.1.3. The HVAC filter system is a proven system with over 20 years of combined operation at other chemical demilitarization sites<sup>2</sup>. 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

<sup>1</sup> The Final Environmental Impact Statement (EIS), Destruction of Chemical Munitions at Blue Grass Army Depot, Kentucky, December 2002, submitted for the program and included herein by reference indicates that all aspects of the program meet all health, safety, and environmental requirements.

<sup>2</sup> At JACADS, TOCDF, ANCDF, and ABCDF, the same type of system is also installed or planned for the remaining chemical demilitarization sites.

1 are discussed throughout Attachments 4 and 6. Although the results demonstrate that the  
2 process can be made safe, they should not be construed as the maximum safe emissions from  
3 the BGCAPP. The maximum safe—and hence allowable—emissions under the RD&D program  
4 and other permits will be based on an environmental assessment of the BGCAPP, which will be  
5 performed in sufficient time prior to the start of testing with agent to allow a full evaluation of the  
6 results.

## 7 **10.1 Calculation Method for 99.9999% Destruction Efficiency**

8 **Destruction efficiency will be calculated according to the equation described in BGCAPP**  
9 **permit KY8-213-820-105, condition T-9.**

## 10 **10.2 Munitions Demilitarization Building (MDB)**

11 Except for the processes listed below, all processes within the MDB perform mechanical  
12 processes on the munitions (e.g., punching, draining, washing, and shearing of the munitions):

- 13 1. **EBH and energetics neutralization reactor (ENR)**, which vent into the common EBH  
14 offgas treatment system (**OTE**)
- 15 2. **Agent neutralization system (ANS)** and metal parts treater (MPT), which vent into the  
16 common MPT offgas treatment system (**OTM**)

17 The emissions from these **processes** will be discharged into the MDB heating, ventilating, and  
18 air conditioning (HVAC) filter system.

19 All air emissions from the MDB are filtered through the HVAC filter system described in  
20 Attachment 6. The HVAC filter system is a proven system with over 20 years of combined  
21 operation at other chemical demilitarization sites<sup>2</sup>.

## 22 **10.3 Agent and Energetics Hydrolysate Storage**

23 These storage tanks form a buffer between the treatment operations in the MDB and the SCWO  
24 process. The hydrolysates' vapor pressures are very low. However, as a precaution and to  
25 control possible vapors, the hydrolysate tanks are vented to activated carbon adsorbers. The  
26 RD&D program will identify the frequency of replacement that these filters will require to ensure  
27 that vapor control can be achieved during normal operation.

## 28 **10.4 Supercritical Water Oxidation (SCWO) Processing Building** 29 **(SPB)**

30 This building includes the SCWO reactors and the water recovery system. All materials that  
31 enter this building have been analyzed and shown to be below the target release level for agent  
32 and the emissions from these sources pose no agent hazard. The processing may produce  
33 small quantities of other emissions. Extensive tests have been conducted on SCWO systems  
34 treating agent and energetics hydrolysates and hydrolysate simulants as part of the Program  
35 Manager for Alternative Technologies and Approaches (PMATA) and Program Manager,  
36 Assembled Chemical Weapons Alternatives (PM ACWA) programs. These tests were reviewed  
37 and evaluated by a number of National Research Council (NRC) panels. The panels findings  
38 and conclusions and an extensive list of references containing the data on which their  
39 conclusions are based are presented in the reports that are listed in Attachment 4, Table 4-1.  
40 The reports all concluded that the emissions from the General Atomics Design SCWO reactor

1 were extremely low. The RD&D program will further characterize these emissions and verify  
2 their levels for the actual wastes found in the Blue Grass Army Depot (BGAD).

3 The SCWO system selected at BGAD has been successfully demonstrated at a scale  
4 comparable to that to be used at BGCAPP during the extensive demonstration under ACWA.  
5 The demonstrations were performed at increasingly longer time frames and culminated in a  
6 series of long-term tests, termed the 500-hour tests, on the materials that will be treated by  
7 SCWO at BGAD. These **tests included** GB, VX, and mustard hydrolysates **and** energetic  
8 hydrolysates. All tests demonstrated extremely and consistently high levels of organic chemical  
9 destruction. The tests were documented and critiqued by internal Department of Defense (DOD)  
10 groups and independently reviewed by many NRC panels. Table 4-1 lists the major reports in  
11 which the NRC panels chronicled and critiqued the progress of the evaluation and selection  
12 process. The NRC reports cite the numerous internal government reports that document all of  
13 the demonstration programs.

14 The evaluation process first examined numerous alternative technologies (NRC 1993) and in  
15 NRC 2002 and NRC 2002a identified two technologies that had been demonstrated. It identified  
16 the General Atomics Total Solution (GATS) process, on which the BGCAPP design is based, as  
17 the one with lower total hydrocarbon and carbon monoxide (CO) emissions. The Final  
18 Environmental Impact Statement (EIS) for BGCAPP (December 2002) also discusses alternate  
19 technologies and draws the same conclusion.

20 Based on the testing referenced above, the gas streams exiting the SCWO unit<sup>3</sup> are typically  
21 very low in total hydrocarbons (less than 1 ppm). The CO concentration has been demonstrated  
22 to be consistently less than 2 ppm and particulates less than 4 mg/dry standard cubic meter  
23 (DSCM). Cadmium (Cd) + lead (Pb) are less than 0.015 mg/DSCM, and antimony (Sb) +  
24 Arsenic (As) + Beryllium (Be) + Chromium (Cr) are less than 0.045 mg/DSCM<sup>4</sup>. Most of these  
25 values are below the lower limit of detection of the measurement method<sup>5</sup>. These results  
26 support the conclusion that the SCWO technology has a negligible impact on the environment.

27 The concentrations identified above were measured during the system demonstration programs.  
28 Although they do demonstrate that the system is safe and protective of the environment, they  
29 should not be construed as the requested performance limits on the final system. The actual  
30 emission limits for the BGCAPP will be established on the basis of the environmental and health  
31 evaluations that will be performed during the RD&D program.

## 32 **10.5 Polychlorinated Biphenyls (PCBs)**

33 PCBs have been found in the rocket shipping and firing tubes. These materials are part of the  
34 matrix of the shipping and firing tubes. They exit the process as part of the rocket solids and this  
35 waste stream will be disposed of at a permitted Toxic Substances Control Act (TSCA) offsite  
36 disposal facility.

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<sup>3</sup> The only gas releases from the SCWO are through the gas-liquid separators and pressure reducers.

<sup>4</sup> They are presented as uncorrected for dilution because the oxygen concentration in the SCWO gas streams is below 7%.

<sup>5</sup> 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.....11-1**

11.1 Anticipated Composition of Exit Streams from BGCAPP ..... 11-1

11.2 Waste Solids ..... 11-2

11.3 Process Liquid Effluents ..... 11-2

11.4 Nonprocess Liquid Effluents ..... 11-2

11.5 Gaseous Emissions ..... 11-2

## 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 plant is a sealed entity with only **three** emission points<sup>1</sup>, which are controlled by redundant air pollution equipment.
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.

Before the start of agent operation, 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.

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<sup>1</sup> The emission points are (1) munitions demilitarization building (MDB) HVAC filter; (2) hydrolysate storage tank vent filters; and (3) supercritical water oxidation (SCWO) **processing building (SPB)**.

## 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.

1 The SCWO system and the WRS treat only the hydrolysates and **spent decontamination**  
2 **solution**. As discussed in Attachment 10, these systems produce inherently low emissions and  
3 do not require additional air pollution control equipment. **During startup, they will be vented to**  
4 **the SCWO process building (SPB) filtration system as a precautionary measure. After the**  
5 **process is validated, they will** vent directly to the atmosphere.

6 The following criteria will be used to assess the impact of the air emissions on health and the  
7 environment:

- 8 1. Measure the actual emissions from all sources and apply them to the risk assessment  
9 methodology that will have been developed.
- 10 2. Demonstrate that the emissions do not exceed risk-based values for acceptable risk  
11 and environmental protection.

12

## Attachment 12 Contents

<b>Attachment 12</b>	<b>Additional Information Pertinent to Proposed Operation of Experimental Waste Facility or Process .....</b>	<b>12-1</b>
12.1	Previously Published Documents .....	12-1
12.2	Appendixes.....	12-1
12.3	Additional Information to Be Provided to KDEP .....	12-1
12.4	Regulatory Waiver Requests.....	12-1

## 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.

1           **The above request was incorporated into RD&D Permit KY8-213-820-105,**  
 2           **Condition T-72.**

- 3           2.   401 KAR 34:180 Section 5 – “Inspections. At least weekly, the owner or operator must  
 4           inspect areas where containers are stored, looking for leaking containers and for  
 5           deterioration of containers and the containment system caused by corrosion or other  
 6           factors.”

7           In lieu of visual inspections of chemical munitions and containers inside of EONCs,  
 8           BGCAPP proposes that for any EONC containing hazardous wastes that are stored at  
 9           the CHB more than 7 days, chemical agent monitoring of the air in the EONC will be  
 10          performed. This request maximizes safety of workers at the facility while allowing  
 11          BGCAPP personnel to detect leaking munitions.

12          **The above request was incorporated into RD&D Permit KY8-213-820-105,**  
 13          **Condition T-73.**

- 14          3.   401 KAR 34:350 – Chemical Munitions  
 15          401 KAR 34:350 requires permit applicants to demonstrate “...99.9999 percent  
 16          destruction or neutralization of each substance proposed to be treated or destroyed.”  
 17          The regulation further defines this destruction efficiency by the equation listed below.

$$18 \quad DE \% = \frac{(W_{in} - W_{out} - W_{res}) \times 100\%}{W_{in}}$$

19          Where:

20                Win = Mass feed rate of waste to the incinerator.

21                Wout = Mass emission rate of the same waste present in exhaust emissions prior  
 22                to release to the atmosphere.

23                Wres = Mass removal rate of waste via the incinerator residues.

24          Because this equation is more applicable to incinerators (hence the reference to  
 25          removal rate of incinerator residues), this equation is not appropriate for the proposed  
 26          neutralization process. The following equation is proposed as a more appropriate  
 27          method of calculating the destruction efficiency for the BGCAPP:

$$28 \quad \% \text{ Destruction Efficiency} = 100\% \times (M_{in} - M_{out}) / M_{in}$$

29                M<sub>in</sub> = Mass of agent per reactor batch into the agent neutralization system  
 30                (ANS) reactor (also called the “agent hydrolyzer” in Figure 4-1)

31                M<sub>out</sub> = Mass of agent per reactor batch exiting the ANS in the hydrolysate

32          **The above request was incorporated into RD&D Permit KY8-213-820-105,**  
 33          **Condition T-9.**

1 **DEP 7094B (35/92)**

2 **Attachment 13 Public Notice**

3 PURSUANT TO APPLICATION NUMBER: \_\_\_\_\_

4 The Natural Resources and Environmental Protection Cabinet, Division of Waste  
5 Management, has received a special waste, research, development, and demonstration  
6 permit application from:

7 Name of Applicant Blue Grass Army Depot

8 Name of Facility See Above

9 Address 2091 Kingston Highway

10 City Richmond State KY Zip Code 40475-5001

11 This application, if approved, would allow the construction of the facility to accept the  
12 following types of waste and the following activities:

13 This facility would be used to conduct Research, Development and Demonstration on  
14 technology selected to be used to destroy the chemical weapon stockpile at the BGAD

15 \_\_\_\_\_  
16 The proposed facility may be accessed from KY Route 52

17 by traveling east from Richmond toward Waco

18 \_\_\_\_\_  
19 Additional information regarding this application may be obtained from:

20 Contact Person Mr. Dave Easter<sup>1</sup>

21 Address 2091 Kingston Hwy

22 City Richmond State KY Zip Code 40475-5007

23 Phone No. (859) 779-6221

24 The permit application is being processed at the following location:

25 Division of Waste Management  
26 Solid Waste Branch  
27 14 Reilly Road  
28 Frankfort, Kentucky 40601

1 \_\_\_\_\_  
<sup>1</sup> All correspondence and questions regarding this notice may also be directed to **Sandra Plant**, 301  
Highland Park Drive, Richmond, KY 40475 – (859) 625-1291.

- 1 Within thirty (30) days of the publication of this notice, any person who wishes to
- 2 comment on the application may submit written comments, and, if desired, request from
- 3 the Cabinet a public meeting.
- 4 Please refer to Application No. \_\_\_\_\_ on all correspondence.
- 5 Publication pursuant to KRS 224.40-310.

1 DEP 7094B(3/92)

2 **Attachment 14 Public Notice**

3 Pursuant to Application Number: \_\_\_\_\_

4 The Natural Resources and Environmental Protection Cabinet, Division of Waste  
5 Management, has received a special waste, research, development, and demonstration  
6 permit application from, and has prepared a draft permit for:7 Name of Applicant Blue Grass Army Depot

8 Name of Facility \_\_\_\_\_

9 Address 2091 Kingston Highway10 City Richmond State KY Zip Code 40475-500111 This application, if approved, would allow the construction of the facility to accept the  
12 following types of waste and the following activities: No offsite waste would be  
13 accepted; the facility would only be used to destroy chemical weapons stored onsite14 The proposed facility may be accessed from KY Route 5215 by traveling east from Richmond toward Waco16  
17 Additional information regarding this application may be obtained from:18 Contact Person Mr. Dave Easter<sup>1</sup>19 Address 2091 Kingston Hwy20 City Richmond State KY Zip Code 40475-500721 Phone No. ( 859 ) 779-622122 All data submitted by the applicant and other documents concerning this application are  
23 available for public inspection during normal business hours at the following location:24 Office Blue Grass Chemical Stockpile Outreach Office25 Address 1000 Gibson Bay Dr., Suite 226  
27 City Richmond State KY Zip Code 40475

28 The permit application is being processed at the following location:

29 Division of Waste Management  
\_\_\_\_\_

<sup>1</sup> All correspondence and questions regarding this notice may also be directed to **Sandra Plant**, 301 Highland Park Drive, Richmond, KY 40475 – (859) 625-1291.

1 Solid Waste Branch  
2 14 Reilly Road  
3 Frankfort, Kentucky 40601  
4 10

5 DEP 7094B(3/92)

6 A public hearing has been scheduled to receive public comments and will be conducted  
7 at the following location and time:

8 Place \_\_\_\_\_

9 Address \_\_\_\_\_

10 City \_\_\_\_\_ State \_\_\_\_\_ Zip Code \_\_\_\_\_

11 From \_\_\_\_\_ to \_\_\_\_\_

12 Any person who wishes to comment on the draft permit decision for this special waste  
13 site or facility may file comments with the Cabinet and, if desired request a public  
14 hearing within thirty (30) days of the publication of this notice pursuant to Section 6 of  
15 401 KAR 45:050. application may submit written comments, and, if desired, request from  
16 the Cabinet a public meeting.

17 Please refer to Application No. \_\_\_\_\_ on all correspondence.

18 Publication pursuant to KRS 224.40-310.