



REPLY TO
ATTENTION OF:

DEPARTMENT OF THE ARMY
ASSEMBLED CHEMICAL WEAPONS ALTERNATIVES FIELD OFFICE
BLUE GRASS CHEMICAL AGENT-DESTRUCTION PILOT PLANT
830 EASTERN BYPASS, SUITE 106
RICHMOND, KENTUCKY 40475-2512

SFAE-ACW-BG

26 June 2019
ACW-19-0107

MEMORANDUM THRU Blue Grass Chemical Agent-Destruction Pilot Plant (BGCAPP) Project Coordinator (JMBG-PW/Mr. Joseph Elliott), 431 Battlefield Memorial Highway, Richmond, Kentucky 40475-5001

FOR COMMANDER, Blue Grass Army Depot (BGAD), (JMBG-CO/COL Joseph R. Kurz), 431 Battlefield Memorial Highway, Richmond, Kentucky 40475-5001

SUBJECT: Recommend Approval of the Finding of No Significant Impact (FONSI) for the Referenced Environmental Assessment (EA)

REFERENCES: Proposed Action for Processing Nerve Agent Munitions at Blue Grass Army Depot, Richmond, Kentucky, Environmental Assessment, May 2019

1. A public comment period for the subject document began on 16 May 2019 and ended on 17 June 2019. A public meeting was conducted on 21 May 2019 at the Blue Grass Chemical Stockpile Outreach Office.
2. Comments were received during the public comment period.
3. The comments were as follows.
 - a. Letter dated 13 June 2019 from an anonymous commenter (attached).
 - b. Letter from the United States Department of the Interior, Fish and Wildlife Service dated 17 June 2019 (attached).
 - c. Letter from the Energy and Environment Cabinet, Department of Environmental Protection dated 18 June 2019 (attached).
 - d. Letter from the Tourism, Arts and Heritage Cabinet, Kentucky Heritage Council dated 21 May 2019 (attached).
 - e. Letter from the Cherokee Nation dated 6 June 2019 (attached).
 - f. Email from the Muscogee (Creek) Nation, dated 6 June 2019 (attached).
4. The comments were reviewed and considered to determine whether any changes should be made to the EA. The conclusion was made by the EA team that none of the comments required changes to the EA or to the draft FONSI. Therefore, I advocate that the FONSI be signed and the document finalized (enclosed).

SFAE-ACW-BG

SUBJECT: Recommend Approval of the Finding of No Significant Impact (FONSI) for the Referenced Environmental Assessment (EA)

5. The point of contact for this matter is the undersigned at (859) 779-7450, email candace.m.coyle.civ@mail.mil.



Encl

CANDACE M. COYLE, Ph.D.
Site Project Manager
Blue Grass Chemical Agent-Destruction Pilot Plant

dbb/ecs

CF:

SFAE-ACW-BG, Directors

CCRC-AD-C, Administrative Contracting Officer

CCRC-AD-C, PCO

SFAE-ACW-BG, Technical Advisor

CCRC-AD-C, Document Control

SFAE-ACW-BG, GFO Document Control

usarmy.bluegrass.jmc.mbx.bgcapp-mailbox@mail.mil

From: Gano Perez <GPerez@mcn-nsn.gov < Caution-mailto:GPerez@mcn-nsn.gov > >
Sent: Thursday, June 6, 2019 6:50 PM
To: Blue Grass Chemical Stockpile Outreach Office <bgoutreach@iem.com < Caution-mailto:bgoutreach@iem.com > >
Subject: 2019.05 Dept of Army-Program Executive Office-Assembled Chemical Weapons Alternatives (PEO-ACWA) Proposed Action to retrofit existing facility- C/O Colonel US Army Commanding-ATTN Joseph R. Kurz

ATTN:Joseph R. Kurz,

Thank you the correspondence regarding the Department of Army-Program Executive Office-Assembled Chemical Weapons Alternatives (PEO-ACWA) Proposed Action to retrofit existing facility project. This project in Madison County, Kentucky is currently outside our Area of Interest (AOI) We respectfully defer to the other Tribes that have been contacted. If you have any further questions or concerns, please give us a call.

I have attached our most recent Areas of Interest by state and county.

Gano Perez Jr.

Historic and Cultural Preservation Department, GIS Cultural Specialist

Muscogee (Creek) Nation

P.O. Box 580 | Okmulgee, OK 74447

T 918.732.7761

F 918.758.0649

gperez@MCN-nsn.gov < Caution-mailto:gperez@MCN-nsn.gov >

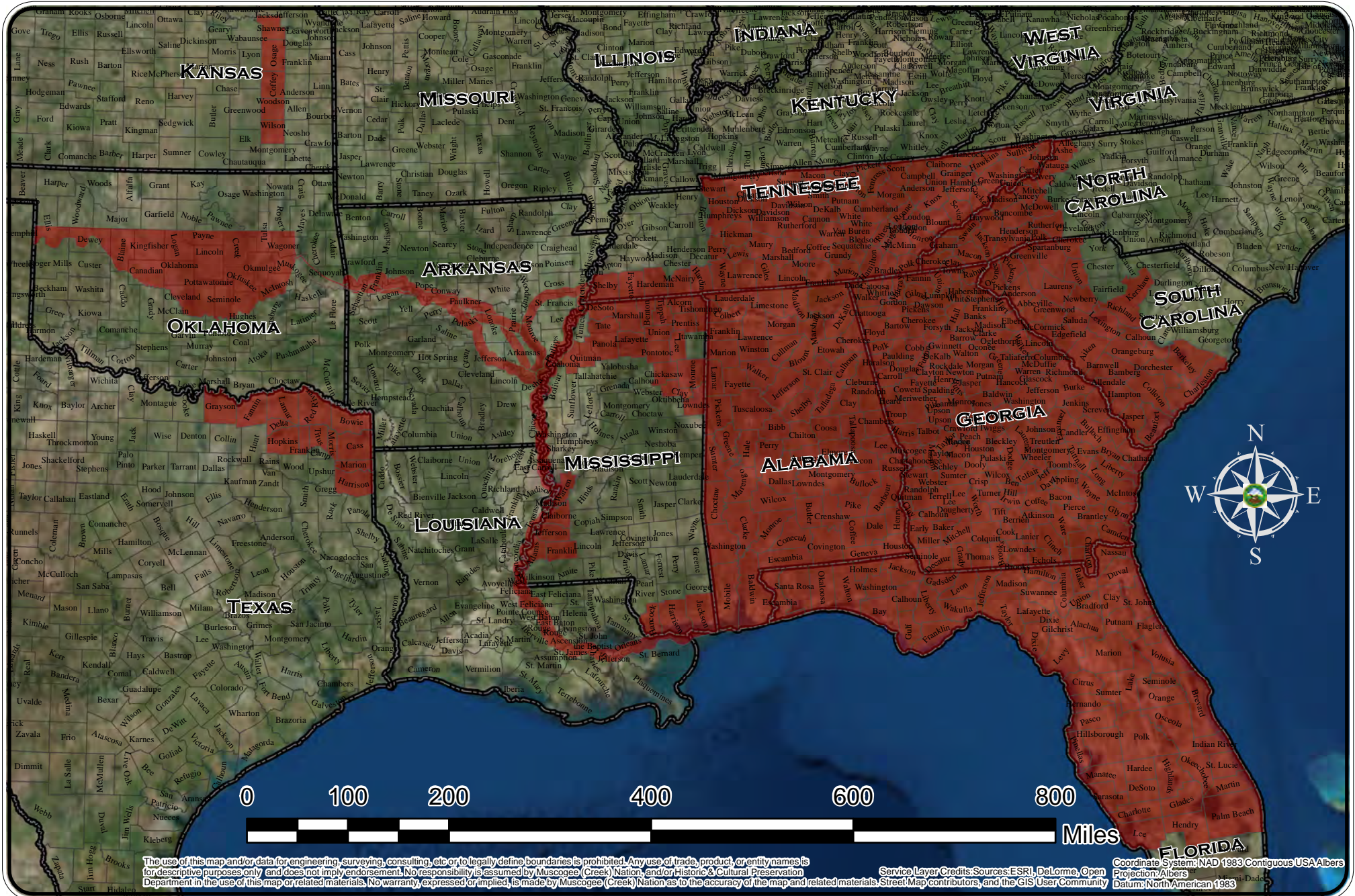
Section106@MCN-nsn.gov < Caution-mailto:Section106@MCN-nsn.gov >

Caution-http://www.muscogeenation-nsn.gov/ < Caution-http://www.muscogeenation-nsn.gov/ >

Enclosure f. to ACW-19-0107



Muscogee (Creek) Nation's Area Of Interest 2019



The use of this map and/or data for engineering, surveying, consulting, etc. or to legally define boundaries is prohibited. Any use of trade, product, or entity names is for descriptive purposes only and does not imply endorsement. No responsibility is assumed by Muscogee (Creek) Nation, and/or Historic & Cultural Preservation Department in the use of this map or related materials. No warranty, expressed or implied, is made by Muscogee (Creek) Nation as to the accuracy of the map and related materials. Street Map contributors, and the GIS User Community

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Projection: Albers
Datum: North American 1983



GWYD D3P
CHEROKEE NATION®
P.O. Box 948 • Tahlequah, OK 74465-0948 • 918-453-5000 • cherokee.org

Office of the Chief

Bill John Baker
Principal Chief
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S. Joe Crittenden
Deputy Principal Chief
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June 6, 2019

Joe Elliott
Department of the Army
Blue Grass Chemical Stockpile Outreach Office
1000 Commercial Drive, Suite 2
Richmond, KY 40475

Re: Proposed Action for Processing Nerve Agent Munitions at Blue Grass Army Depot

Mr. Joe Elliott:

The Cherokee Nation (Nation) is in receipt of your correspondence about **Proposed Action for Processing Nerve Agent Munitions at Blue Grass Army Depot**, and appreciates the opportunity to provide comment upon this project.

The Nation maintains databases and records of cultural, historic, and pre-historic resources in this area. Our Historic Preservation Office reviewed this project, cross referenced the project's legal description against our information, and found no instances where this project intersects or adjoins such resources. Thus, the Nation does not foresee this project imparting impacts to Cherokee cultural resources at this time.

However, the Nation requests that the Department of the Army (Army) halt all project activities immediately and re-contact our Offices for further consultation if items of cultural significance are discovered during the course of this project.

Additionally, the Nation requests that the Army conduct appropriate inquiries with other pertinent Tribal and Historic Preservation Offices regarding historic and prehistoric resources not included in the Nation's databases or records.

If you require additional information or have any questions, please contact me at your convenience. Thank you for your time and attention to this matter.

Wado,

Elizabeth Toombs, Tribal Historic Preservation Officer
Cherokee Nation Tribal Historic Preservation Office
elizabeth-toombs@cherokee.org
918.453.5389

Enclosure e. to ACW-19-0107



756401201516
CHEROKEE NATION
P.O. Box 948
Tahlequah, OK 74465-0948



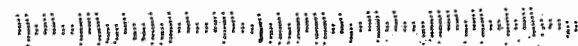
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Joe Elliott
Department of the Army
Blue Grass Chemical Stockpile Outreach Office
1000 Commercial Drive, Suite 2
Richmond, KY 40475

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MATTHEW G. BEVIN
GOVERNOR

TOURISM, ARTS AND HERITAGE CABINET
KENTUCKY HERITAGE COUNCIL
THE STATE HISTORIC PRESERVATION OFFICE

DON PARKINSON
SECRETARY

REGINA STIVERS
DEPUTY SECRETARY

THE BARSTOW HOUSE
410 HIGH STREET
FRANKFORT, KENTUCKY 40601
PHONE (502) 564-7005
FAX (502) 564-5820
www.heritage.ky.gov
May 21, 2019

CRAIG A. POTTS
EXECUTIVE DIRECTOR
& STATE HISTORIC
PRESERVATION OFFICER

Mr. Joseph R. Kurz
Dept. of the Army
Bluegrass Army Depot
431 Battlefield Memorial Highway
Richmond, KY 40475

Re: **EA & Draft FONSI for proposed action for processing nerve agent munitions at BGAD,
Richmond, Madison Co., KY**

Dear Mr. Kurz:

Our review indicates that the proposed project will not impact any properties or sites that are listed in or eligible for the National Register of Historic Places. The proposed project should not require an archaeological survey or cultural historic survey.

In the event that human remains are encountered during project activities, all work should be immediately stopped in the area. The area should be cordoned off, and in accordance with KRS 72.020 the county coroner and local law enforcement must be contacted immediately. Upon confirmation that the human remains are not of forensic interest, the unanticipated discovery must be reported to the Kentucky Heritage Council.

Should the project plans change, or should additional information become available regarding cultural resources or citizens' concerns regarding impacts to cultural resources, please submit that information to our office as additional consultation may be warranted. Should you have any questions, feel free to contact Nick Laracuate of my staff at nicolas.laracuate@ky.gov.

Sincerely,

Craig A. Potts,
Executive Director and
State Historic Preservation Officer

CP:nrl KHC #54446

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MATTHEW G. BEVIN
GOVERNOR

CHARLES G. SNAVELY
SECRETARY

**ENERGY AND ENVIRONMENT CABINET
DEPARTMENT FOR ENVIRONMENTAL PROTECTION**

ANTHONY R. HATTON
COMMISSIONER

300 SOWER BOULEVARD
FRANKFORT, KENTUCKY 40601

June 18, 2019

Blue Grass Chemical Stockpile Outreach Office
1000 Commercial Dr., Ste. 2
Richmond, KY 40475

Re: Dept. of the Army-BGAD

Dear Mr. Elliott,

The Energy and Environment Cabinet serves as the state clearinghouse for review of environmental documents generated pursuant to the National Environmental Policy Act (NEPA). Within the Cabinet, the Commissioner's Office in the Department for Environmental Protection coordinates the review for Kentucky state agencies. We received your correspondence dated May 13, 2019. Your letter requested an environmental review for this project. We have reviewed the document and provided comments below.

Division of Water

Water Quality Branch:

No special-use waters would be impacted by the project and the report outlines best management practices for reducing runoff to nearby waters. Questions should be directed to Andrea Fredenburg, Water Quality Branch, (502) 782-6950, Andrea.Fredenburg@ky.gov.

Water Resources Branch:

An individual Clean Water Act (CWA) section 401 Water Quality Certification from the DOW is not required for this project, as no surface waters of the Commonwealth are proposed to be impacted. Questions should be directed to Samantha Vogeler, Water Quality Certification Section, (502) 782-6995, Samantha.Vogeler@ky.gov.

Watershed Management:

Construction is on previously disturbed land and site is covered under existing groundwater protection and best management plans. No comments. Questions should be directed to Chloe Brantley, Water Supply Section, (502) 782-6898, Chloe.Brantley@ky.gov.

The proposed work is endorsed by the Groundwater Section of the Watershed Management Branch. However, the proposed work is located in an area with a high potential for karst development where groundwater is susceptible to direct contamination from surface activities. It

is our recommendation that the proposed work be made aware of the requirements of 401 KAR 5:037 and the need to develop a Groundwater Protection Plan (GPP) for the protection of groundwater resources within that area. Questions should be directed to Kurtis Spears, Groundwater Section, (502) 782-7119, Kurtis.Spears@ky.gov or David Jackson, Groundwater Section, (502) 782-6986, DavidA.Jackson@ky.gov.

Field Operations Branch:

No comments. Questions should be directed to Connie Coy, Field Operations Branch, (502) 782-6587, Constance.Coy@ky.gov.

Enforcement Branch:

The Division of Enforcement does not object to the project proposed by the applicant. Questions should be directed to Tim Harrod, Division of Enforcement, (502) 782-6858, Timothy.Harrod@ky.gov.

Division of Waste Management

UST Branch records indicate no underground storage tank site issues identified within or near the project impact area.

If any UST's are discovered in the area they should be reported to KDWM. Any additional questions or issues should be directed to the UST Branch.

Superfund Branch records include no sites identified in or near the project impact area: Any additional questions or issues should be directed to the Superfund Branch.

Solid Waste Branch Records indicate no active and historic sites within 1.0 miles of the project impact area.

Any questions or issues should be directed to the Solid Waste Branch.

The Hazardous Waste Branch is very familiar with the proposed action at BGAD and has been in ongoing discussions with the Army and contractors regarding these proposed activities. The proposed actions would require major modifications to BGAD's hazardous waste permit, which has additional requirements for public participation. The Hazardous Waste Branch has no specific objections or concerns with the proposed action; any issues identified during our review of the permit applications (when submitted) will be addressed during technical review and will be available for public review and comment during the permitting process. Any questions or issues should be directed to the Hazardous Waste Branch.

RLA Branch records indicate there are no RLA tracked open dumps within the project impact area.

Any questions or issues should be directed to the RLA Branch.

Any solid waste encountered by this project must be disposed of at a permitted facility. If asbestos, lead paint and/or other contaminants are encountered for the project contact the Division of Waste Management for proper disposal and closure.

The information provided is based on those facilities or sites that KDWM currently has in its database. If you would like additional information on any of these facilities or sites, you may contact the file room custodian at (502) 782-6357. Please keep in mind additional locations of releases, potential contamination or waste facilities may be present but unknown to the agency. Therefore, it is recommended that appropriate precautions be taken during construction activities. Please report any evidence of illegal waste disposal facilities and releases of hazardous substances, pollutants, contaminants or petroleum to the 24-hour Environmental Response Team at 1-800-928-2380.

Division for Air Quality

401 KAR 63:010, Fugitive Emissions, states that no person shall cause, suffer, or allow any material to be handled, **processed**, transported, or stored without taking reasonable precaution to prevent particulate matter from becoming airborne. Additional requirements include the covering of open bodied trucks, operating outside the work area transporting materials likely to become airborne, and that no one shall allow earth or other material being transported by truck or earth-moving equipment to be deposited onto a paved street or roadway. Please note the Fugitive Emissions Fact Sheet located at <http://air.ky.gov/SiteCollectionDocuments/Fugitive%20Dust%20Fact%20Sheet.pdf>

401 KAR 63:005 states that open burning shall be prohibited except as specifically provided. Open Burning is defined as the burning of any matter in such a manner that the products of combustion resulting from the burning are emitted directly into the outdoor atmosphere without passing through a stack or chimney. However, open burning may be utilized for the expressed purposes listed on the Open Burning Brochure located at <http://air.ky.gov/Pages/OpenBurning.aspx>

The Division would like to offer the following suggestions on how this project can help us stay in compliance with the NAAQS. These air quality control strategies are beneficial to the health of citizens of Kentucky.

- Utilize alternatively fueled equipment.
- Utilize other emission controls that are applicable to your equipment.
- Reduce idling time on equipment.

The Division also suggests an investigation into compliance with applicable local government regulations.

This review is based upon the information that was provided by the applicant. An endorsement of this project does not satisfy, or imply, the acceptance or issuance of any permits, certifications or approvals that may be required from this agency under Kentucky Revised Statutes or Kentucky Administrative Regulations. Such endorsement means this agency has found no major concerns from the review of the proposed project as presented other than those stated as conditions or comments. If you should have any questions, please contact me at (502) 782-0863.

Sincerely,

A handwritten signature in black ink, appearing to read "Louanna C. Aldridge". The signature is written in a cursive style with a large initial "L" and a distinct "C." before the last name.

Louanna Aldridge



United States Department of the Interior

FISH AND WILDLIFE SERVICE

Kentucky Ecological Services Field Office
330 West Broadway, Suite 265
Frankfort, Kentucky 40601
(502) 695-0468

June 17, 2019

Blue Grass Chemical Stockpile Outreach Office
100 Commercial Drive, Suite 2
Richmond, Kentucky 40475
Attn: Mr. Joe Elliot

Subject: FWS 2019-B-0428; Comments on Blue Grass Army Depot Environmental Assessment for Processing Nerve Agent Munitions at Bluegrass Army Depot, Madison County, KY

Dear Mr. Elliot:

The U.S. Fish and Wildlife Service Kentucky Field Office has reviewed the above-referenced Environmental Assessment (EA). The Bluegrass Army Depot (BGAD) is proposing to augment the chemical weapons destruction capability of the Blue Grass Chemical Agent-Destruction Pilot Plant (BGCAPP) to reduce worker safety risks associated with destroying nerve agent munitions. Augmentation would be achieved by retrofitting an existing facility and installing up to two new pieces of equipment to process munitions and/or munition components. The new pieces of equipment would be installed at previously disturbed locations. We offer the following comments for your consideration:

Federally-Listed Species

Federally-listed species that are known to occur, or have the potential to occur, on BGAD include the Indiana bat (*Myotis sodalis*), gray bat (*Myotis grisescens*), northern long-eared bat (*Myotis septentrionalis*), and running buffalo clover (*Trifolium stoloniferum*). There are no trees, caves, cave-like features, or aquatic resources that could be used by federally-listed bat species for roosting or foraging within the project area. Therefore, we agree that the project does not have the potential to impact federally-listed bat species. In addition, the project area does not contain any areas that provide rich soils and/or filtered-light habitat suitable for running buffalo clover. Therefore, we agree that the project does not have the potential to impact running buffalo clover.

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We appreciate the opportunity to comment on the EA. Because the project contains no suitable habitat for federally-listed species, we have no additional comments or concerns with the proposed action or the EA, as they relate to the Endangered Species Act.

If you have any questions, please contact Carrie Allison at 502-695-0468, extension 103.

Sincerely,

A handwritten signature in blue ink, reading "Virgil Lee Andrews, Jr.", written in a cursive style.

Virgil Lee Andrews, Jr.
Field Supervisor

June 13, 2019

Blue Grass Chemical Stockpile
Outreach Office
1000 Commercial Drive, Suite 2
Richmond, KY 40475

To whom it may concern:

I would like to provide input into the proposed action on the Environmental Assessment document by the program executive office, Assemble Chemical Weapon Alternative, Aberdeen Proving Ground, Maryland for processing nerve agent munitions at Blue Grass Army Depot, Richmond, Kentucky. Last year I provided input into the Depot chemical demilitarization permit, attached. The comments I made then are still valid and actually strengthened by the proposed changes. I still disagree with an unproven "Pilot plant" being in my back door. I have worked with chemical rounds for decades and retired in the 90s. At that time the Depot stockpile was to be destroyed by incineration with a completion date of the late 90s.

After reading the proposed action, it is evident the munitions should have and still be destroyed by incinerations. All byproducts would have been destroyed here at one time, with very limited handling, by a proven method, and with minus risk. The risk of the "Pilot plan" is much higher than by incineration. The risk to the community and costs just kept rising. Age of munition and storage is the utmost risk.

The "purpose of the proposed action" talks about augmenting the capability of the Main Plant to improve safety. It is hard to trust that this is the case. I have to question the statement that the proposed changes are driven by safety rather than the Pilot plant does not functional and the deadline of Dec 2003. Over the last several decades we have seen the Army change from a proven demilitarization process to an un-proven Pilot plant. Several unconventional changes and problems have already been noted over the years, like deleting washout, removing mustard operations from the main plant and processing in an explosive chamber, the necessity of rewelding the Super Critical Water Oxidation units, etc... Within months of the proposed startup date, another new direction is being proposed. What is the Army thinking? Who is truly in charge of this program?

The Environmental Assessment document states that leaking munitions "overpacked M55 rockets" will be removed from the overpacks by personnel in the highest level of personal protective equipment before being processed in this same manner as other agent rockets. This is not new and has been known for several decades, and this should have been address

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within the Pilot plant. Why not develop a mechanical system to remove rockets from the overpack, thereby limiting the need for personnel in personal protective equipment?

The document states that "leaking munitions are overpacked in larger, sealed, steel containers for continued storage." Does that mean the drain and undrain warheads will be sealed, in steel containers prior to placing back into storage?

The document states that "De-mated M56 warheads, whether drained or undrained, would be packaged in a container and crated in a way that prevents leakage of agent and mitigates explosive risk during transfer, storage, and handling. The containerized M56 warheads would be transferred to an SDC or returned to storage." What, specifically, is meant by "packaged in containers"? How safe will these containers be, where and how will the containers be stored, and for how long? How many times will the warhead and containers be handled? What happens if the container fails? If the containers fail, what steps will be taken and what is the risk to the workers and public?

The document states that "de-mated M56 warheads may be containerized following de-mating and draining in the BGCAPP Main Plant." Specify the type of containers and the system to be used. Will warheads be containerized manually or mechanically? Where will the containerizations take place? A layout of the de-mating, draining and containerization method would be beneficial.

How fast can the SDC processed warheads and in compared to main plant?

Will rocket motors be processed In the SDC?

Will rocket motors be processed with or without the shipping and firing tube?

The document talks about a "robust OTS". What, specifically, is meant by "robust"?

The document states that "Items being fed to the SDC need no preparation prior to destruction, and there is no requirement to remove M55 rockets from overpacks or containers prior to processing." Does that mean no manual handling of the drained or undrained rocket is necessary after it enters the plant? If the SDC will handle an undrained warhead, why take the risk and drain the warhead? Why not feed the warheads directly into the SDC?

In the 80s, the Depot processed several chemical rounds. At that time the agent in the rounds would not drain on its own. The process required warm caustic solution to clean the agent out of the rounds. Gravity draining and water alone did not work. The agent was semi solid, and without the warm caustic solution, it would not drain. This is also confirmed within the

document; "Gelled or Solidified Agent." Given the issues that occurred in the 80s, that the munition is even older, and statements within the document, the process for removing washout was not founded on sound principles. Free draining of the munitions will not remove the agent from the munitions. The washout is needed and should be part of the process. The main plant should not be started until the Army can ensure the munitions will be free of agent prior to placing the munitions back into storage. Is there still an explosive risk? If the munitions are drained at all, the munitions should be directly fed into the chamber. Otherwise, the draining process should be eliminated and the munitions fed directly into the chamber.

What is the risk of all that hazardous material going through Richmond? Transportation of all the hazardous material should be routed through the Depot Duncannon entrance and not through or around Richmond. This would reduce a lot of risk to the people of Madison County.

I have followed the entire disposal program with strong interest. A lot of tax payer money has been poured into Kentucky to support this chemical weapons disposal project. I am not thrilled to say it, but I believe Kentucky's activists have had a tremendously negative effect on the process. Their involvement has resulted in waste and misuse of public funds, activists taking charge without a thorough knowledge of the science supporting the process, misleading representatives to influence public laws, and regulations that only put the people at greater risk. These actions have just caused delays and put the people of Madison County and Depot workers at a greater risk. With all the changes and proposed actions, it is apparent this "Pilot" plant does not work and an incinerator should be built.

In reference to the proposed action, the revisions to the current chamber and an addition chamber is a reasonable proposal. However, agent munitions should be direly feed into the chambers and not be drain. If the munitions are to be drained, they should be drained by washout rather than gravity alone, and all drained munitions should be processed directly and not placed back into storage.

Every time the munitions are handled, the risk to the worker and public increased. Therefore, the Pilot plant should not be started until these chambers are ready to process agent munitions. The agent munitions should go from storage to the plant and be processed.

The Depot stockpile should have been demilitarized over 25 years ago. With all the delays, and continued changes in the "Pilot plant" the Army should be embarrassed. With friends and family at the Depot, I am requesting to remain anonymous. A concern citizen and Madison County resident. -S

February 1, 2018

Heather Alexander
Kentucky Energy and Environment Cabinet
Division of Waste Management
300 Sower Boulevard
Frankfort, Kentucky 40601

To whom it may concern:

I would like to provide input into the Depot chemical demilitarization permit. I still disagree with an unproven pilot plant being in my back door. I have worked with chemical rounds for decades, and retired in the 90s. At that time the Depot stockpile was to be destroyed by incineration with a completion date of the late 90s. The risk to the community and cost just kept rising. In the 80s, we processed several chemical rounds. One thing is known, the agent in the rounds would not drain on its own because we tried. The process was changed to use warm caustic to clean the agent out of the rounds. Gravity draining and water alone did not work. The agent was semi solid, and without the warm caustic would not drain. These operations were conducted in the chemical control area and below the dam. The chemical control area should be checked for contamination. Given the issues that occurred in the 80s, the process for removing the washout is not founded on sound principles and should not be permitted.

The Interim Design Assessment for Blue Grass Chemical Agent Pilot Plant, issued in 2005 by the National Research Council, leaves no doubt that tedious work lies ahead to prove the untested design. An example of the Super Critical Water Oxidation was used "Despite its important advantages, Super Critical Water Oxidation has not yet become a commercial success". The report is correct, and with the continuing issues and cost, why is the Super Critical Water Oxidation process still being considered? What are the plans if it does not work? Is it true the government spent over \$10 million to correct piping and welds on the Super Critical Water Oxidation? What was the actual cost to the taxpayers? Maybe the funds should have been used elsewhere. To destroy one unit of agent, how much waste is produced? Where is the waste reduction? With incineration, things keep getting smaller and it's managed all in one place. With this plant, the waste keeps growing with each step of the process. Is this really treatment? This plant will require a lot of hazardous material and produces a lot of waste. What is the risk of all that hazardous material coming through Madison County? Transportation of all the hazardous material should be routed through the Depot Duncan entrance and not through Richmond. Once the Depot reports a leaker, how long does it take them to find and can the leakers? The Depot was not very timely this last year. How will Depot leakers effect the plant operation? The

February 1, 2018

original permit was issued in 2005. Why did it take twelve years to issue an updated permit? Over the last twelve years, what has been the cost of staff, government, Depot, Kentucky, and contractors to support this project? What will be Kentucky's role once the permit is issued? What is the cost per round to process through the pilot plant compared to incineration?

I have followed the entire disposal program with strong interest. A lot of tax payer money has been poured into Kentucky to support this chemical weapons disposal project. I am not thrilled to say it, but I believe Kentucky and the activists have greatly messed it up. Waste and misuse of public funds, allowing activists to take charge, misleading representatives to influence public laws, regulations that only put the people at greater risk. These actions have just caused delays and put the people of Madison County and Depot workers at a greater risk. What will happen if the Pilot plant does not work? For safety and to prevent further delay, Super Critical Water Oxidation should be abandoned, waste should be managed elsewhere, and an incinerator should be built as a standby option.

The Depot stockpile should have been demilitarized over 20 years ago. With all the delays, I do not believe I will see the completion in my lifetime. With friends and family at the Depot, I am requesting to remain anonymous.



Richmond, Kentucky



DEPARTMENT OF THE ARMY
BLUE GRASS ARMY DEPOT
431 BATTLEFIELD MEMORIAL HIGHWAY
RICHMOND, KENTUCKY 40475

July 1, 2019

FINDING OF NO SIGNIFICANT IMPACT

Proposed Action for Processing Nerve Agent Munitions at Blue Grass Army Depot, Richmond, Kentucky

Environmental Assessment

BACKGROUND

Chemical munitions filled with either vesicant/blister agent (designated as H agent, also called mustard agent) or nerve agents (one of two types: either VX or GB) are currently stored by the Blue Grass Chemical Activity at Blue Grass Army Depot (BGAD). The destruction of the entire U.S. stockpile of chemical weapons is required by U.S. public law and by an international treaty known as the Chemical Weapons Convention (CWC). The current plan to accomplish the destruction of nerve agent munitions in the BGAD stockpile consists of utilizing the Blue Grass Chemical Agent-Destruction Pilot Plant (BGCAPP) Main Plant to process the nerve agent munitions. A Static Detonation Chamber (SDC) 1200 will be used to destroy the mustard agent munitions.

The proposed action is needed to increase worker safety, minimize equipment downtime, and reduce the number of times personnel enter agent-contaminated areas. The following conditions contribute to safety risk and to the risk of not meeting the mandated date for complete destruction of the stockpile.

- **Unknown Operational Problems.** The BGCAPP Main Plant is a pilot facility, and there is a risk of unknown process and safety problems once nerve-agent operations begin. There are potential safety issues associated with some of the equipment that will be used to process the explosive components and aluminum parts associated with nerve agent M55 rockets.
- **Gelled or Solidified Agent in Nerve Agent M55 Rockets.** Due to the age of the M55 rockets, there is concern that the agent in some rockets may contain solids or may be gelled. This is expected to cause equipment operability problems in the BGCAPP Main Plant, which may increase the number of times personnel have to enter into agent-contaminated areas to perform maintenance activities. This increases the safety risk to personnel due to potential agent exposure.

Unpacking Leaking Munitions. The final risk is that munitions in the stockpile that leak are overpacked in larger, sealed, steel containers for continued storage. To process overpacked munitions in the BGCAPP Main Plant, personnel in agent protective suits will be required to open the overpack and remove the leaking munition. This is a high-risk operation.

PROPOSED ACTION

The proposed action is to augment the chemical weapons destruction capability of the BGCAPP Main Plant and the existing SDC 1200 to reduce safety risks associated with processing nerve agent M55 rockets and to meet the requirement to destroy the U.S. chemical weapons stockpile no later than 31 December 2023. Augmentation would be achieved by retrofitting the existing SDC (following completion of mustard agent munition processing) and utilizing an additional SDC to process M55 rocket components and possibly complete (including overpacked) M55 rockets. In addition, an Explosive Destruction System (EDS) Phase 3 (P3) could be utilized to process complete (including overpacked) M55 rockets. The BGCAPP Main Plant would still be used to process nerve agent projectiles, neutralize nerve agent, separate M55 rockets into components (warhead and rocket motor assembly), and possibly drain rocket warheads.

REASON FOR PREPARING AN ENVIRONMENTAL ASSESSMENT (EA)

The Army's implementing National Environmental Policy Act (NEPA) regulation, 32 Code of Federal Regulations (CFR) § 651.33, requires an EA be prepared to help decision makers understand the potential extent of environmental impacts of a proposed action. This EA has been prepared to determine whether significant impacts to the environment are likely to result from the proposed action.

DETERMINATION

The information and analysis presented in *Proposed Action for Processing Nerve Agent Munitions at Blue Grass Army Depot, Richmond, Kentucky, Environmental Assessment* indicate the proposed action will reduce or eliminate current safety and schedule risks with no significant impacts to human health or the environment.

The analysis provided in the above referenced EA, prepared by subject matter experts in accordance with the Army's implementing NEPA regulation, determined that the proposed action will have no significant impact on land use, aesthetics, cultural resources, air quality, water resources, human health and safety, terrestrial ecological resources, socioeconomic resources, environmental justice, noise, waste management and transportation, or resource requirements.

I have determined, based upon the analysis in the EA and review of the stakeholder comments received, that the proposed action would create no significant impacts. This finding applies to retrofit of the existing SDC 1200 and operation of that facility to process M55 rocket components; and site preparation, installation, and operation of a new SDC 1200 or 2000 to process M55 rockets or components at one of the proposed sites north or west of the BGCAPP Container Handling Building. In addition, this finding applies to site preparation, installation, and operation of an EDS P3 to process nerve agent M55 rockets at a location inside the chemical igloo storage area. The finding also applies to decommission/closure of all three units.

The points of contact for this action are Mr. Joe Elliott, Chemical Demilitarization Project Coordinator, at (859) 779-6021, or Mr. Ramesh Melarkode, Acting Environmental Division Chief, at (859) 779-6354.

Sincerely,

A handwritten signature in black ink, appearing to read 'Joseph R. Kurz', with a stylized flourish at the end.

Joseph R. Kurz
Colonel, U.S. Army
Commanding

Enclosures

cc:

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**PROPOSED ACTION FOR PROCESSING NERVE
AGENT MUNITIONS AT
BLUE GRASS ARMY DEPOT, RICHMOND,
KENTUCKY**

ENVIRONMENTAL ASSESSMENT



May 2019

**PROGRAM EXECUTIVE OFFICE,
ASSEMBLED CHEMICAL WEAPONS ALTERNATIVES
Aberdeen Proving Ground, Maryland**

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ENVIRONMENTAL ASSESSMENT

May 2019

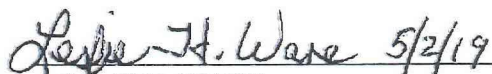
Lead Agency: Program Executive Office, Assembled Chemical Weapons Alternatives (PEO ACWA)

Title of Proposed Action: Proposed Action for Processing Nerve Agent Munitions at Blue Grass Army Depot, Richmond, Kentucky

Affected Jurisdiction: Madison County, Kentucky

PREPARED BY:

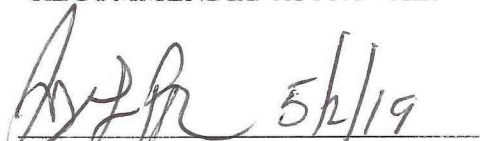
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ORGANIZATION OF THIS ENVIRONMENTAL ASSESSMENT

This Environmental Assessment (EA) evaluates the environmental effects of the Army's proposed action to augment the chemical weapons destruction capability of the Blue Grass Chemical Agent-Destruction Pilot Plant (BGCAPP) Main Plant and the existing Static Detonation Chamber (SDC) 1200 in order to reduce safety risks and meet the public law to destroy the United States (U.S.) chemical weapons stockpile no later than 31 December 2023. Augmentation would be achieved by retrofitting the existing SDC and utilizing an additional SDC to process drained and undrained nerve agent M55 rockets and components, including overpacked M55 rockets, with the possible addition of an Explosive Destruction System (EDS) to process overpacked M55 rockets.

- SECTION 1 INTRODUCTION** summarizes the purpose of and need for the proposed action and provides relevant background information about the chemical agent and munitions to be destroyed at Blue Grass Army Depot (BGAD).
- SECTION 2 PROPOSED ACTION AND ITS ALTERNATIVES** describes in detail the proposed action and the no-action alternative, as well as other alternatives to the proposed action.
- SECTION 3 AFFECTED ENVIRONMENTAL RESOURCES AND POTENTIAL ENVIRONMENTAL CONSEQUENCES** describes the existing environmental resources that could be affected by the proposed action and alternative actions and identifies the potential environmental impacts of the no-action alternative.
- SECTION 4 CONCLUSIONS** summarizes the findings about the potential environmental impacts for the proposed action and alternative actions, as well as the no-action alternative. Recommendation on whether to proceed with a Finding of No Significant Impact is discussed in this section.
- SECTION 5 PERSONS CONTACTED AND CONSULTED** provides a listing of those individuals who were contacted to provide data and information for the analyses in this EA, as well as those who contributed to the preparation of this EA through their analyses and expert reviews.
- SECTION 6 REFERENCES** provides bibliographic information for cited reference materials.

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ACRONYMS AND ABBREVIATIONS

µg	microgram
AADT	annual average daily traffic
ac-ft	acre-foot
ac-ft/yr	acre-feet per year
ACWA	Assembled Chemical Weapons Alternatives
AERMOD	American Meteorological Society/Environmental Protection Agency Regulatory Model (an atmospheric dispersion computer model)
AFS	Aluminum Filtration System
AFSS	advanced fragment suppression system
AMC	Army Materiel Command
ANAD	Anniston Army Depot
ANCDF	Anniston Chemical Agent Disposal Facility
atm	standard atmospheric pressure
BGAD	Blue Grass Army Depot (in Kentucky)
BGCA	Blue Grass Chemical Activity
BGCAPP	Blue Grass Chemical Agent-Destruction Pilot Plant
CAA	Clean Air Act
CAC	Citizens' Advisory Commission
CEQ	Council on Environmental Quality
CFR	<i>Code of Federal Regulations</i>
CLA	Chemical Limited Area
CMA	U.S. Army Chemical Materials Activity (formerly the U.S. Army Chemical Materials Agency)
CO	carbon monoxide
CT	census tract
CWA	Clean Water Act
CWC	Chemical Weapons Convention
DAVINCH	Detonation of Ammunition in Vacuum Integrated Chamber
dB	decibel
dB(A)	decibel (frequency-weighted to correspond to human hearing)
DDESB	Department of Defense Explosives Safety Board
DOD	U.S. Department of Defense
DOT	U.S. Department of Transportation
DRE	destruction and removal efficiency
EA	environmental assessment
EBH	energetics batch hydrolyzer
EDS	Explosive Destruction System
EDT	explosive destruction technology
ENR	energetics neutralization reactor

ENS	Energetics Neutralization System
EPA	U.S. Environmental Protection Agency
EU	emission unit
FARS	Fatality Analysis and Reporting System
FEIS	final environmental impact statement
FONSI	finding of no significant impact
gal/day	gallons per day
gal/yr	gallons per year
GB	a chemical nerve agent, also called “sarin”
GWPP	Groundwater Protection Plan
H	a chemical vesicant/blister agent
HHRA	human health risk assessment
HVAC	heating, ventilation, and air conditioning
IBD	inhabited building distance
ILD	intra-line distance
INRMP	Integrated Natural Resources Management Plan
IONMP	Installation Operational Noise Management Plan
ISCST3	Industrial Source Complex Short-Term Version 3
JMC	Joint Munitions Command
KDEP	Kentucky Department for Environmental Protection
KOH	potassium hydroxide
KPDES	Kentucky Pollutant Discharge Elimination System
M	million
MEA	monoethanolamine
mg/m ³	milligrams per cubic meter
MPHRA	Multiple Pathway Health Risk Assessment
NAAQS	National Ambient Air Quality Standards
NaOH	sodium hydroxide
NEPA	National Environmental Policy Act
NO ₂	nitrogen dioxide
NPDES	National Pollutant Discharge Elimination System
NRC	National Research Council
O ₃	ozone
OTS	off-gas treatment system
P3	Phase 3
Pb	lead

PCAPP	Pueblo Chemical Agent-Destruction Pilot Plant
PCB	polychlorinated biphenyl
PCD	Pueblo Chemical Depot
PEO ACWA	Program Executive Office, Assembled Chemical Weapons Alternatives
PL	Public Law
PM _{2.5}	particulate matter with a diameter equal to or less than 2.5 µm
PM ₁₀	particulate matter with a diameter equal to or less than 10 µm
ppb	parts per billion
PPE	personal protective equipment
ppm	parts per million
RCMD	Recovered Chemical Materiel Directorate
RCRA	Resource Conservation and Recovery Act
RMA	rocket motor assembly
SCWO	supercritical water oxidation
SDC	Static Detonation Chamber
SFT	shipping and firing tube
SLERA	screening-level ecological risk assessment
SLHHRA	screening-level human health risk assessment
SO ₂	sulfur dioxide
TDC	Transportable Detonation Chamber
tons/yr	tons per year
TSCA	Toxic Substances Control Act
TSDF	treatment, storage, and disposal facility
U.S.	United States
U.S.C.	United States Code
USATCES	United States Army Technical Center for Explosives Safety
VMT	vehicle miles traveled
VOC	volatile organic compound
VSF	volume to service flow
VSL	vapor screening level
VX	a chemical nerve agent

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1. INTRODUCTION

The destruction of the entire United States (U.S.) stockpile of chemical weapons that contain lethal, unitary chemical agents is required by U.S. Congressional directives (see Public Law [PL] 99-145, et seq., and Section 8119 of PL 110-116) and by an international treaty known as the Chemical Weapons Convention (CWC) (OPCW 2005) (Senate Resolution 75, 105th Congress). This Environmental Assessment (EA) addresses the proposed destruction of drained or undrained nerve agent M55 rockets (hereinafter “M55 rockets”) and rocket components currently stored at Blue Grass Army Depot (BGAD) near Richmond, Kentucky.

The Program Executive Office, Assembled Chemical Weapons Alternatives (PEO ACWA) has the responsibility for the destruction of the chemical weapons stockpiles located at Pueblo Chemical Depot (PCD) and BGAD and is the proponent for this EA. PEO ACWA proposes to deploy and operate specialized equipment that uses an explosive destruction technology (EDT)—including static detonation chamber (SDC) technology—for the safe and timely destruction of BGAD’s inventory of M55 rockets and rocket components. This process would retrofit and utilize the existing SDC that was analyzed in 2013, as well as install additional EDT equipment.

BGAD is a Joint Munitions Command (JMC), U.S. Army government-owned, government-operated facility under the Army Materiel Command (AMC). BGAD is one of two remaining Army installations in the United States that stores chemical weapons. Blue Grass Chemical Activity (BGCA), a Chemical Materials Activity (CMA) organization also under AMC, is responsible for the safe, secure storage of the chemical weapons stockpile until destruction operations are completed.

This EA provides information to be considered in making a decision regarding the proposed action and alternative actions by documenting the potential environmental consequences. The intent is to obtain public input and comment on the proposed action and the draft finding of no significant impact (FONSI) to provide the Army’s decision-makers with the necessary information to support informed decisions regarding an environmentally sound path forward to destroy BGAD’s inventory of M55 rockets. Because this EA concludes with a recommendation for a FONSI, the Army has simultaneously issued a draft FONSI and is seeking public comment on the draft FONSI during the same comment period as for this EA.

This chapter presents background information about the M55 rockets in storage at BGAD (see Section 1.1), provides a brief overview of the Army’s proposed action (Section 1.2), and discusses the purpose and need for the proposed action (Section 1.3). Section 1.4 addresses the scope (i.e., legal framework and approach taken) for the environmental review conducted in this EA. Public participation is discussed in Section 1.5.

1.1 BACKGROUND

More than 101,000 chemical agent munitions, filled with a combined total of more than 520 tons of chemical warfare agents, are currently stored at BGAD. The chemical agents include nerve agents (either GB agent or VX agent) and vesicant/blister agent (H agent, which is also called mustard agent).

Based on the *Final Environmental Impact Statement (EIS) for Destruction of Chemical Munitions at Blue Grass Army Depot, Kentucky* (hereinafter 2002 Final Environmental Impact

Statement [FEIS]) (PMCD 2002), neutralization followed by supercritical water oxidation (SCWO) was chosen as the primary means for destruction of the chemical stockpile. To accomplish this mission, the Blue Grass Chemical Agent-Destruction Pilot Plant (BGCAPP)—hereafter referred to as the BGCAPP Main Plant—was constructed. The BGCAPP Main Plant is scheduled to become operational in November 2019 or earlier.

In 2013, an EA (hereinafter BGAD EDT EA) (ACWA 2013) was prepared for the use of a supplemental technology for mustard munitions that could not be processed in the BGCAPP Main Plant. The supplemental technology selected is an SDC 1200, which is scheduled to begin operations as early as June 2019.

The M55 rockets (see Figure 1-1) are the subject of this EA. The M55 rocket consists of an M56 warhead filled with chemical agent attached to an M67 rocket motor assembly (RMA). The warhead is primarily fabricated of aluminum alloy, and the RMA is steel and aluminum alloy. Some smaller rocket components are made of other types of metals. The complete M55 rocket is contained in a fiberglass shipping and firing tube (SFT). Stored munitions are monitored through a regular inspection program. When a leak is discovered, the munition is placed into a larger steel overpack container and stored separately from the rest of the stockpile.

In the current BGCAPP Main Plant design, M67 RMAs will be separated from the M56 warheads. The M56 warheads will be processed in the BGCAPP Main Plant, while RMAs that are not agent-contaminated will be processed outside of the BGCAPP Main Plant. The nerve agent will be drained from the M56 warheads and neutralized. Drained warheads (with residual agent contamination) and any agent-contaminated RMAs will be sheared into several pieces to expose the energetics and processed in the Energetics Neutralization System (ENS). The ENS includes the energetics batch hydrolyzers (EBHs) and energetics neutralization reactors (ENRs). Hydrolysate from the ENS will be processed in the Aluminum Filtration System (AFS) to remove

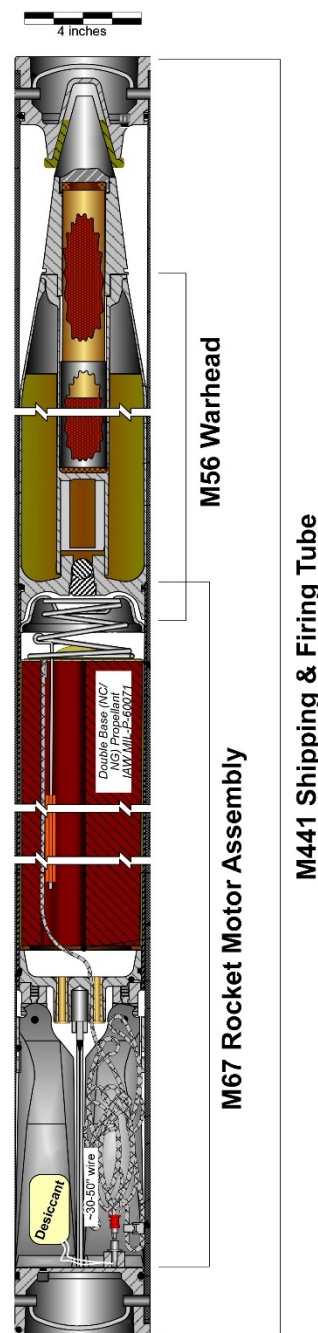


Figure 1-1. Schematic Illustration of M55 Rocket (GB or VX)

aluminum. Hydrolysate from the agent neutralization process and the ENS will be blended before being further processed in the SCWO. Overpacked M55 rockets will be removed from the overpacks by personnel in the highest level of personal protective equipment (PPE) before being processed in this same manner.

1.2 OVERVIEW OF THE PROPOSED ACTION

PEO ACWA proposes to improve safety associated with processing M55 rockets filled with the chemical nerve agents GB or VX. This EA analyzes alternatives to augment the destruction of M55 rockets. The EA also documents the potential environmental impacts of the proposed action. The intent is to provide decision-makers the necessary information to make informed choices regarding an environmentally conscious path forward in achieving demilitarization goals at BGAD.

1.3 PURPOSE AND NEED OF THE PROPOSED ACTION

1.3.1 Purpose

The purpose of the proposed action is to augment the capabilities of the BGCAPP Main Plant, improve worker safety, and decrease the risk that the program will not meet the legal mandate to destroy the BGAD stockpile munitions by 31 December 2023.

1.3.2 Need

The proposed action is needed to increase worker safety, minimize equipment downtime, and reduce the number of times personnel enter agent-contaminated areas. The proposed action also responds to the need to maintain compliance with the CWC and U.S. law regarding destruction of the chemical stockpile. The proposed action supports the overall goal to (1) conduct the destruction activities in a safe, environmentally acceptable, and cost-effective manner and (2) complete the destruction of the BGAD inventory of chemical agents in compliance with CWC and U.S. public law.

50 U.S. Code (U.S.C.) 1521 requires the Secretary of Defense to provide for maximum protection for the environment, the general public, and the personnel who are involved in the destruction of the lethal chemical agents and munitions.

Currently, the CWC requires complete destruction of the entire U.S. chemical weapons stockpile. PL 114-92, Section 1411, 25 November 2015, National Defense Authorization Act for Fiscal Year 2016, requires destruction of the stockpile no later than 31 December 2023. PL 103-337 prohibits the transportation of any chemical munitions that constitute part of the chemical weapons stockpile out of the state in which those munitions are located. Therefore, shipping the chemical munitions located on BGAD to any other military or commercial facility was eliminated from further consideration. The following conditions contribute to safety risk and to the risk of not meeting the mandated date for complete destruction of the stockpile.

- **Unknown Operational Problems.** The BGCAPP Main Plant is a pilot facility, and there is a risk of unknown process and safety problems once operations begin. There are potential

safety issues associated with maintenance of the ENS. There are also safety considerations associated with processing hydrolysate in the AFS.

- **Gelled or Solidified Agent.** Another risk is based on experience at baseline incineration facilities. Due to the age of the M55 rockets, there is concern that the agent in some rockets may contain solids or may be gelled. This is expected to cause equipment operability problems in the BGCAPP Main Plant, which may increase the number of times personnel have to enter into agent-contaminated areas to perform maintenance activities. This increases the safety risk to personnel due to potential agent exposure.
- **Unpacking Leaking Munitions.** The final risk is that munitions in the BGCA stockpile that leak are overpacked in larger, sealed, steel containers for continued storage. To process overpacked munitions in the main plant, personnel in agent protective suits will be required to open the overpack and remove the leaking munition. This is a high-risk operation.

The proposed action will continue the JMC/CMA/PEO ACWA commitment to worker safety, environmental compliance, and demilitarization goals and schedules, while utilizing effective, tested, and available existing technologies.

1.4 SCOPE OF EA

1.4.1 Framework

The potential environmental impacts associated with the destruction of the BGAD inventory have been previously addressed in the 2002 FEIS (PMCD 2002). The FEIS concluded that operation of BGCAPP Main Plant would not result in any significant adverse environmental impacts. The 2002 FEIS discusses the possible use of a “blast chamber” to destroy munitions’ energetic components that might be contaminated with agent.

PEO ACWA published for public comment a BGAD EDT EA (ACWA 2013) that evaluated the significance of the potential environmental impacts of constructing and operating an EDT facility at BGAD for the destruction of mustard-filled munitions. This EDT, referred to hereafter as the existing SDC, is constructed and is scheduled to begin operations as early as June 2019.

This EA, as well as the 2002 FEIS (PMCD 2002) and the BGAD EDT EA (ACWA 2013), has been prepared in accordance with the National Environmental Policy Act (NEPA) (PL 91-190, 42 U.S.C. 4321-4347, as amended) and the Council on Environmental Quality (CEQ) regulations for implementing the NEPA procedural provisions (40 Code of Federal Regulations [CFR] 1500–1508; Department of Defense [DOD] Directive 4715.9, *Environmental Planning and Analysis* [DOD 1996]; Army Regulation 200-1, *Environmental Protection and Enhancement* (DA 2007); and Army Regulation 200-2, *Environmental Analysis of Army Actions* [32 CFR 651]). Under these procedures, the Army must consider the environmental consequences of its proposed actions.

The potential environmental impacts of the alternatives of the proposed action are evaluated in this EA, and include those impacts associated with land use, air quality, water resources, human health and safety, ecological resources, socioeconomic resources, environmental justice, noise, waste management, and resource consumption. To avoid redundancy and to comply with the intent of CEQ guidance at 40 CFR 1500.4 on reducing paperwork, Section 3 of this EA tiers from and relies upon the findings of the Army’s 2002 FEIS

(PMCD 2002) and EAs where appropriate, rather than presenting new analyses. Previous EAs include the BGAD EDT EA (ACWA 2013) as well as two EAs conducted at PCD. In the 2012 PCD EA (hereinafter PCD EDT EA) (ACWA 2012), Explosive Destruction Systems (EDSs) were selected to augment the Pueblo Chemical Agent-Destruction Pilot Plant (PCAPP) Main Plant for destruction of problematic mustard munitions. In the 2018 PCD EA (hereinafter PCD SDC EA [ACWA 2018]), SDCs were selected to further augment PCAPP Main Plant capabilities to process mustard munitions. Where a simple comparison between the findings of these previous assessments and the current proposed action is not sufficient to determine the relative magnitude or significance of the potential impacts, additional analysis is presented.

This EA also evaluates a no-action alternative in accordance with CEQ regulations and 32 CFR 651. The no-action alternative involves operation of the BGCAPP Main Plant to destroy the nerve-agent stockpile and continuing to use the existing SDC to destroy mustard munitions.

Although NEPA documents often include discussions of technology-related and regulatory issues, the documents are prepared early in the planning process and, therefore, rarely contain design information sufficiently detailed for use with the various permits required by other statutes. Regulatory compliance for the proposed action would require the Army to submit a comprehensive, detailed description of the destruction technology selected and the proposed pollution control measures as part of its applications for permits to be issued pursuant to the Resource Conservation and Recovery Act (RCRA), Clean Air Act (CAA), Clean Water Act (CWA), Toxic Substances Control Act (TSCA) (exclusively for destruction of overpacked munitions due to concern about polychlorinated biphenyl [PCB] contamination of the SFTs), and other applicable laws and regulations. Thus, separate regulatory documentation beyond the scope of this EA would be prepared, as necessary, independent of the NEPA review process. Some of these other regulatory and permitting processes also include public meetings to discuss pertinent environmental issues.

1.4.2 Approach

This EA identifies, documents, and evaluates the potential effects of the proposed action and alternatives. An interdisciplinary team of environmental scientists, engineers, and analysts performed the impact analyses. The team identified resources and topical areas, incorporated information from the previous environmental reviews, analyzed the proposed action against the existing conditions, and determined the relevant beneficial and adverse effects associated with the proposed action.

Section 3 of this EA describes the existing conditions of the potentially affected resources and other areas of special interest within the boundaries or in the vicinity of BGAD. The region of potential impact is Madison County, Kentucky, where BGAD is located. The existing conditions described in Section 3 constitute the basis for assessing the potential effects of implementing the proposed action. Mitigation measures that could reduce the likelihood or severity of adverse impacts are identified, where appropriate. The alternatives are described in Section 2.2. This EA does not compare one alternative against another or attempt to quantify the “best” alternative. Selection of the alternative will consider costs, logistics, scheduling, permitting, and other economic factors. This EA analyzes direct impacts (i.e., those caused by or directly associated with implementation of the proposed action and occurring at the same time and place) and indirect impacts (i.e., those caused by implementation of the proposed action and occurring later in time or farther removed in distance but still reasonably foreseeable). Cumulative effects (i.e., those resulting from the incremental impacts of the proposed action

when added to other past, present, and future actions regardless of what agency, organization, or person undertakes such other actions) are also addressed. Cumulative effects include those that might result from individually minor—but collectively significant—actions taken over time. The assessment of cumulative impacts considers the operation of the proposed action during the operational period of the BGCAPP Main Plant.

1.5 PUBLIC PARTICIPATION

Public involvement is an integral component of the Army's plans to complete the destruction of the BGAD stockpile. This EA, and its accompanying draft FONSI, has a 30-day public comment period. Public comments and participation in the NEPA process are invited and welcomed. The BGAD and PEO ACWA outreach teams support public participation goals and the sharing of information related to the demilitarization objectives for the BGAD stockpile. Outreach efforts for this EA will be conducted as part of the NEPA review and will be consistent with PEO ACWA policy.

The strategy to disseminate information and invite public input on the proposed change in destruction approach consists of the following:

- Community forums or special presentations, technology overviews, or site visits, as determined, in cooperation with the Kentucky Chemical Demilitarization Citizens' Advisory Commission (CAC)
- Ongoing communication opportunities through the CAC and its Chemical Destruction Community Advisory Board
- Local publication and availability of the EA for public comment
- Full utilization of public outreach assets in the distribution of the EA, collection of feedback, and support of all public meetings

In addition to the environmental review documented in the EA, additional environmental permits will be required for site preparation, installation, and operation of any new equipment for processing nerve agent. Public participation would be also part of the environmental permitting process.

Because this EA concludes with a recommendation for a FONSI, the Army issued a draft FONSI simultaneous with the issuance of this Final EA and is seeking public comment on the draft FONSI during the same 30-day comment period as the EA. After the close of the 30-day public comment period, the Army will consider all of the public comments received and will issue a final determination in regard to proceeding with the proposed action.

2. PROPOSED ACTION AND ITS ALTERNATIVES

This section describes the proposed action and the alternatives considered by the Army to accomplish this action. Section 2.1 presents a detailed description of the proposed action and provides technical information and data that serve as the basis for the assessment of the potential environmental impacts as presented in Section 3. Section 2.1 also describes the resource requirements and the waste streams associated with the use of this equipment. Section 2.2 discusses alternatives considered.

Section 2.3 discusses the no-action alternative, and Section 2.4 identifies other alternatives that were eliminated from further consideration. A rigorous screening process was used to determine which alternatives support implementation of the proposed action. For an alternative to be considered viable and carried forward for analysis, the alternative had to meet the following screening criteria consistent with the purpose and need.

- The use of a technology that does not negatively impact safety of the worker, human health, or the environment of the surrounding communities.
- The use of a technology that does not require, or minimizes, disassembly of the munitions.
- The use of a commercially available technology with a successful history of chemical agent munition destruction and sufficient throughput capacity. The technology must be available in sufficient quantities to process munitions by the mandated date and to meet PEO ACWA mission requirements.
- The use of a technology that does not impact the ability of the site to obtain the necessary environmental permits required to process munitions by the mandated date and to meet PEO ACWA mission requirements.

2.1 PROPOSED ACTION

The proposed action is to augment the chemical weapons destruction capability of the BGCAPP Main Plant to reduce safety risks associated with processing M55 rockets and to meet the CWC requirement, as modified by PL 114-92, Section 1411, to destroy the U.S. chemical weapons stockpile no later than 31 December 2023. Augmentation would be achieved by retrofitting the existing SDC and utilizing an additional SDC (an SDC 1200 or a larger SDC 2000) to process M55 rockets and/or components. Overpacked M55 rockets in SFTs could be processed in an SDC 2000 or in an EDS Phase 3 (P3) (described in Section 2.1.1.2).

The M55 rockets would still be de-mated in the BGCAPP Main Plant. De-mating involves the separation of the M56 warheads from the RMAs. The M56 warheads and the RMAs would be processed separately in an SDC 1200 due to explosive feed limits. The M56 warheads could be drained and the agent processed in the BGCAPP Main Plant, if necessary. De-mated M56 warheads, whether drained or undrained, would be packaged in a container and crated in a way that prevents leakage of agent and mitigates explosive risk during transfer, storage, and handling. The containerized M56 warheads would be transferred to an SDC or returned to storage.

SDCs are in service internationally for the purpose of destruction of conventional and chemical-agent-filled munitions. Nerve agent has never been processed in SDCs in the United

States. Retrofitting the existing SDC 1200's off-gas treatment system (OTS) would be required to process nerve agent. An additional SDC could be utilized to add more processing capacity.

The SDC is an electrically heated explosive and chemical agent destruction system providing total containment of blast effects and chemical agent. The indirectly heated SDC unit is equipped with a robust OTS. The system is interlocked, so it is never open to the outside during operations. The detonation chamber (DC) is heated above the autoignition temperature of all known explosives and propellants, ensuring complete destruction of both the explosive and agent components in one step without the need to dismantle munitions. Items being destroyed are held in the DC a sufficient amount of time to ensure that they are free from explosives and/or agent and are suitable for recycling as scrap metal. The ability to minimize the handling requirements for the munitions provides significant safety enhancements to the workforce. SDC workers are not routinely required to enter into agent-contaminated areas, as is the case for BGCAPP Main Plant workers. The OTS treats off-gas, which is the gas generated in the DC.

In addition to processing drained or undrained M56 rocket warheads and RMAs in the existing SDC 1200, an additional SDC could be utilized to add processing capacity. The new SDC could be either an SDC 1200 or a larger SDC 2000. The SDC 2000 has a larger entry to the DC than an SDC 1200, which enables larger items to be fed to the unit. The SDC 2000 has a higher explosive feed limit than the SDC 1200, which allows the unit to process a complete M55 rocket, including overpacked M55 rockets in the SFT, without separation of the warhead and the RMA. If another SDC 1200 were used instead of an SDC 2000, an additional unit, the EDS P3, would be needed to process overpacked M55 rockets due to explosive feed limits.

An EDS P3 could be utilized to process complete M55 rockets and overpacked M55 rockets in SFTs. The EDS P3 uses commercial cutting charges to access the rocket's agent cavity and explosive components inside of a stainless steel pressure vessel. This pressure vessel would provide 100 percent vapor and fragmentation containment. Reagents would then be added to the vessel to neutralize the chemical agents. The vessel design allows the collection of liquid and vapor samples to confirm chemical agent destruction before the vessel is drained and opened in preparation for the next operation. The throughput of this system is drastically lower than the SDC throughput. The EDS P3 can process one to two M55 rockets per day, while an SDC can process up to six M56 warheads per hour and the SDC 2000 can process up to three complete M55 rockets per hour.

2.1.1 Description of Proposed Units

2.1.1.1 Description of SDCs

Mustard munitions will be processed in the existing SDC beginning as early as June 2019. When those operations are completed, the unit will be RCRA clean-closed for mustard agent and the OTS will be retrofitted for processing nerve agent. This will involve total replacement of the OTS. After the retrofit of the OTS is completed, an initial shakedown period would be used to ramp the unit to its full-capacity processing rate. In conjunction with the operation of the BGCAPP Main Plant, operations in the existing SDC are expected to be complete by the end of 2023.

Site preparation for installation of a new SDC would be expected to begin in late 2019 or early 2020. The unit would be placed near the BGCAPP Container Handling Building. The land disturbance anticipated—including any new support structures and parking areas—would be approximately 2 acres.

Army, DOD, depot, and other applicable safety and surety policies would be followed regarding the transportation/transfer of munitions from storage to the SDCs. Items to be processed through the SDCs would be transported, stored, and monitored in accordance with the RCRA hazardous waste permit. Permitted storage in proximity to the SDCs would allow continued operations at night and on weekends and holidays. Evaluation will be made to determine if there is adequate lighting to allow for safe movement of munitions from these magazines to the SDCs at night.

Both the SDC 1200 and SDC 2000 are designed for destruction of conventional munitions and energetic components, as well as chemical-agent-filled munitions, by indirect heating in a DC. The SDC 2000 could process larger items and items with higher amounts of explosive than the SDC 1200. It is expected that an SDC 2000 could process a complete, overpacked M55 rocket while an SDC 1200 could only process de-mated components of the M55 rockets. The SDC 2000 will have a similar OTS as the retrofitted existing SDC 1200.

The shell of the DC and the fragment shield are heated to elevated temperatures by heating elements exterior to the DC. An item fed to the DC comes in direct contact with a heated mass until the item reaches its autoignition temperature. This conductive heating, which causes internal pressure to build within the munition, results in rupture of the munition—allowing for deflagration or detonation of the item and rapid destruction. Organic compounds in the DC are destroyed by pyrolysis (thermochemical decomposition at elevated temperatures in the absence of oxygen).

Once the energetics and chemical agent inside the munition have been destroyed, any remaining scrap material from the munition is emptied onto a scrap conveyor system that originates underneath the DC. The off-gas generated inside the DC is cleaned and filtered in an OTS.

The BGAD stockpile includes some M55 rockets in SFTs that are overpacked. In addition, the de-mated M56 warheads may be containerized following de-mating and draining in the BGCAPP Main Plant. Items being fed to the SDC need no preparation prior to destruction, and there is no requirement to remove M55 rockets from overpacks or containers prior to processing. The ability to minimize handling requirements provides a significant safety enhancement to the workforce. The items are placed into trays on a loading system, which feeds the trays one at a time into the DC. The nearly spherical, armored, double-shelled, high-alloy stainless steel DC is designed to contain blasts that may occur. Figures 2-1 and 2-2 provide flow diagrams of the SDC process. Figure 2-3 depicts the existing SDC.

Operators in a control room start the destruction sequence and initiate feed. Feed rates will be based on environmental and safety requirements. The tray is moved via a conveyor, lift, and pusher system into the first loading chamber. A gate is closed and air seals are inflated to close off the first loading chamber from the outside. Then, a second gate is opened and the tray is pushed into the second loading chamber. The second gate is closed and another set of air seals is inflated to create a barrier between the first and second loading chambers.

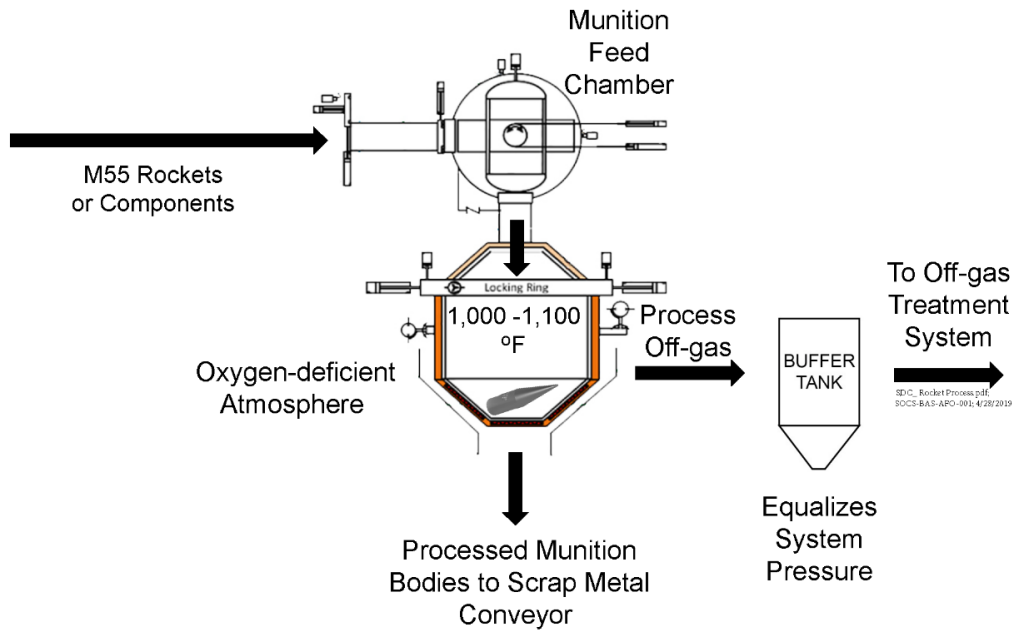


Figure 2-1. Flow Diagram for SDC Process

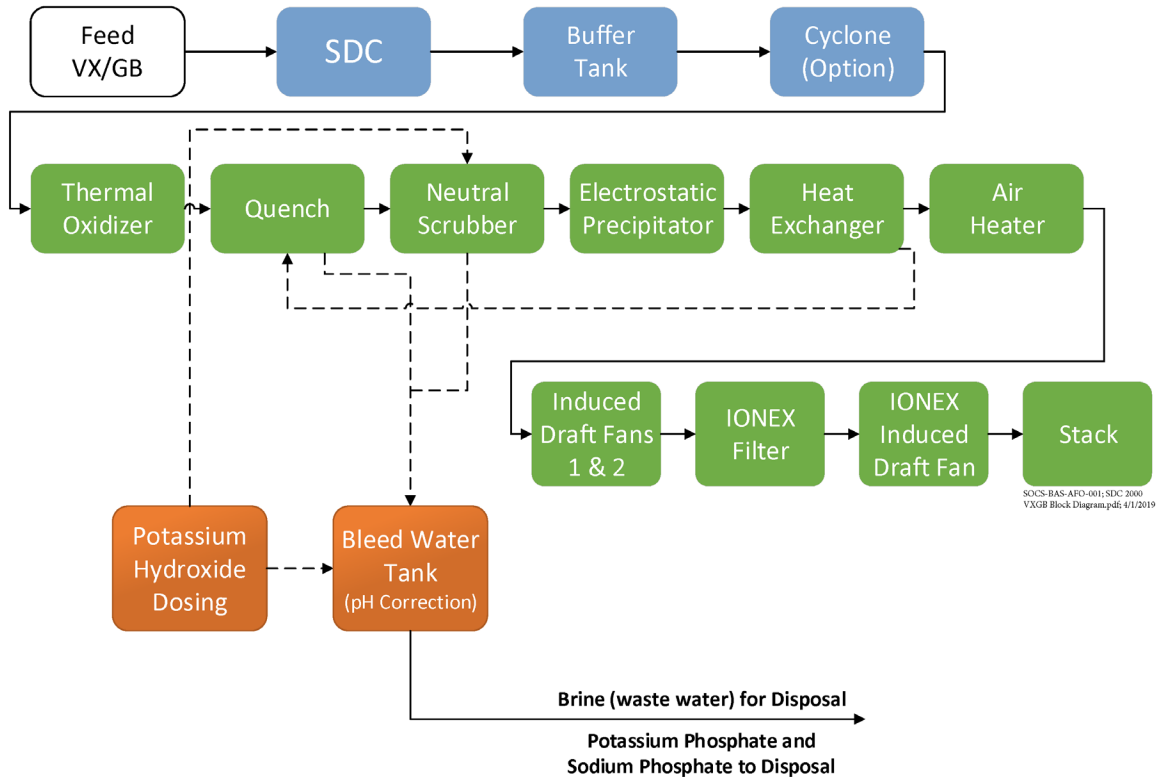


Figure 2-2. Flow Diagram for OTS



Figure 2-3. Existing SDC

An industrial computer automates feeding items to the SDC. When indications that all parameters are within required boundaries, a control room operator initiates the feed command. The fragment valve that blocks the opening of the DC is opened, and the second loading chamber is rotated so that the tray drops into the heated DC for destruction. A timer is initiated that controls when the next tray can be fed. The control room operators monitor parameters, such as temperature and pressure, to ensure the munitions are destroyed before they feed the next tray of munitions. This process is repeated until the DC is approximately 50 percent full with thermally treated munition bodies. The fragmented munition bodies are held in the DC a sufficient amount of time to ensure they are free from explosive and/or agent contamination and, therefore, are suitable for disposal as scrap metal. The DC contents are emptied onto the scrap conveyor system where the munition bodies are cooled and dumped into a scrap bin for transfer to a roll-off container.

A pipe carries the off-gas generated in the DC through a buffer tank designed to reduce pressure peaks to downstream components. From there, the off-gas is fed to the OTS for treatment before it is exhausted to the atmosphere through a stack. The OTS thermally and chemically treats the exhaust from the destruction process.

In the OTS, a natural gas fueled burner (thermal oxidizer) heats the off-gas to more than 1,800°F for approximately 4 seconds. Hot gases are cooled in a quench to inhibit the formation of dioxin and furan compounds. The next stage is the neutral scrubber, which neutralizes acid and removes particulates and other contaminants. An electrostatic precipitator removes mist and contaminants from the off-gas. Heaters further reduce humidity before the off-gas flows into a filter unit.

The filter unit, consisting of fiber filters to remove particulate and charcoal to absorb vapors, is downstream of the OTS. The filter is a safeguard to ensure no organic contaminant vapors escape from the stack and to remove additional contaminants. Gases exiting the stack are monitored for chemical agent, oxygen, and carbon monoxide (CO).

The SDC system has successfully demonstrated a destruction removal efficiency (DRE) greater than 99.9999 percent for mustard agent. The Anniston Army Depot (ANAD) SDC was used as part of Anniston Chemical Agent Disposal Facility (ANCDF) in 2011 to destroy mustard-filled munitions with no negative environmental impacts.

The ANAD SDC processed 2,737 mustard-filled munitions, including 4.2-inch mortar rounds, 105mm projectiles, and 155mm projectiles (ANCDF 2009). These munitions also contained explosive components. Emissions tests conducted while feeding mustard-filled munitions, conventional munitions, and surrogate materials more difficult to destroy than nerve agents at the ANAD SDC are the basis of the assessment in Section 3 of this report. These tests indicate the ANAD SDC operated in compliance with RCRA and CAA permits. An assessment of risk indicates that operation of the ANAD SDC did not pose an unacceptable risk to human health or the environment. The ANAD SDC was RCRA clean-closed for mustard agent at the completion of the ANCDF mission, and it continues to safely process conventional munitions and uncontaminated explosives from PCAPP. The ANAD SDC operates in compliance with environmental requirements and has a stellar safety record. The ANAD SDC OTS differs from the OTS proposed to retrofit the existing SDC and the OTS of the proposed new SDC in order to more efficiently treat the off-gas for fluoride compounds associated with GB; these differences would serve to further reduce emissions rates.

Support equipment and structures for the SDCs are described in Section 2.1.2.

2.1.1.2 Description of EDS P3

Site preparation for installation of the EDS P3 would be expected to begin in late 2019 or early 2020. The unit would be placed in the CLA. The land disturbance anticipated—including any new support structures and parking areas—would be approximately 1 acre.

Army, DOD, depot, and other applicable safety and surety policies would be followed regarding the transportation/transfer of munitions from storage to the EDS P3. Items to be processed through the EDS P3 would be transported, stored, and monitored in accordance with the RCRA hazardous waste permit. Permitted storage in proximity to the EDS P3 would allow continued operations at night, on weekends, and on holidays. Evaluation will be made to determine if there is adequate lighting to allow for safe movement of munitions from these magazines to the EDS P3 at night.

The EDS P3 is a self-contained, transportable system designed to provide on-site treatment of chemical agents and munitions. The primary component of the EDS P3 is a thick-walled, stainless steel explosive containment vessel. A reusable, advanced fragment suppression system (AFSS) serves as a support for the munitions, as well as a shield to protect the interior of the containment vessel. The destruction process begins when the munitions are placed onto a special munition holder that fits into the AFSS. Then, shaped charges are placed near each munition. After the munitions and the shaped charges are assembled on the munition holder, the entire assembly is placed into the AFSS, which is inside the containment vessel. Once the EDS P3 containment vessel is sealed, the shaped charges are detonated.

Detonation of the shaped charges destroys the explosive component of the munition and opens its outer casing (munition body) to release the chemical fill under total containment (i.e., no release to the environment). The neutralizing reagent (monoethanolamine [MEA]) is pumped into the sealed containment vessel to react chemically with the chemical agent fill and with the agent-contaminated components of the munitions. After the mixture of chemicals is allowed to react, a sample is drawn through the vessel door to verify that the fill has been neutralized. After verification, the waste products (e.g., debris and neutralents) resulting from the EDS P3 treatment process are transferred from the containment vessel into U.S. Department of Transportation (DOT)-approved containers for off-site shipment to a RCRA-permitted treatment, storage, and disposal facility (TSDF). The containment vessel is rinsed with water at the completion of each treatment cycle.

The operation of each EDS P3 would involve one 10-hour processing cycle, as follows. The munitions would be placed into the containment vessel, followed by detonation and subsequent addition of the neutralizing reagent. Next, the byproducts of the neutralization reaction would be drained, and a heated rinsate would be added. A final rinsing of the containment vessel would occur after the vessel had cooled sufficiently. The containment vessel would then be opened to allow access to and removal of the munition debris and other solid waste. A maximum of two such cycles can be processed within a 24-hour period.

Neutralent and rinsate wastes are drained from the EDS containment vessel into the waste transfer system. Atmospheric emissions from the EDS unit originate from chemicals evaporating from the liquid wastes; therefore, no metal constituents or other non-volatile constituents would be released to the atmosphere. Atmospheric emissions from the EDS unit only occur when liquid is drained from the EDS containment vessel or when the vessel is purged at the end of the treatment cycle. Because there is no induced airflow through the waste transfer system, the duration of emissions is very short. The typical duration of atmospheric emissions during the cycling would be approximately 10 minutes for the draining of rinsate wastes (two times) and

15 minutes for the purge. The pressure generated inside the vessel during the detonation and treatment is vented through a carbon filter, which removes any residual reagents and other chemicals from the air stream. The EDS is capable of achieving established treatment levels that are protective of public safety and human health.

Smaller EDSs have been used extensively at other locations (e.g., Redstone Arsenal and the former Camp Sibert, both in Alabama; Pine Bluff Arsenal in Arkansas [see CMA 2004]; the former Rocky Mountain Arsenal in Colorado; Dugway Proving Ground in Utah; and PCD in Colorado).

Based on previous operating experience of the smaller EDSs, the scrap metal from the munition bodies and explosive components coming from the unit would be headspace monitored to below the vapor screening level (VSL) agent concentration and disposed of in a RCRA landfill. It is anticipated that waste from the EDS P3 will also be below VSL agent concentration.

The supporting infrastructure for the EDS units is described in Section 2.1.2.

2.1.2 Site Layout and Installation

The location of the existing SDC and the proposed location of a new SDC and the EDS P3 is shown on Figure 2-4. Implementation of the proposed action requires the selection of a site for the new facilities that would not disrupt the operation of the BGCAPP Main Plant or other BGAD operations.



Figure 2-4. Location of Existing SDC, Proposed SDC, and Proposed EDS P3

The site and operation of the SDCs and EDS P3 and the storage limits for the service magazines must comply with DOD and Department of the Army explosive safety requirements. The siting and operational requirements of the SDCs and the EDS P3, as well as the establishment of net explosive weight limits for the service magazines, are complex operational concepts that require discussions with the approving authorities: the United States Army Technical Center for Explosives Safety (USATCES) and the DOD Explosives Safety Board (DDESB).

Each system (SDC or EDS P3) would be operated inside its own environmental enclosure on a concrete pad. Negative pressure ventilation would prevent air leakage from the enclosure into the environment. Make-up air would be supplied through vents or louvers in one end of the environmental enclosure, with a filtration system at the other end. The filtration system would include filters, carbon filtration media, and the appropriate fans and motors to create a negative pressure inside the enclosure, and the filtered air would be exhausted to atmosphere. Nerve agent monitoring would be conducted inside the environmental enclosure for personnel protection.

The following support equipment and structures are in place for the existing SDC and would be needed for the new SDC and EDS P3. Existing facilities will be utilized where available.

- **Control Rooms.** Operations will be controlled and monitored remotely. All necessary commands and settings are performed from the operator stations inside the associated control room.
- **Heating, Ventilation, and Air Conditioning (HVAC) Air Filtration Units.** An HVAC air filtration unit provides negative pressure on each environmental enclosure to filter any contaminants in the exhaust air before the exhaust is released to the atmosphere.
- **Lockers, Restrooms, PPE Support, and Storage Building.** A maintenance and storage facility would serve personnel. This building could also house a locker room and restrooms.
- **Storage Magazines.** Magazines will provide for storage of munitions to be destroyed.
- **Secondary Waste Storage Areas.** Less than 90-day RCRA areas provide storage of secondary wastes generated. RCRA-permitted storage locations at BGAD and the BGCAPP Main Plant may be utilized before the wastes are shipped for treatment and disposal.
- **Emergency Generators.** Diesel-powered generators provide backup power to critical systems.
- **Parking Area.** The existing parking would be utilized for government vehicles only.

The BGCAPP Main Plant is inside the Chemical Limited Area (CLA) security fencing. The existing SDC is inside the BGCAPP security fencing, as will be the new SDC. The EDS P3 also will be inside the CLA security fencing. Access to the sites will require passing through a guarded gate that would be staffed by security personnel 24 hours per day.

The topography of the proposed locations of the new SDC and the EDS P3 consists of relatively flat terrain. The proposed sites have been previously disturbed. Site preparation would involve minimal grading and grubbing, including very small amounts of excavation and fill work. Additional site preparation activities would include pouring concrete pads and provisioning fire water/potable water, natural gas, and electrical connections to the site. Electric power would be provided to the site by connections to the existing BGAD or BGCAPP distribution system. Diesel-powered backup generator sets would be provided for critical systems (air filtration and monitoring equipment) should the loss or interruption of power occur. Water,

sewer, natural gas, and communications connections would also be provided to the site by connection to existing BGAD utilities systems. The site drainage system will be designed to divert surface water runoff from the units and to prevent erosion and surface water accumulation on the site. Leftover site preparation debris would be collected and transported to an off-site commercial site for disposal. The new units would be modularized and assembled at the site. All necessary mechanical, electrical, and piping components would be included in the SDC modules. Any commodities—such as the insulation, ladders, platforms, piping, instruments, and raceways not installed on the modules—would be installed onsite.

2.1.3 Resource Requirements

The SDCs and EDS P3 would require electricity, propane/natural gas, diesel fuel, water, and other consumables. Diesel fuel would be used to power backup generators for the proposed units. Resource requirements are further discussed in Section 3.1.9.

The estimated workforce to retrofit the existing SDC, prepare the sites, and install the new SDC and EDS P3 would be approximately 30 to 80 workers total, and the duration is expected to be approximately 16 months total for installation of all units. The workforce for operations would include support workers and operational staff. Support from the existing BGCAPP Main Plant workforce for certain functions (for example, laboratory analysis and medical support) may be utilized when possible. For the purpose of this EA, it is estimated that 140 workers would be required to support operation of the existing SDC, 110 additional workers for the new SDC, and 25 workers for operation of the EDS P3, for a total of 275 workers to operate all three units. These workers include functions such as project management, engineering, clerical, laboratory support, project controls, safety, shift management, control room operations, and munitions handling.

2.1.4 Waste Management

Wastes would be generated during the installation of the proposed SDC and EDS P3. The characteristics and quantities of such wastes would be similar to those generated during installation of any small-sized industrial facility. All wastes would be initially placed into roll-off containers and then transferred to an off-site waste management vendor.

Operation of the SDCs would generate both solid and liquid wastes. Solid wastes such as dust, salts, and sludge would be generated primarily from operation of the SDC OTS and scrap conveyor. Carbon and fiber filters would be generated from operation of the filter units. Munition packaging materials would also be generated. Liquid waste would be generated during OTS operation and periodic maintenance. In the unlikely event of agent decontamination activities, the following waste streams would also be generated: spent rinse water and decontamination solutions, contaminated PPE, and laboratory wastes.

The wastes generated by operation of the EDS P3 would mainly consist of liquid neutralant and rinse water. Carbon and fiber filters would be generated from operation of the filter units. Munition packaging materials would also be generated. In the unlikely event of agent decontamination activities, the following waste streams would also be generated: spent rinse water and decontamination solutions, contaminated PPE, and laboratory wastes.

All wastes generated from the proposed action would be appropriately characterized and containerized in accordance with the RCRA permit requirements. Any waste generated could potentially be contaminated with toxic chemicals and may be characterized by generator

knowledge or laboratory analysis. Waste with toxic chemicals present at concentrations higher than the regulatory limits would be managed as a hazardous waste, in accordance with regulatory requirements. Materials that came in contact with or were derived from chemical agent would carry applicable Kentucky-specific waste codes. In the unlikely event of agent-contaminated materials, decontamination would follow the established Standing Operating Procedures. If the analysis showed that no hazardous constituents were present, wastes that were not classified as a hazardous waste under RCRA or TSCA would be managed as non-hazardous wastes. Any wastes destined for shipment to an off-site TSDF would be managed in accordance with RCRA or TSCA requirements. Wastes are further described in Section 3.1.8.

2.1.5 Approvals, Permits, and Conditions

Before implementing the proposed action, the Army would be required to coordinate its actions with various federal, Kentucky, and local regulatory authorities. At a minimum, a RCRA permit would need to be in place before site preparation begins for the new SDC or the EDS P3. CAA and CWA permits may also need to be issued as determined by the Commonwealth of Kentucky. TSCA approvals may also need to be issued by the Environmental Protection Agency (EPA) for units processing items that include SFTs.

No National Pollutant Discharge Elimination System (NPDES) permits, other than a general construction stormwater permit, would be required for site preparation and installation of the new SDC and the EDS P3. Stormwater discharges are regulated by the Kentucky Department of Environmental Protection (KDEP) Division of Water using a Kentucky Pollutant Discharge Elimination System (KPDES) permit. Under this program, the Army may obtain coverage for stormwater discharges during operations of the new units.

Approval of the Site Safety Submission Document by the DDESB would be a prerequisite to operation of the systems. A primary function of the DDESB is to review and approve the safety aspects of all plans for siting, installing, or modifying ammunition and explosives DOD facilities, to include possible impacts on nearby structures and activities. In addition, the U.S. Department of Health and Human Services, Centers for Disease Control and Prevention (CDC), would continue its advisory role by reviewing data and making appropriate recommendations concerning public health and safety.

In conjunction with the anticipated KDEP permitting requirements, the Army would conduct a Multiple Pathway Health Risk Assessment (MPHRA) on the emissions associated with the proposed action.

Prior to processing nerve agent in any of the units, the Army may be required to conduct an operational readiness review. The Army would be subject to a variety of reporting, inspection, notification, and other permit requirements of the State of Kentucky.

2.1.6 Decommissioning and Closure

Upon the completion of the mission, the units would be appropriately decontaminated and RCRA clean-closed (i.e., all hazardous wastes and residues would be removed or decontaminated to levels below applicable standards and limits). The units and support structures would be dispositioned as Army assets. If not immediately dispositioned, the units would be placed into a layup status and maintained in a condition ready for use.

Following disposition/layup of the units, the environmental enclosures and the supporting equipment would be removed. All foundations and concrete pads that were used to support the

units, as well as all utility connection and infrastructure improvements, could be left in place as negotiated between the Army and the governor of the state. At the conclusion of operations, and upon the decommissioning and closure, the sites could become available for other uses.

Possible reuse of the facilities is under consideration at BGAD. Final closure plans cannot be determined until after the Army and the Commonwealth of Kentucky agree on the final end-state for the facilities. The federal and Kentucky statutes are expected to require the Commonwealth of Kentucky governor's approval for any RCRA facility. A RCRA closure plan will be submitted pending a final decision of demolition, layup, or reuse of facilities at BGAD.

2.2 ALTERNATIVES CONSIDERED

2.2.1 Alternative 1

- Process M56 warheads (drained or undrained) and RMAs in the existing retrofitted SDC 1200
- Process M56 warheads (drained or undrained), RMAs, and complete M55 rockets (including overpacked rockets in SFTs) in a new, larger SDC 2000
- Continue use of the BGCAPP Main Plant to destroy the GB and VX projectiles, neutralize nerve agent, process hydrolysate generated from the neutralization process, and de-mate (and possibly drain) the GB and VX M56 warheads from the RMAs, if necessary

The existing SDC 1200 would destroy the entire mustard stockpile and then would be retrofitted to destroy M56 warheads (drained or undrained) and agent-contaminated RMAs. A second, larger SDC 2000, located in or near the existing Container Handling Building, would process M56 warheads (drained or undrained); complete M55 rockets; complete, overpacked, undrained M55 rockets in SFTs; and agent-contaminated RMAs. In addition, the overpacked M56 warheads would be processed in the SDCs. Uncontaminated RMAs could be processed in the SDCs or at an off-site TSDF.

Processing M55 rockets and components in SDCs would improve worker safety when compared to the BGCAPP Main Plant. This alternative would reduce or eliminate the use of the ENS and the AFS in the BGCAPP Main Plant, which would reduce or eliminate the safety concerns associated with those units. This alternative would also reduce safety risk associated with processing gelled and/or solidified agent in the BGCAPP Main Plant.

Processing the overpacked M55 rockets in the SDC 2000 would further improve worker safety in the BGCAPP Main Plant by eliminating the need for workers to remove leaking M55 rockets from overpack containers.

The use of SDCs to destroy M55 rockets and components would also increase the likelihood for BGCAPP to meet the mandate date for destruction of the BGAD stockpile.

This alternative is preferred over Alternative 2 (described in Section 2.2.2) due to the ability to process overpacked munitions in the SDC 2000 where the SDC 1200 cannot, making it necessary to utilize an additional unit, the EDS P3. Alternative 3 (described in Section 2.2.3) is similar to this alternative, but adds the EDS P3 in addition to the SDC 2000 to enhance the capacity to process overpacked munitions.

2.2.2 Alternative 2

- Process M56 warheads (drained or undrained) and RMAs in the existing retrofitted SDC 1200
- Process M56 warheads (drained or undrained) and RMAs in a new SDC 1200
- Process complete M55 rockets, including overpacked rockets in SFTs, in an EDS P3
- Continue use of the BGCAPP Main Plant to destroy the GB and VX projectiles, neutralize nerve agent, process hydrolysate generated from the neutralization process, and de-mate (and possibly drain) the M56 warheads from the RMAs

The existing SDC 1200 would destroy the entire mustard stockpile and then would be retrofitted to destroy GB and VX M56 warheads (drained or undrained) and agent-contaminated RMAs. A second SDC 1200, located in or near the existing Container Handling Building, would be utilized to process GB and VX M56 warheads (drained or undrained) and agent-contaminated RMAs. Complete M55 rockets, including overpacked rockets, would be processed in an EDS P3 located west of the BGCAPP Main Plant in the igloo storage area. In addition, the GB and VX overpacked M56 warheads would be processed in the SDCs or EDS P3. Uncontaminated RMAs could be processed in the SDCs or at an off-site TSDF.

Processing M55 rocket components in SDCs would improve worker safety when compared to the BGCAPP Main Plant. This alternative would reduce or eliminate the use of the ENS and the AFS in the BGCAPP Main Plant, which would reduce or eliminate safety concerns associated with those units. This alternative would also reduce safety risk associated with processing gelled and/or solidified agent in the BGCAPP Main Plant.

Processing the overpacked M55 rockets in the EDS P3 would further improve worker safety in the BGCAPP Main Plant by eliminating the need for workers to remove leaking M55 rockets from overpack containers.

The use of SDC 1200 units to destroy M55 rocket components and the use of the EDS P3 to process complete M55 rockets, including overpacked rockets, would also increase the likelihood for BGCAPP to meet the mandated date for destruction of the BGAD stockpile. This alternative is less preferred than Alternative 1 because overpacked rockets cannot be processed in the SDC 1200. An additional unit, the EDS P3, would be required.

2.2.3 Alternative 3

- Process M56 (drained or undrained) warheads and RMAs in the existing retrofitted SDC 1200
- Process M56 warheads (drained or undrained), RMAs, complete M55 rockets, and overpacked M55 rockets in SFTs in a new, larger SDC 2000
- Process complete M55 rockets, including overpacked rockets in SFTs, in an EDS P3
- Continue use of the BGCAPP Main Plant to destroy the GB and VX projectiles, neutralize nerve agent, process hydrolysate generated from the neutralization process, and de-mate (and possibly drain) the M56 warheads from the RMAs

The existing SDC 1200 would destroy the entire mustard stockpile and then would be retrofitted to destroy GB and VX M56 warheads (drained or undrained) and agent-contaminated RMAs. A second, larger SDC 2000, located in or near the existing Container Handling Building, would be utilized to process GB and VX M56 warheads (drained or undrained); complete M55

rockets (drained or undrained); complete, overpacked, undrained M55 rockets in SFTs; and agent-contaminated RMAs. Overpacked rockets with SFTs would be processed in an EDS P3 located west of the BGCAPP in the igloo storage area. In addition, the overpacked M56 warheads would be processed in the SDCs or EDS P3. Uncontaminated RMAs could be processed in the SDCs or at an off-site TSDF.

Processing M55 rocket components in SDCs would improve worker safety when compared to the BGCAPP Main Plant. This alternative would reduce or eliminate the use of the ENS and the AFS in the BGCAPP Main Plant, which would reduce or eliminate safety concerns associated with units. This alternative would also reduce safety risk associated with processing gelled and/or solidified agent in the BGCAPP Main Plant.

Processing overpacked M55 rockets in the SDC 2000 or EDS P3 would further improve worker safety in the BGCAPP Main Plant by eliminating the need for workers to remove leaking M55 rockets from the overpack containers.

The use of SDCs to destroy M55 rocket components and the use of the SDC 2000 and the EDS P3 to process complete M55 rockets, including overpacked rockets, would also increase the likelihood for BGCAPP to meet the mandate date for destruction of the BGAD stockpile. This alternative is less preferred than Alternative 1 because it adds an additional unit, the EDS P3, as an option to processing complete and/or overpacked rockets in the SDC 2000.

2.3 NO-ACTION ALTERNATIVE

The CEQ regulations (40 CFR 1502.14(d)) require analysis of a no-action alternative to provide a benchmark, enabling decision-makers to compare the magnitude of the potential environmental effects caused by the other alternatives considered to implement the proposed action. The no-action alternative is not required to be reasonable, nor does it need to meet the purpose and need described in Section 1.3. Under the no-action alternative, no augmentation to chemical weapons destruction process currently planned for BGAD would be implemented, and the BGAD M55 rockets and components would be destroyed exclusively in the BGCAPP Main Plant instead of SDCs and possibly the EDS P3.

Implementation of the no-action alternative would not reduce safety concerns associated with maintenance of the ENS and the AFS when processing M55 rockets, and would not reduce safety concerns associated with manually removing agent-contaminated M55 rockets from overpacked containers. This alternative also would not decrease safety risk associated with processing gelled and/or solidified agent in the BGCAPP Main Plant. In addition, eliminating the use of SDCs/EDS P3 to process M55 rockets and components would jeopardize the ability to meet the mandated date for the destruction of the BGAD chemical weapons stockpile.

2.4 ALTERNATIVES ELIMINATED FROM FURTHER CONSIDERATION

2.4.1 Use of Multiple EDTs Other than SDC

The BGAD EDT EA (ACWA 2013) evaluated the use of several EDTs, including the EDS and the Detonation of Ammunition in Vacuum Integrated Chamber (DAVINCH). The EDS is a thick-walled, stainless steel explosive containment vessel that uses a donor explosive charge

to destroy the explosive component of the munition and to open the outer casing. A neutralizing reagent chemical reacts to destroy the chemical agent. The DAVINCH is a thick-walled vacuum chamber that uses a donor explosive charge. The explosive material and chemical agent are destroyed as a result of high temperature and pressure generated by the shock wave and fireball from the blast. The use of the donor charge in both of these alternatives increases worker exposure to explosive hazards and adds safety risks when compared to the SDC, which does not require a donor charge. In addition, the EDS and DAVINCH do not have the capacity of the SDC; to meet the throughput capacity of one SDC, an estimated twenty-four EDSs or six DAVINCH units would be needed. Finally, these EDTs would not be available in sufficient quantities to meet the mandated date for destruction of the BGAD stockpile. Therefore, the use of EDTs, other than the SDC and possibly an EDS P3 for processing a limited number of complete and/or overpacked M55 rockets, was eliminated from further consideration.

2.4.2 Incineration Technology

Another alternative considered was the use of incineration technology to destroy M55 rockets. Incineration specifically a deactivation furnace and a liquid incinerator, is a technically feasible technology that would allow successful processing of munitions. A deactivation furnace and liquid incinerator were used to destroy agent-filled munitions with high solid content and gelled agent at the baseline incineration facilities. This was accomplished in compliance with RCRA and CAA permits without unacceptable risk to human health and the environment according to MPRAs conducted at those sites. There is a significant risk to the permitting process for this alternative that would likely prevent the use of a deactivation furnace and liquid incinerator for meeting the mandated date for destruction of the BGAD stockpile. Therefore, this alternative was eliminated from further consideration.

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3. THE AFFECTED ENVIRONMENT AND POTENTIAL ENVIRONMENTAL CONSEQUENCES

The proposed action is to augment the chemical weapons destruction capability of the BGCAPP Main Plant to reduce safety risks associated with processing M55 rockets and to meet the CWC requirement to destroy the U.S. chemical weapons stockpile no later than 31 December 2023. Each alternative described in Section 2.2 proposes the use of the retrofitted existing SDC 1200 to process components of M55 rockets. An additional SDC is also included with each alternative. The alternatives differ as follows: Alternatives 1 and 3 propose the addition of an SDC 2000 and Alternative 2 proposes the addition of an SDC 1200. The SDC 2000 differs from the SDC 1200 in that it can process a complete, overpacked M55 rocket, where the SDC 1200 can only process de-mated components of the M55 rocket. In addition to SDCs, Alternatives 2 and 3 propose the use of an EDS P3 to process complete, overpacked M55 rockets.

Section 3.1 discusses the environmental resources that could be affected by the proposed action and the potential environmental impacts upon those resources. The following categories of environmental resources are addressed:

- Air quality (Section 3.1.1)
- Water resources (Section 3.1.2)
- Human health and safety (Section 3.1.3)
- Terrestrial ecological resources (Section 3.1.4)
- Socioeconomic resources (Section 3.1.5)
- Environmental justice, (Section 3.1.6)
- Noise (Section 3.1.7)
- Waste management and off-site transportation of wastes (Section 3.1.8).

Impacts due to resource requirements are discussed in Section 3.1.9, and impacts from decommissioning and closure of the proposed action are discussed in Section 3.1.10. Section 3.2 discusses the potential environmental impacts of the no-action alternative.

The worst-case scenario for each alternative is evaluated. Therefore, if the worst-case alternative has no significant impacts, the other alternatives would also have no significant impacts. The worst-case alternative includes the use of the EDS P3. The categories that involve emissions (Sections 3.1.1 and 3.1.3) evaluate the impact based on the maximum feed of agent to the SDC while processing undrained M56 warheads, as well as complete, overpacked M55 rockets being processed in the EDS P3. Worst-case assumptions will be further explained in the applicable sections.

3.1 IMPACTS OF THE PROPOSED ACTION

The proposed action would create no significant impacts upon the following categories of environmental resources, which are not discussed further in this EA.

- **Land use.** The use of the retrofitted existing SDC would not require additional land use. The land use impacts of adding an additional SDC and an EDS P3 would be relatively minor.

Installation of a new SDC would require approximately 2 acres. Installation of the EDS P3 would require approximately 1 acre. The maximum amount of land required would be approximately 3 acres for any of the proposed alternatives. This would occur within the installation boundaries of the 14,596-acre BGAD. The intended sites for the proposed new units are previously disturbed areas managed under BGAD's existing Integrated Natural Resources Management Plan (INRMP) (BGAD 2017a). Therefore, construction of the new units would have no significant impacts to either on-site or off-site land use. Figure 2-4 depicts the location of the proposed SDC and EDS P3.

- **Aesthetics.** The physical layout of the proposed units would resemble that of a typical small-scale industrial facility. The structures would blend in with the other structures at the BGCAPP and BGCA igloo storage areas. The proposed locations are not visible from the installation boundary. Hence, the presence of the units would not be expected to adversely affect viewsheds or the aesthetic characteristics of the area. Therefore, no significant impacts to aesthetic resources would occur as a result of the proposed action.
- **Cultural (i.e., archaeological and historic) resources.** Cultural resources on and within BGAD are managed under BGAD's existing Integrated Cultural Resources Management Plan (DA 2016). Potential impacts to cultural resources have been previously evaluated for BGCAPP (USACE 2004; USACE 2011). Because the proposed action would occur within and/or adjacent to the previously disturbed BGCAPP vicinity and inside the previously disturbed CLA, the potential to disturb or affect cultural resources is low. Therefore, no significant impacts to cultural resources are expected to occur as a result of the proposed action. If items are found during site preparation that indicate historical human activity, operations will stop and the items will be evaluated in accordance with the Integrated Cultural Resources Management Plan before proceeding.

3.1.1 Air Quality

This subsection addresses the potential impacts to air quality that might result from the proposed action. The analyses focus on the criteria pollutants that might be emitted. Criteria pollutants are defined as those pollutants regulated by the National Ambient Air Quality Standards (NAAQS) that have been established by the EPA to protect human health and welfare (40 CFR 50). The NAAQS are expressed as concentrations of pollutants in the ambient air (i.e., in the outdoor air to which the general public has access). NAAQS exist for the pollutants sulfur dioxide (SO₂), nitrogen dioxide (NO₂), ozone (O₃), CO, lead (Pb), and particulate matter less than or equal to 10 micrometers (µm) in aerodynamic diameter (PM₁₀) and also less than or equal to 2.5 µm in diameter (PM_{2.5}). These are called criteria pollutants because the criteria for regulating them under the CAA must be published, reviewed, and updated periodically to reflect the latest scientific knowledge.

The primary NAAQS values define levels of air quality that the EPA deems necessary, with an adequate margin of safety, to protect human health. Secondary NAAQS values are similarly designated to protect human welfare by safeguarding environmental resources (such as soils, water, plants, and animals) and manufactured materials. The primary and secondary standards are currently the same for all pollutants and averaging periods except for the 3-hour SO₂ average, which has a secondary standard only. In addition, no secondary NAAQS values currently exist for CO or for the 1-hour averaging period for NO₂. A geographical area that meets or does better than the NAAQS is called an attainment area (designated "unclassifiable/attainment"). If insufficient data are available to support a classification, a

designation of “unclassifiable” is assigned for those pollutants. Madison County is designated as “unclassifiable/attainment” for all the criteria pollutants except SO₂, which is “unclassifiable.”

States may modify NAAQS to make them more stringent or to set standards for additional pollutants. The Commonwealth of Kentucky adopted the NAAQS as state standards without modification and also established standards for hydrogen sulfide, gaseous fluorides (expressed as hydrogen fluoride), total fluorides, and odors. GB agent contains fluorine and VX agent contains sulfur, so there is a possibility of formation of hydrogen sulfide and fluorine compounds. The new OTS is designed to remove fluorine and sulfur. The formation of hydrogen sulfide, gaseous fluorides, or total fluorides was not modeled in this EA for the following reasons. The Commonwealth of Kentucky does not provide ambient air concentrations of those compounds for comparison, as was done with the criteria pollutants discussed in Sections 3.1.1.1 and 3.1.1.3. Pollutant concentrations at the stack were estimated based on mass and energy balance calculations for processing both GB and VX in the new OTS. The estimated stack concentrations indicate hydrogen sulfide concentrations at the stack from processing VX and hydrogen fluoride concentrations at the stack while processing GB to be below the Kentucky ambient air standards for those compounds, even prior to conducting air dispersion modeling to determine the ambient concentrations at the facility fence line. As shown in Section 3.1.1.3, the maximum concentrations of compounds at the fence line modeled from air dispersion modeling and compared to background and the NAAQS were insignificant. Similar results are expected for hydrogen fluoride and hydrogen sulfide compounds from the existing retrofitted SDC and the new SDC. Emissions testing and air dispersion modeling will be conducted while processing both GB and VX. If the maximum ambient concentrations are found to be above Kentucky standards at the fence line, OTS modifications or feed reductions can be made. The Kentucky standard for odor only requires evaluation when odor complaints are received. The current NAAQS levels are shown in Table 3-1.

3.1.1.1 Ambient Conditions and Existing Emissions

BGAD is located in Madison County in east-central Kentucky, southeast of the cities of Lexington and Richmond (see Figure 3-1), on a 14,596-acre site composed mainly of open fields and wooded areas. BGAD is located along the Interstate 75 corridor, which parallels the western boundary of the depot. The terrain is characterized as gentle rolling. The regional climate for Madison County is humid continental with warm summers and cold winters. Summers tend to be humid and stormy, while winters are generally cold with a few mild periods.

Kentucky has a network of 35 monitoring stations in 26 counties. Locations of ambient air monitoring stations are selected in accordance with EPA regulations (40 CFR 58, Appendix D). In general, monitors are placed in densely populated areas or near sources of pollution. Estimates of the ambient values for each criteria pollutant were obtained from the Kentucky Division of Air Quality 2018 Annual Report (KYDAQ 2018) as shown in Table 3-1. These values are indicators of ambient concentrations applicable to the specific geographic area. The values are either actual monitoring data in Madison County or the maximum concentration in Kentucky or in the neighboring county, thus, representing a highly conservative estimate of the ambient background concentration for the airshed over BGAD.

Table 3-1. NAAQS and Ambient Concentrations.^a

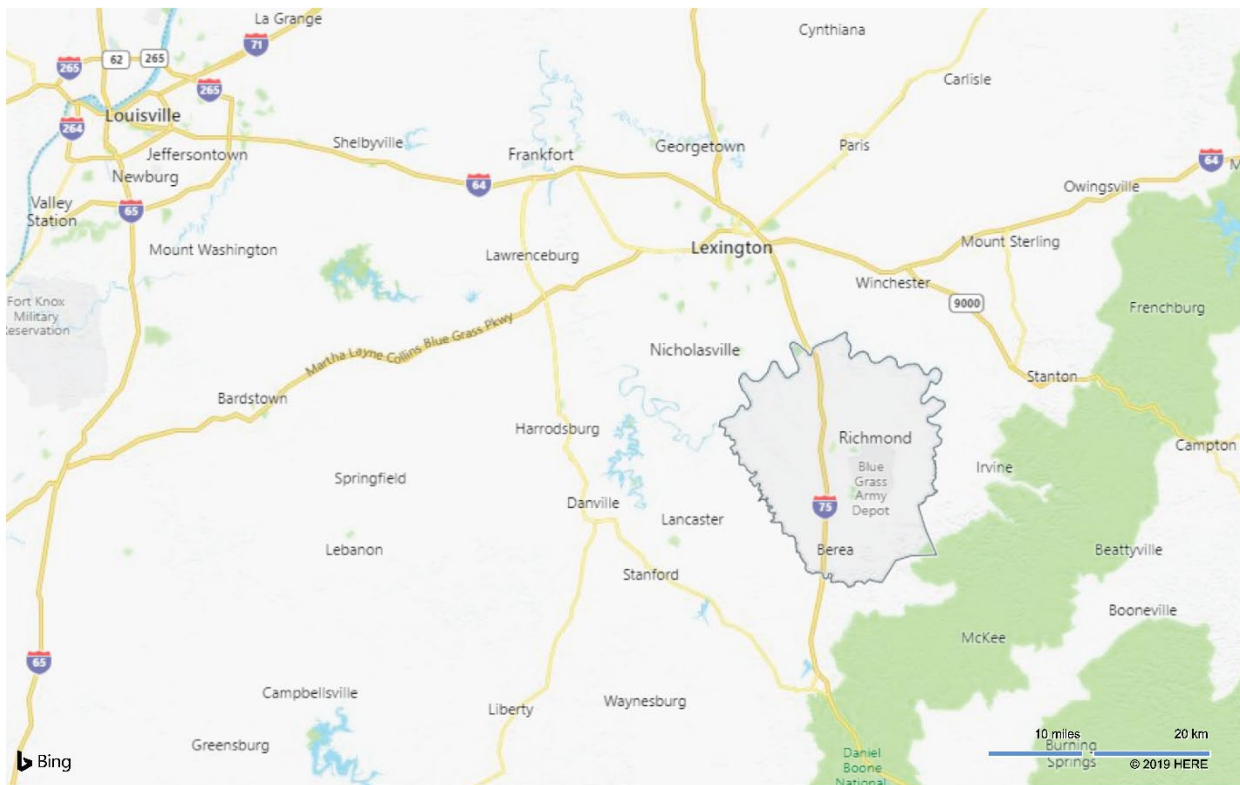
Pollutant	Primary/ Secondary	Averaging Time	Level ^b	Form	Ambient Concentration ^c	Attainment Designation ^d	Ambient Concentration as Percent of NAAQS Value
CO	Primary	8-hour	9 ppm (10 mg/m ³)	Not to be exceeded more than once per year	1.8 ppm (2 mg/m ³)	Unclassifiable/ Attainment	20%
		1-hour	35 ppm (40 mg/m ³)	Not to be exceeded more than once per year	1.6 ppm (1.8 mg/m ³)		4.6%
Pb	Primary and Secondary	Rolling 3-month average	0.15 µg/m ³	Not to be exceeded	0.05 µg/m ³	Unclassifiable/ Attainment	33%
NO ₂	Primary	1-hour	100 ppb (188 µg/m ³)	98th percentile of daily maximum 1-hour average, averaged over 3 years	40 ppb (75 µg/m ³)	Unclassifiable/ Attainment	40%
	Primary and Secondary	Annual	53 ppb (100 µg/m ³)	Annual mean	4.8 ppb (9 µg/m ³)		9%
O ₃	Primary and Secondary	8-hour	70 ppb (137 µg/m ³)	Annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years	66 ppb (130 µg/m ³)	Unclassifiable/ Attainment	94%
PM _{2.5}	Primary and Secondary	24-hour	35 µg/m ³	98th percentile of 24-hour concentrations, averaged over 3 years	17 µg/m ³	Unclassifiable/ Attainment	49%
	Primary	Annual	12 µg/m ³	Weighted annual mean, averaged over 3 years	7.5 µg/m ³		63%
	Secondary	Annual	15 µg/m ³	Weighted annual mean, averaged over 3 years	7.5 µg/m ³		50%
PM ₁₀	Primary and Secondary	24-hour	150 µg/m ³	Not to be exceeded more than once per year on average over 3 years	47 µg/m ³	Unclassifiable/ Attainment	31%
SO ₂	Primary	1-hour	75 ppb (196 µg/m ³)	99th percentile of 1-hour daily maximum concentrations, averaged over 3 years	5 ppb (13 µg/m ³)	Unclassifiable	6.7%
	Secondary	3-hour	0.5 ppm (1,300 µg/m ³)	Not to be exceeded more than once per year	0.004 ppm (10.5 µg/m ³)		0.8%

Table 3-1. NAAQS and Ambient Concentrations.^a (Continued)

Notes:

- ^a Source of NAAQS: <https://www.epa.gov/criteria-air-pollutants/naaqs-table>. Source of ambient concentrations: KYDAQ 2018.
- ^b The units shown in parenthesis (in microgram(s) per cubic meter [$\mu\text{g}/\text{m}^3$]) for the criteria pollutants were converted from their respective parts per million (ppm) or parts per billion (ppb) units based on ideal gas law at the standard temperature (293 K) and pressure (1 atm) condition.
- ^c The values are either actual monitoring data in Madison County or the maximum concentration in Kentucky or in the neighboring county, thus representing a highly conservative estimate of the ambient background concentration for the airshed over BGAD.
- ^d 401 Kentucky Administrative Regulations 51:010

mg/m^3 = milligram(s) per cubic meter



Data from: Wikipedia · Freebase

Figure 3-1. Location of Blue Grass Army Depot within Commonwealth of Kentucky.

Among all seven NAAQS criteria pollutants (CO, SO₂, NO₂, O₃, Pb, PM₁₀, and PM_{2.5}), only Pb and PM_{2.5} are monitored in Madison County. The latest monitoring data for the county's Pb show that Madison County was within the NAAQS compliance level (KYDAQ 2018) with a maximum rolling 3-month average of 0.05 micrograms per cubic meter (µg/m³) for 2017, which is less than the NAAQS value of 0.15 µg/m³ for Pb. Madison County's PM_{2.5} data in 2017 show an annual mean of 7.5 µg/m³, and the maximum 24-hour average was 17 µg/m³. Both of these values are less than the NAAQS for the annual mean of

12.0 $\mu\text{g}/\text{m}^3$ for $\text{PM}_{2.5}$ and the 24-hour standard of 35 $\mu\text{g}/\text{m}^3$. The County has also been in compliance for the past 3 years, through 2017.

For O_3 , the only county that was in exceedance of the 3-year average of the fourth highest daily 8-hour ozone standard was Jefferson. Although there is no ozone monitoring in Madison County, there are two ozone monitors in nearby counties. One is at Lexington Primary (in Fayette County) and the other at Nicholasville (in Jessamine County). The 3-year averages of the 8-hour fourth maximum data values for both counties are less than the NAAQS. Both counties are in compliance with the NAAQS ozone standard.

The Kentucky Division of Air Quality 2018 Annual Report (KYDAQ 2018) indicates that all areas of Kentucky are meeting the NAAQS, except for the exceedances of the ozone standard in Jefferson County. Considering that the two counties (Fayette and Jessamine) near Madison County are in compliance, this provides an indication that BGAD in Madison County is likely to be in compliance with the NAAQS.

Table 3-1 indicates that although the ambient concentrations are less than the NAAQS, several of them represent a substantial percentage of the respective NAAQS levels, indicating that background levels of these pollutants are relatively significant.

Table 3-2 presents estimates of air emissions of criteria pollutants from BGAD and BGCAPP sources as well as estimates of air emissions from the proposed operation of the SDCs and EDS P3. Estimates for the retrofitted existing SDC are based on the worst-case emissions from maximum predicted nerve agent feed rate of 72 pounds per hour. Estimates for the SDC 2000 are based on the worst-case emissions from processing complete M55 rockets at 3.5 rockets per hour. Data used to estimate emissions for the SDCs are taken from the ANAD SDC mustard agent, surrogate, and rocket motor emissions test reports. Estimates for the EDS P3 are based on processing one complete M55 rocket.

Table 3-2. Stationary Source Emissions (tons per year).

Pollutants	Title V Potential to Emit ^a	BGAD/BGCAPP Main Plant ^{a,b}	Existing SDC 1200 ^c	New SDC 2000 ^c	EDS P3 ^c	Cumulative Emissions
CO	225	10	0.11	12.7	0.1	22.91
Pb	0.0068	0.000012	0.0000067	0.0000023	0.0000068	0.000028
NO_2	225	22	1.41	0.737	0.000042	24.15
O_3	N/A ^d	N/A ^d	N/A ^d	N/A ^d	N/A ^d	N/A ^d
$\text{PM}_{2.5}$	54	0.95	0.00043	0.00043	0.00029	0.95
PM_{10}	80	1.6	0.00086	0.00085	0.00057	1.6
SO_2	29.7	0.9	0.0254	0.0133	0.00011	0.94

Notes:

^a Source: BGAD 2018a and KDEP 2016

^b Emissions from emission unit (EU) 22 (open burning open detonation) were not included, as this source is not a stationary source.

^c Source: Franklin 2019; based on 8,760-hour per-year operation

^d Not applicable. Ozone is not directly emitted from the sources listed.

The criteria pollutant emissions from the SDCs and EDS P3 are relatively insignificant compared to BGAD/BGCAPP emissions. However, CO emissions from the proposed SDC 2000 while processing complete M55 rockets are in the same range as BGAD/BGCAPP emissions. Actual emissions are likely to be lower because processing complete rockets in the SDC 2000 will be the exception, rather than the rule. Emissions from the SDC 2000 while processing M56 warheads are likely to be closer to the emissions for the retrofitted existing SDC while processing M56 warheads. Emissions estimates for the retrofitted existing SDC will be less than shown in Table 3-2 if the warheads are drained.

BGAD has a Title V Air Permit (KDEP 2016), which allows total site air emissions up to the authorized "Potential to Emit" limits stipulated. The cumulative emissions (22.91 tons per year) of CO from BGAD/BGCAPP plus SDCs and EDS P3 is still much lower than the Title V Potential to Emit of 2,251 tons per year. The cumulative emissions for all other criteria pollutants are similarly much lower than the Title V Potential to Emit. Therefore, the SDC and EDS P3 emissions are not likely to affect the permit status of BGAD.

3.1.1.2 Potential Air Quality Impacts of Site Preparation and Installation

Emissions and resulting increases in ambient air concentrations of pollutants during site preparation and installation of the new SDC and EDS P3 would be much less than for typical construction of a facility involving excavation and earthwork. The siting of the units will involve minimal earth disturbance because the units are modular in design and will be situated on a pad and assembled.

Particulate Matter. Emissions of particulate matter (also called fugitive dust), as shown in Table 3-3, would result if excavation and earthwork are conducted during site preparation. The impacts of such emissions upon off-site PM₁₀ concentrations were previously modeled in the 2002 FEIS (PMCD 2002) for the BGCAPP Main Plant using the EPA-recommended Industrial Source Complex Short-Term Version 3 (ISCST3) air dispersion model (EPA 1995). Two potential sites were modeled, one assuming 3 acres using SDC, Transportable Detonation Chamber (TDC), or DAVINCH, and an alternate site of 10 acres using EDS units only. For purposes of this analysis, only the modeled results for the larger site are presented in Table 3-3. Actual site preparation for the proposed action is estimated to be 3 acres (see Section 2); therefore, this 10-acre analysis is conservative. Routine dust suppression measures (e.g., sprinkling with water) were assumed to reduce particulate emissions by 50 percent (EPA 1985).

The modeled PM₁₀ concentrations resulting from the proposed site preparation and installation activities were added to estimates of currently existing background dust concentrations in the region as obtained from Table 3-1. Actual concentrations at particular locations within the broad area around BGAD are subject to spatial variations, especially for particulate matter, and to temporal variations including long-term trends. Therefore, on-site PM₁₀ sources were also included in the modeling.

Table 3-3. Effects of Site Preparation and Installation Activities of Proposed Action on Ambient Air Concentrations of Particulate Matter at the Point of Maximum Impact.^a

Pollutant and averaging period	Concentration ($\mu\text{g}/\text{m}^3$)				Percent of NAAQS Levels	
	Background ^b	Increment from Proposed Action ^c	Total (maximum)	NAAQS Value	Total Proposed Action plus Background	Proposed Action Alone
PM ₁₀ , 24-hour	47 $\mu\text{g}/\text{m}^3$	22 $\mu\text{g}/\text{m}^3$	69 $\mu\text{g}/\text{m}^3$	150 $\mu\text{g}/\text{m}^3$	46%	15%
PM _{2.5} , 24-hour	17 $\mu\text{g}/\text{m}^3$	11 $\mu\text{g}/\text{m}^3$	28 $\mu\text{g}/\text{m}^3$	35 $\mu\text{g}/\text{m}^3$	80%	31%
PM _{2.5} , Annual (Primary)	7.5 $\mu\text{g}/\text{m}^3$	0.2 $\mu\text{g}/\text{m}^3$	7.7 $\mu\text{g}/\text{m}^3$	12 $\mu\text{g}/\text{m}^3$	64%	1.7%
PM _{2.5} , Annual (Secondary)	7.5 $\mu\text{g}/\text{m}^3$	0.2 $\mu\text{g}/\text{m}^3$	7.7 $\mu\text{g}/\text{m}^3$	15 $\mu\text{g}/\text{m}^3$	51%	1.3%

Notes:

- ^a The point of maximum impact is the location of the highest modeled concentration.
- ^b Background concentrations were obtained from Table 3-1.
- ^c Because the NAAQS allow for one anomalous exceedance of the standard each year, the 24-hour background values for both sizes of particulate matter represent annual second-highest values.

For modeling in this EA, emissions of PM_{2.5} were assumed to be one half of the PM₁₀ emissions (i.e., half of the PM₁₀ emitted was assumed to be PM_{2.5}). The modeled incremental concentrations in Table 3-3 are considered to be conservative due to the following assumptions: (1) the entire area would be under disturbance from site preparation at all times, (2) rates of dust emissions would be constant over the entire site preparation area and over time, (3) settling of airborne particles due to gravity and removal by wet/dry deposition would be negligible. The results in Table 3-3 show that no exceedance of the NAAQS level for either PM₁₀ or PM_{2.5} would be expected to result from site preparation and installation activities of the proposed action, even if 10 acres were to be disturbed simultaneously.

Because the NAAQS, which are set to protect public health and welfare with an adequate margin of safety, would not be expected to be exceeded as a result of the proposed site preparation and installation activity, the expected air quality impacts would be minor. As noted above, dust suppression measures (e.g., sprinkling with water) would be used as necessary to control fugitive dust and comply with local and state laws and regulations concerning the control of dust generated.

Vehicular Emissions. Temporary and localized increases in atmospheric concentrations of NO₂, CO, SO₂, volatile organic compounds (VOCs), and particulate matter would result from exhaust emissions from workers' vehicles, heavy vehicles, diesel generators, and other equipment to be used during the site preparation and installation of the proposed facilities. These emissions would be similar to those from typical industrial construction projects, and would have negligible impacts on ambient air quality.

3.1.1.3 Potential Air Quality Impacts during Operations

The discharge of atmospheric pollutants would occur from the stack(s) of the retrofitted existing SDC 1200, new SDC 2000, and EDS P3 following off-gas treatment. To simulate the worst-case scenario of impacts to air quality due to stack emissions from the proposed action,

maximum criteria air pollutant concentrations were calculated by using the latest version of the American Meteorological Society/Environmental Protection Agency Regulatory Model (AERMOD) air dispersion model (EPA 2004) updated in August 2018 (Franklin 2019). The modeling domain is illustrated in Figure 3-2. The worst-case scenario is described in Section 3.1.1.1.

The predicted concentrations of criteria pollutants were modeled at the grid resolution of 50-meter spacing along the fence line, 100-meter spacing out to 3 kilometers, and 500-meter spacing out to 5 kilometers, and 1,000-meter spacing out to 10 kilometers. Elevated terrain was assumed and included in the air quality analysis.

Table 3-4 shows the results of the air quality modeling conducted for this EA and it displays the incremental and cumulative contributions for each criteria pollutant as emitted from the SDCs and EDS P3. The maximum incremental and cumulative pollutant concentrations were found to occur at the northern and northwest BGAD fence line.

As can be seen in Table 3-4, the incremental contributions of the SDC and EDS P3 emissions to airborne concentrations of the criteria pollutants are significantly less than the NAAQS in Table 3-1.

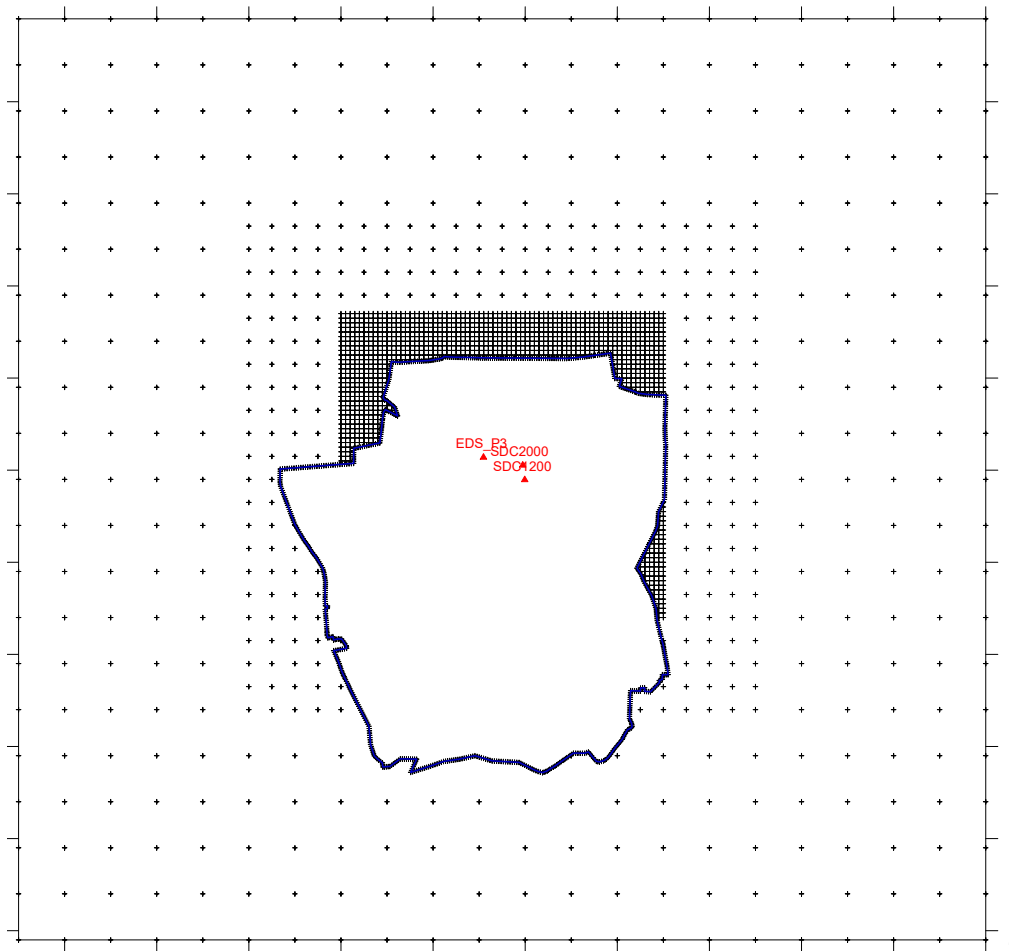


Figure 3-2. Receptor Grid as Used in the Atmospheric Dispersion Modeling Calculations for Potential Impacts to Air Quality.

**Table 3-4. Predicted Maximum Incremental and Cumulative Fence Line Criteria
Pollutant Concentrations for the Proposed Action.**

Pollutant	Averaging Period	SDC 1200 Maximum Modeled Concentration ($\mu\text{g}/\text{m}^3$)	SDC 2000 Maximum Modeled Concentration ($\mu\text{g}/\text{m}^3$)	EDS P3 Maximum Modeled Concentration ($\mu\text{g}/\text{m}^3$)	Worst-case Total Modeled Concentration ^a ($\mu\text{g}/\text{m}^3$)	Background Concentration ^b ($\mu\text{g}/\text{m}^3$)	Worst-case Cumulative Concentration ^c ($\mu\text{g}/\text{m}^3$)	NAAQS ($\mu\text{g}/\text{m}^3$)	Percent of NAAQS
NAAQS Primary Standards									
CO	1-hour	0.40	61.50	41.03	102.93	2,000	2,103	40,000	5.3
	8-hour	0.08	14.64	8.32	23.04	1,800	1,823	10,000	18
Pb	3-month	0.00000017	0.00000083	0.000023	0.000024	0.05	0.05	0.15	33
NO ₂	1-hour	2.261	1.953	0.005	4.219	75	79.2	188	42
	Annual	0.017	0.014	0.000002	0.031	9	9	100	9
PM _{2.5}	24-hour	0.00011	0.00015	0.00712	0.00738	17	17	35	49
	Annual	0.000005	0.000008	0.000014	0.000027	7.5	7.5	12	63
PM ₁₀	24-hour	0.00017	0.00027	0.01110	0.01155	47	47	150	31
SO ₂	1-hour	0.057	0.047	0.024	0.128	13	13.1	196	6.7
NAAQS Secondary Standards									
Pb	3-month	0.00000017	0.00000083	0.000023	0.000024	0.05	0.05	0.15	33
NO ₂	Annual	0.017	0.014	0.000002	0.031	9	9	100	9
PM _{2.5}	24-hour	0.00011	0.00015	0.00712	0.00738	17	17	35	49
	Annual	0.000005	0.000008	0.000014	0.000027	7.5	7.5	15	50
PM ₁₀	24-hour	0.00017	0.00027	0.01110	0.01155	47	47	150	31
SO ₂	3-hour	0.039	0.032	0.018	0.089	10.5	10.6	1,300	0.8

Notes:

^a Worst-case total modeled concentration = the sum of maximum modeled concentrations from the three stacks. This is overly conservative, since the maximum modeled concentration for each stack occurs at different receptor locations and times.

^b Background concentrations were obtained from Table 3-1.

^c Worst-case cumulative concentration = the sum of the worst-case total modeled concentration and background concentration.

Table 3-4 also shows the estimated cumulative impacts to air quality (i.e., the combined effects of the incremental contributions when added to the existing, ambient concentrations from Table 3-1). The cumulative impact modeling approach overlays the estimated incremental impacts of the proposed action onto the ambient concentration data. It does not account for potentially significant concentration gradients caused by major sources of air pollution, such as nearby fossil-fuel-fired power plants. A more detailed analysis that includes the modeled impacts from other large existing sources of air pollution is beyond the scope of the analysis in this EA.

3.1.1.4 Conclusions Regarding Air Quality Impacts

The air quality modeling analysis conducted for this EA shows that the worst-case alternative of the proposed action would produce no significant impacts on the ambient air quality at the BGAD boundary during site preparation, installation, or operation. Air quality impacts within the larger region around BGAD would be even smaller in magnitude. The percentage contributions to the primary and secondary NAAQS by the proposed action for all criteria pollutants are insignificant. In conclusion, the impacts on ambient air concentrations of pollutants regulated by NAAQS are expected to be minor for the proposed action.

3.1.2 Water Resources

No groundwater would be consumed, diverted, or affected by any of the proposed alternatives. Withdrawal of groundwater at BGAD is negligible, since it is conducted only as part of the well monitoring program. Potential impacts to groundwater resources at BGAD are minimized through the implementation of the existing depot-wide Groundwater Protection Plan (GWPP) (BGAD 2017b). The 2002 FEIS (PMCD 2002) addressed the potential for impacts to groundwater resources that might result from spills. The FEIS concluded that if spills or leaks of hazardous materials were to occur, then procedures for recovering these materials would be applied to minimize the potential for groundwater contamination. For the above reasons, no significant impacts to groundwater resources would be expected to occur as a result of the proposed action. Therefore, groundwater resources are not discussed further in this EA.

Section 3.1.2.1 describes measures to be implemented to prevent impacts to surface water resources during site preparation and installation of the worst-case alternative of the proposed action. Section 3.1.2.2 describes existing BGAD water resources and treatment, while Section 3.1.2.3 discusses water usage estimates for the proposed action. Section 3.1.2.4 focuses on potential impacts to surface water resources due to the implementation of the worst-case alternative of the proposed action.

3.1.2.1 Potential Impacts during Site Preparation and Equipment Installation

The location of the new units to be added as part of the proposed action are on previously disturbed land. No aquatic resources or wetlands would be disturbed or affected. A U.S. Army Corps of Engineers site investigation determined that no regulated wetlands would be impacted by the construction of the BGCAPP Main Plant (USACE 2004). Because the proposed sites for the new SDC are near the footprint of the BGCAPP Main Plant, the same conclusion can be reached for each of the sites proposed. The proposed location of the EDS P3 in the CLA is in an area that has no aquatic resources or wetlands. Furthermore, implementation of best management

practices for erosion and siltation control during construction would prevent any significant impacts to aquatic resources and wetlands as a result of the proposed action.

Potential impacts to water resources during site preparation and installation of the new SDC and the EDS P3 are minimized or mitigated through implementation of the GWPP (BGAD 2017b) in concert with Executive Order 13514 (2009) as implemented by DOD (2010). The DOD guidance specifies the requirements for reducing the impacts of stormwater runoff. The BGCAPP Storm Water Management Plan (BPBG 2018a) describes best management practices to minimize the impacts of erosion and/or sedimentation on adjacent ground and any receiving waters. The best management practices for the new SDC and EDS P3 would likely be similar to those for the BGCAPP Main Plant.

The use of best management practices minimizes the impacts of erosion and/or sedimentation by diverting flows from exposed soil, detaining stormwater runoff, and reducing runoff and the discharge of pollutants from exposed areas of the project. Stormwater detention basins, check dams, and other best management practices are intended to trap sediment on site and are constructed as one of the first steps during site preparation activities. Perimeter best management practices are to be installed before land-disturbing activities begin. These perimeter controls may include physical structures (such as fencing) or temporary structures (such as silt fences) to control the area where construction activities will occur.

Other potential best management practices include the following activities and measures:

- Marking clearing limits in order to preserve existing vegetation
- Minimizing off-site vehicle tracking of sediments
- Using a stormwater detention basin to capture sediment during construction activities
- Constructing check dams at appropriate intervals within ditches or swales that drain disturbed areas
- Using silt fences, erosion logs, and straw bale barriers around disturbed areas
- Protecting storm drain inlets to reduce sediment accumulation
- Stabilizing soil (after final grading) with gravel, compactable soil, mulch, seeding, or chemical stabilizers to control dust and to reduce sediment runoff
- Using dust control measures (such as application of water to disturbed areas)
- Stabilizing slopes and using slope drains
- Implementing post-site preparation erosion and sediment controls

3.1.2.2 Existing Surface Water Resources and Existing Water Treatment Facilities at BGAD

Surface Water Resources. No surface-water bodies are located in the immediate vicinity of the new SDC or the proposed EDS P3. No surface water would be diverted or affected by installation and operation of the units for the proposed action. All surface water resources at BGAD are described in the INRMP (BGAD 2017a). BGAD is located within the Kentucky River basin and is drained by headwater tributaries of Big Muddy Creek, Otter Creek, and Silver Creek. Most streams on BGAD flow intermittently and are dry during late summer and early fall. Many pools are present throughout BGAD.

Four streams drain the majority of BGAD: (1) Muddy Creek enters the depot at its southeastern corner, flows in a northerly direction, and then exits at the depot's eastern boundary; (2) an unnamed tributary of Hays Fork Creek flows in a southwesterly direction into Silver Creek outside BGAD boundaries; (3) Little Muddy Creek flows in an easterly direction

and flows into Muddy Creek within the depot boundaries; and (4) Viny Fork flows in a northerly direction parallel to and east of Muddy Creek and flows into Big Muddy Creek (BGAD 2017a).

Otter Creek and Silver Creek tributaries are second-order streams within BGAD, and Muddy Creek is a third-order stream. These streams generally are shallow (i.e., less than 3 feet deep), have a maximum width of 15 to 30 feet, and are characterized by short, shallow riffles and long pools. Muddy Creek is a first-priority impaired stream; hence, it cannot support swimming due to pathogens from suspected grazing-related sources. The impaired stream segment of Muddy Creek includes portions flowing through BGAD (BGAD 2017a).

The largest surface water feature at BGAD is Lake Vega, a 135-acre impoundment of Little Muddy Creek (located upstream from the confluence of Little Muddy Creek and Muddy Creek). Lake Vega is located in approximately the center of the depot and is wholly contained within the depot boundaries. Two other large water bodies are located wholly within BGAD boundaries: Lake Gem (35 acres) and Lake Buck (15 acres), both of which are in the southwestern portion of the depot and both of which were created by impoundments of Silver Creek tributaries (BGAD 2017a).

BGAD Facilities. BGAD obtains its water from on-post surface water sources. Prior to its on-site use at BGAD, the water is treated on post, with a capacity of 720,000 gallons per day (gal/day) (i.e., 263 million gallons per year [gal/yr] or 806 acre-feet per year [ac-ft/yr]). A total of 99.7 million gallons (306 ac-ft) of treated water were produced in 2018, which represents 37.9 percent of capacity.

The depot treats its wastewater on post. BGAD's sanitary sewer system collects domestic sewage from latrines, showers, and other sanitary facilities. The sewage is treated at the depot's treatment plant, which has a capacity of 374,000 gal/day or 136.5 million gal/yr. The wastewater treatment plant treated 64.4 million gallons (198 acre-feet [ac-ft]) in 2018, which represents 47.2 percent of capacity.

3.1.2.3 Surface Water Usage Requirements

During site preparation and installation of the proposed action, treated water from on post would be used for concrete preparation, for dust suppression on unpaved surfaces where construction vehicles would travel, and for rinsing or cleaning equipment, structures, and materials. No estimate of the quantity of water needed for these activities is currently available; however, the anticipated quantity would be small in comparison to the quantities of water needed for similar activities during construction of the BGCAPP Main Plant. The consumption of water for site preparation and installation of the proposed SDC and EDS P3 would therefore not be expected to create any significant water-use impacts.

The primary impacts on surface water use would be associated with the process water needed for operations and with the non-process water. Chemicals for use would arrive pre-mixed; hence, no additional water would be required for these chemicals. Table 3-5 shows the process water requirements for a retrofitted or new SDC 1200, an SDC 2000, and an EDS P3. Each entry in the table represents the respective vendor's estimates of the quantities of water needed for the preparation or rinsing of the explosive containment chamber for the EDS P3 or for operation of an SDC OTS.

Table 3-5. Process Water Requirements for the Proposed Technologies.

Type of System	Rate of Water Use per System	Annual Water Requirement
Retrofitted existing or new SDC 1200 ^a	270 gallons/hour	2,365,000 gallons
SDC 2000 ^a	270 gallons/hour	2,365,000 gallons
EDS P3 ^b	150 gallons/detonation	60,000 gallons

Notes:

^a The vendor recommended water usage estimate at two times the current water usage of the existing SDC (which is 2.25 gallons per minute). SDC estimates assume operation for 12 months at 24-hour per day, 7 days per week.

^b EDS P3 estimate assumes one detonation per day, 6 days a week, for 1 year. The water usage estimate per detonation is 150 gallons (Bird 2019).

Additional, non-process water would be used by the workers for drinking, cleanup, showers, and toilets and is estimated at 30 gal/day per person. The operating crew is estimated at 140 workers for the retrofitted existing SDC and 110 workers for a new SDC. The operating crew for the EDS P3 is estimated at 25 operators.

Table 3-6 shows the combined annual water usage estimates for each of the alternatives in million gal/yr, including process and non-process water. The worst-case water usage is estimated to be from Alternative 2 or Alternative 3 at 7.83 million gal/yr (24 ac-ft).

Table 3-6. Annual Combined Process and Non-Process Water Usage Requirements for Each Alternative Analyzed.

Alternative	Water Usage
Alternative 1 – Retrofitted existing SDC 1200; new SDC 2000	7.50 million gal/yr
Alternative 2 – Retrofitted existing SDC 1200; new SDC 1200 and EDS P3	7.83 million gal/yr
Alternative 3 – Retrofitted existing SDC 1200; new SDC 2000 and EDS P3	7.83 million gal/yr

Note:

Process water usage estimates from Table 3-5; non-process water usage estimated at 30 gallons per person per day

3.1.2.4 Potential Impacts to Surface Water Resources

For 2018, the depot-wide water usage is estimated to be approximately 99.7 million gal/yr (225 ac-ft/yr). This includes 12.0 million gal/yr of water used by the BGCAPP Main Plant and the retrofitted existing SDC while testing equipment in preparation for beginning chemical agent processing operations. Therefore, 87.7 million gal/yr is estimated from all BGAD sources other than the BGCAPP Main Plant and retrofitted existing SDC.

Based on the numerical data presented in Section 3.1.2.3 regarding the estimated quantities of process water plus non-process water required by the worst-case alternative, the total amount of water to be used would be an approximate 8.9 percent increase of the current annual water use at BGAD.

Section 4.3.2 of the 2002 FEIS (PMCD 2002) provides BGCAPP Main Plant's projected water usage as 12.7 million gal/yr (39 ac-ft/yr), which is composed of 6.3 million gal/yr of process water and 6.4 million gal/yr of non-process water. When the anticipated water usage for

the worst-case alternative (7.83 million gal/yr [24 ac-ft/yr]) is added to the BGCAPP water usage estimates, the resulting value is 20.53 million gal/yr (63 ac-ft/yr). This is approximately 7.8 percent of the existing capacity (263 million gal/yr [806 ac-ft/yr]) of BGAD's on-post treated water.

If the existing BGAD water use of 87.7 million gal/yr (269 ac-ft/yr) were to continue while both the BGCAPP Main Plant and the worst-case alternative were in simultaneous operation, the combined total consumption of all water used at BGAD would become 108.2 million gal/yr (332 ac-ft/yr). This combined quantity is about 41 percent of the existing capacity of BGAD's on-post treated water, and is equivalent to only about 21 percent of the normal pool capacity (507 million gallons [1,557 ac-ft]) of Lake Vega.

Therefore, adequate quantities of water are available to support the operation of both the BGCAPP Main Plant and the worst-case alternative simultaneously, as well as the other users of water at BGAD. The actual water usage for the BGCAPP Main Plant will be determined when operations begin, but even if actual water usage is ten times the 2002 FEIS estimate, adequate quantities of water are available. Furthermore, because these facilities are expected to be in operation for less than 5 years, any overall impacts to water supplies would be temporary and minor, if observable at all.

3.1.2.5 Conclusions about Impacts to Surface Water Resources

The anticipated quantity of water needed during the installation of the equipment would be small in comparison to the quantity of water needed for similar activities at the BGCAPP Main Plant; therefore, it is not expected to create any significant impacts to water supplies.

The primary impacts from water use at the proposed action would be associated with the quantities of process water needed for process operations and non-process water required to support the facility. The process water requirement for the alternative actions is shown in Table 3-5. The worst-case combined non-process water requirement is estimated to be 7.83 million gal/yr (24 ac-ft/yr). This amount represents an approximate 8.9 percent increase in the current annual water use at BGAD.

In regard to cumulative impacts, the combined water use of the BGCAPP Main Plant and the worst-case alternative is estimated at 20.53 million gal/yr (63 ac-ft/yr), which is about 7.8 percent of the existing capacity of BGAD's on-post treated water. If the existing BGAD water use were to continue while both the BGCAPP Main Plant and the worst-case alternative were in simultaneous operation, the combined total consumption of all water used at BGAD would be 108.2 million gal/yr (332 ac-ft/yr). This combined quantity is about 41 percent of the existing capacity of BGAD's on-post treated water, and equivalent to only about 21 percent of the normal pool capacity of Lake Vega.

Thus, adequate water supplies exist to support the operation of both the BGCAPP Main Plant and the worst-case alternative if they were to operate during the same time period.

Because BGCAPP and the proposed action are each expected to be in operation for less than 5 years, any overall impacts to water supplies would be temporary and minor, if observable at all.

Based on the above considerations, it is concluded that no significant impacts to surface water resources would occur during site preparation, installation, or operation of all the alternative actions.

3.1.3 Human Health and Safety

This subsection discusses the potential impacts to human health that could occur during retrofitting and operation of the existing SDC and during site preparation, installation, and operation of a new SDC and EDS P3 while processing M55 rockets and provides an assessment of such impacts. Impacts from emissions are considered in Section 3.1.3.1. Section 3.1.3.2 provides a discussion of potential health impacts and hazards to the workers who would install and/or operate the facilities.

3.1.3.1 Impact of Emissions on Human Health

This subsection explores the human health hazards associated with the proposed action that would have the highest predicted emissions: operation of the existing SDC, with a new SDC (either the 1200 or 2000) and an EDS P3. Although the SDC 1200 and SDC 2000 detonation chambers are different sizes, emissions should be comparable when processing the same amount of nerve agent and explosive because the OTS would be the same.

Several previous studies were reviewed to evaluate potential human health impacts due to emissions from operation of SDCs and EDSs. The objectives of these studies were to (1) evaluate how chemicals reasonably expected to be present in the air emissions could be transported through the environment and into the food chain, (2) assess the exposure pathways and scenarios by which different people (i.e., human receptors) could directly or indirectly come into contact with these chemicals, and (3) calculate the risks and hazards associated with each exposure scenario.

Section 3.1.3.1.1 provides a summary of health risk assessments conducted at ANAD using SDC emissions data obtained while processing chlorobenzene (a surrogate material more difficult to destroy than mustard and nerve agents) and mustard-agent-filled munitions. Emissions test results while processing M67 RMAs are also discussed in this section.

Section 3.1.3.1.2 summarizes predicted risk and hazard to human health from emissions from the existing SDC at BGAD while processing mustard munitions, as well as cumulative predicted risk and hazard from emissions of the existing SDC at BGAD and the BGCAPP Main Plant.

Section 3.1.3.1.3 summarizes predicted risk and hazard to human health from emissions from an EDS at BGAD. This assessment was completed as part of the BGAD EDT EA (ACWA 2013) and serves as the basis of risk and hazard estimates from emissions from the EDS P3. This information will be used in Section 3.1.3.1.4 to predict risk and hazard of the alternative action with the highest predicted emissions.

Section 3.1.3.1.4 provides calculations of predicted risk and hazard for operation of the existing SDC, the new SDC, and the EDS P3 using the previous risk assessment information detailed in Sections 3.1.3.1.2 and 3.1.3.1.3. This section also compares the emissions between the BGCAPP Main Plant and the proposed worst-case alternative while processing the same munitions.

The risk and hazard calculations and emissions comparison, in combination with the information presented in Sections 3.1.1.1 and 3.1.3.1.2, is sufficient for the Army to conclude that operation of the existing SDC, a new SDC, and the EDS P3 to augment the BGCAPP Main Plant is not likely to impact the health of workers or local residents.

3.1.3.1.1 ANAD SDC

The ANAD SDC was successfully used as part of Anniston Chemical Agent Disposal Facility (ANCDF) in 2011 to destroy mustard-filled munitions with no negative environmental impacts. Compliance testing was completed while processing conventional munitions, chlorobenzene (a surrogate of mustard and nerve agents) spiked with heavy metals, and mustard munitions that also contain explosive components (4.2-inch mortar rounds and 105mm projectiles). During compliance testing, exhaust gas samples were collected and analyzed. The tests results indicate the ANAD SDC operated in compliance with RCRA and CAA requirements.

Data from the compliance tests was used to perform human health risk assessments (HHRAs) in accordance with protocols approved by the Alabama Department of Environmental Management. Table 3-7 provides the maximum risk and hazards predicted for both the ANAD SDC and the total maximum risk and hazards for all sources combined at ANAD (SDC, ANCDF, and other ANAD sources) using the maximum emissions rates from the surrogate test and the mustard test with the highest feed rate. The test assumed a processing period of 1 year.

Table 3-7. Summary Results of MPHRA for ANAD SDC^a

Health Effect	Maximum Risk/Hazard for SDC Emissions	Maximum Cumulative Risk/Hazard for SDC, ANCDF, and ANAD Emissions	Target Limits ^b
Non-carcinogenic Chronic Health Effect	0.0048	0.0874	0.25 for SDC 1.0 for cumulative
Non-carcinogenic Acute Health Effect ^c	0.144	N/A	0.25
Carcinogenic Risk	0.00000000322 (3.22×10^{-9})	0.0000000644 (6.44×10^{-8})	0.00001 ^d (1.00×10^{-5})

Notes:

- ^a Sources: U.S. Army Public Health Command 2012; U.S. Army Public Health Command 2013; BGAD EDT EA (ACWA 2013)
- ^b Target limits required by Alabama Department of Environmental Management
- ^c The acute risk assessment scenario evaluates short-term 1-hour maximum air concentrations based on hourly emissions rates. Inhalation is the route of exposure. Acute risk represents the risk of a person at a particular location and is not additive.
- ^d KDEP target limit is 0.000001 (1.00×10^{-6}).

An important point considered is that emissions from the retrofitted existing SDC or the proposed new SDC are expected to be lower than emissions from the ANAD SDC even though agent throughput is expected to be higher if the M56 warheads are not drained. This is because the OTS proposed for the existing and new SDCs is significantly larger and more efficient than the ANAD SDC's OTS.

Emissions testing was also conducted on the ANAD SDC while processing M67 RMAs. The test was conducted for information purposes only and the data were not used to conduct an HHRA, though the emissions results are below emissions results from tests used in the risk

assessments discussed in this section. The emissions test results are used in Section 3.1.3.1.4 to calculate total emissions generated from processing of M67 RMAs in the SDCs and EDS P3.

In addition, the ANAD SDC successfully demonstrated a DRE greater than 99.9999 percent while processing mustard agent and while processing chlorobenzene, a surrogate material. Chlorobenzene is classified as a Class 1 compound on the Dayton Thermal Stability Index determined by the University of Dayton Research Institute, with Class 1 compounds being the most difficult to destroy. Mustard agent is classified as a Class 4 compound and is considered easier to destroy than chlorobenzene. GB and VX are classified as Class 5 compounds and are considered easier to destroy than either chlorobenzene or mustard agent. This is an indication the SDCs will have no difficulty in achieving a DRE of 99.9999 percent while processing nerve agent munitions.

3.1.3.1.2 BGAD SDC

The existing SDC at BGAD is currently undergoing systemization and will be used as part of BGCAPP's mission to destroy the 155mm mustard-filled projectiles (15,492 total) and mustard-filled DOT bottles (2 total). An MPHRA (Franklin 2018) was conducted to evaluate the potential impacts to human health from operation of the SDC to destroy the mustard-filled projectiles. ANAD SDC emissions rates were the basis of this MPHRA. The emissions rates were increased by a factor of 100 to ensure that risk and hazard estimates were developed conservatively.

Table 3-8 provides the maximum risk and hazard predicted for the existing SDC while processing mustard. The risk and hazard from operating the BGCAPP Main Plant while processing nerve agent munitions and the total maximum risk and hazard for operation of both the BGCAPP Main Plant and the existing SDC while processing mustard agent-filled munitions are also presented in Table 3-8. Results indicate that risk and hazard to human health were well below target limits set by the EPA as protective of human health.

3.1.3.1.3 EDS

Risk discussed in this section is presented for use in Section 3.1.3.1.4. Risk to human health while processing mustard-agent-filled munitions at BGAD in four different types of EDT, including the risk and hazard from operating seven EDSs, was estimated in the BGAD EDT EA (ACWA 2013). EDS was not selected for use at BGAD at that time. The EDSs evaluated were smaller than the EDS P3 being evaluated in this EA. The seven EDSs evaluated in 2013 were proposed to go in the vicinity of the BGCAPP Main Plant. The results in Table 3-9 indicate that risk and hazard associated with operation of seven EDSs to process mustard munitions was calculated to be below target limits considered protective of human health.

Table 3-8. Summary Results of MPHRA for Existing SDC at BGAD.

Effect	Predicted Maximum Calculated Risk for SDC Emissions while Processing Mustard Munitions ^a	Maximum Calculated Risk for BGCAPP Main Plant ^b	Combined Risk for SDC while Processing Mustard Munitions and BGCAPP Main Plant	Target Limits ^c
Non-carcinogenic Chronic Health Effect	0.01749	0.0124	0.0299	0.25 for SDC 1.0 for cumulative
Non-carcinogenic Acute Health Effect ^d	0.02607	0.0256	N/A ^e	0.25
Carcinogenic Risk	0.000000184 (1.84×10^{-7})	0.000000180 (1.80×10^{-7})	0.000000365 (3.65×10^{-7})	0.000001 (1.00×10^{-6})

Notes:

^a Source: Franklin 2018^b Source: Franklin 2011^c Target limits required by KDEP^d Acute risk represents the risk of a person at a particular location and is not additive.^e The acute risk assessment scenario evaluates short-term 1-hour maximum air concentrations based on hourly emissions rates. Inhalation is the route of exposure.**Table 3-9. Maximum Calculated Risk for Seven EDS Units at BGAD.**

Effect	Maximum Calculated Risk for EDSs	Target Limits ^a
Non-carcinogenic Chronic Health Effect	0.0000141 (1.41×10^{-5})	0.25 for SDC 1.0 for cumulative
Non-carcinogenic Acute Health Effect ^b	0.0000124 (1.24×10^{-5})	0.25
Carcinogenic Risk	0.000000000667 (6.67×10^{-10})	0.000001 (1.00×10^{-6})

Source: Franklin 2013

^a Target limits required by KDEP^b The acute risk assessment scenario evaluates short-term 1-hour maximum air concentrations based on hourly emissions rates. Inhalation is the route of exposure.

3.1.3.1.4 Worst-case Alternative of the Proposed Action

The information presented in Sections 3.1.3.1.1 through 3.1.3.1.3 indicates that risks and hazards to human health from operation of SDCs and EDSs at ANAD and predicted at BGAD are below the limits considered protective of human health. There are differences between the specifics of those studies and what is being assessed in this EA. Specifically, the SDCs evaluated for this EA will process nerve agent instead of mustard agent, will operate for longer period of time than the existing SDC will process mustard agent, and the OTS will be designed to more efficiently treat off-gas from processing nerve agent. Even with these differences, the results of those studies alone could be used as the basis for predicting that impacts from emissions from the proposed action and alternative actions would have no negative impact on human health. However, further evidence is provided in this section.

The worst-case alternative would be to operate the existing and new SDCs to process undrained M56 warheads, the existing and new SDCs to process RMAs, and the EDS P3 to process overpacked M55 rockets in SFTs. Using risk and hazard information presented in Tables 3-7 and 3-8 and assuming risk and hazard results are additive, calculations for this worst-case alternative are shown in Table 3-10. The calculations assumed risk and hazard for the retrofitted existing SDC and the new SDC would be the same as while processing mustard munitions with the existing SDCs OTS. The risk and hazard for the EDS P3 were conservatively assumed to be the same risk as the seven EDSs evaluated in the BGAD EDT EA (ACWA 2013). Table 3-9 also shows calculated risk and hazard from the worst-case alternative plus the risk and hazard associated with the BGCAPP Main Plant while processing nerve agent munitions. The predicted risk and hazard estimates are well below limits considered protective of human health.

Table 3-10. Calculated Risk Values for Worst-case Alternative to the Proposed Action.

Effect	Maximum Calculated Risk for Worst-case Alternative ^a	Maximum Calculated Risk for Worst-case Alternative plus BGCAPP Main Plant	Target Limits ^b
Non-carcinogenic Chronic Health Effect	0.035	0.0474	0.25
Carcinogenic Risk	0.000000369 (3.69×10^{-7})	0.000000548 (5.48×10^{-7})	0.000001 (1.00×10^{-6})

Notes:

^a Calculated from Tables 3-7 and 3-8 as two times the predicted maximum calculated risk for SDC emissions plus the maximum calculated risk for seven EDSs.

^b Target limits required by KDEP

No acute health effect is given. Acute risk represents the risk of a person at a particular location and is not additive.

In addition, a comparison was made between the predicted emissions from the BGCAPP Main Plant versus the emissions predicted for the worst-case alternative. The BGCAPP Main Plant emissions estimates are primarily based on laboratory detection limits or reporting limits. Some of the values are based on short-term exposure limits. Compounds that had unrealistically high detection limits were excluded to avoid skewing the comparison in favor of the proposed action. The total emissions do not include emissions of nerve agents, as they are expected to be negligible compared to detection limits for other organic compounds. The total emissions estimates assume operations for 13.8 months, which is the current estimate of time to complete M55 rocket processing in the BGCAPP Main Plant.

The total emissions for the proposed action were estimated in a way that would tend to overestimate the emissions. The comparison assumed that all the M55 rocket warheads that are de-mated from rocket motors and 25,740 RMAs would be processed in the SDCs. The comparison also assumed that the warheads would not be drained for maximum agent loading to the SDCs. The estimated emissions rates were based on the worst-case results of emissions test conducted on the ANAD SDC. An additional assumption was that approximately 400 overpacked rockets would be processed in the EDS P3. Emissions estimates for the EDS P3 were based on results of emissions testing on smaller EDS units.

As indicated in Table 3-10, cumulative emissions from the worst-case alternative of the proposed action are significantly less than the BGCAPP Main Plant for processing the same total mass of agent and energetics. The total cumulative predicted emissions from the proposed action are 10 times less than predicted emissions from the BGCAPP Main Plant. Total cumulative emissions from the worst-case alternative of the proposed action also were estimated for various sub-categories of emissions (non-dioxin organic compounds, dioxin/furans, inorganic compounds, and metals) with similar results.

The calculated risk and hazards presented in Table 3-10 and the emissions comparison presented in Table 3-11 provide further evidence that the proposed action would not cause harm to human health. An MPHRA may be required to be conducted and submitted with the RCRA permit application.

Table 3-11. Comparison of BGCAPP Main Plant and Total Emissions from Worst-case Alternative to the Proposed Action.

Emissions	BGCAPP Main Plant	Existing SDC, New SDC, and EDS P3
Total Emissions	5,936	574
Non-dioxin Organic Compounds	4,180	493
Dioxin/Furan Emissions	0.00288 (2.88×10^{-3})	0.0001 (1.0×10^{-4})
Inorganic Emissions	1,756	24.14
Metals Emissions	756	24.14

Source: Franklin 2019

3.1.3.2 Worker Safety and Health

The potential human health impacts that could occur to workers during retrofitting and operation of the existing SDC and during site preparation, installation, and operation of a new SDC and EDS P3 are discussed in the following paragraphs.

This information, in combination with the information presented in Sections 3.1.3.1.1 through 3.1.3.1.4, is sufficient for the Army to conclude that operation of SDCs to augment the BGCAPP Main Plant will not impact the health of workers or local residents.

Worker Health Impacts During Retrofitting, Site Preparation, and Installation. It is anticipated that exposure to common industrial solvents and other chemicals could occur during site preparation and installation activities (including retrofitting the existing SDC); however, no unusual materials are expected to be used. The potential for human health impacts during site preparation and installation would thus be limited to occupational hazards. Routine and well-documented safety hazards would be present during the operation of vehicles and heavy machinery. The hazards of retrofitting the existing SDC and installing the new SDC and the EDS P3 would be similar to those of any small-scale industrial project and would not be significant or unique. The occupational health effects from site preparation and installation activities would therefore be minor because standard procedures, practices, and protective clothing and equipment would be used by workers to minimize the potential for adverse impacts.

No significant human health impacts would be expected to occur during the site preparation and installation work.

Worker Health Impacts During Operations. The potential impacts to workers resulting from the chemicals to be emitted from the worst-case proposed action are described in Section 3.1.3.1 and will not be repeated in this subsection.

The hazards of nerve agents to workers have been well documented in previous NEPA reviews, including the 2002 FEIS (PMCD 2002), and the Army has developed and implemented barriers (such as filtered ventilation systems and protective clothing), procedures, and administrative controls to appropriately address these hazards. The operations could expose surrounding facilities to explosive and chemical agent hazards as well as other industrial hazards.

Potential accidents and exposures that could occur during site preparation, installation, or operations are addressed and mitigated via hazard analysis and risk reduction as required by Army Regulation 385-10, *The Army Safety Program* (DA 2017). Concerns with respect to location, siting, and exposures to and from adjacent facilities (e.g., from the proposed units to the BGCAPP Main Plant, and vice versa) would be addressed by Army Regulation 385-10 and via submittal of an Explosive Safety Site Plan for the facilities through Army chain of command to the DDESB, which uses DOD 6055.09-M, *DoD Ammunition and Explosives Safety Standards* (DOD 2012), as its regulatory document with respect to explosive and chemical munition operations and facility siting. The public access exclusion distances for the proposed facilities—including the intraline distances (ILDs), the inhabited building distances (IBDs), and the public transportation distances (PTDs)—will also be addressed in the Explosive Safety Site Plan.

Onsite personnel working at the proposed units would be trained in the safe handling of nerve agent munitions and responses to potential exposures associated with their activities prior to being allowed to work. All personnel on site during operations would have respiratory protection provided in the event of a chemical agent incident. Hearing protection would be provided to workers, as appropriate, when they are in close proximity to (1) equipment used to

load and unload munitions, (2) ventilation fans, blowers, and operating OTSs, or (3) backup generators, when in operation.

No significant worker human health impacts would be expected to occur due to the proposed action or alternative actions.

3.1.4 Terrestrial Ecological Resources

As discussed in Section 3.1.2, the proposed action would not be expected to result in impacts to any viable aquatic resources, including wetlands. The potential effects on terrestrial ecological resources—as well as to threatened and endangered species and/or to species of special concern—are discussed in this subsection, as are the potential ecological risks.

3.1.4.1 Existing Terrestrial Resources

The vegetation in Eastern Kentucky can be considered transitional in nature, ranging from grassland species to forest tree species representative of the Cumberland Mountains. The majority of the BGAD site is maintained as fescue-dominated pastures that are mowed periodically, with interspersed shrubs and trees. The majority of BGAD vegetation has been impacted by cattle grazing (PMCD 2002; ACWA 2002).

Forest encompasses roughly 3,760 acres of the BGAD site, of which approximately 75 percent has been impacted by cattle grazing and browsing by deer. The three main forest types on the BGAD site are upland, riparian, and flatwood. In general, the locations of different forest types on BGAD are based on soil type, moisture, and aspect. Upland locations that are well-drained contain bluegrass mesophytic cane forest, bluegrass savannah woodland, and forests characteristic of calcareous soils. Bottomlands along Muddy Creek, Viny Fork Creek, tributaries of Little Muddy Creek, and the headwaters of Otter Creek support riparian forests. (See Section 3.1.2 for a discussion of surface water resources at BGAD.) The flatwood forest (bottomland forest) is restricted to poorly drained soils on the northern portion of the BGAD site (PMCD 2002; ACWA 2002).

The location of the existing SDC has already undergone environmental review and will not be discussed further in this section. The proposed locations of the new SDC and the EDS P3 are depicted on Figure 2-4. The proposed locations of the new SDC are in the vicinity of the BGCAPP Main Plant. The proposed location of the EDS P3 is within the CLA. This site has been previously used for operations related to chemical weapons stored at BGAD. The proposed SDC and EDS sites are already highly disturbed with no trees and very little vegetation. These sites contain very limited viable habitat for terrestrial wildlife.

Impacts to wildlife present would normally include potential for injuries or death from collision with vehicles and equipment used during site preparation and installation activities, and increased road traffic accessing the facilities during the operational phase. Indirect impacts would normally include displacement from noise and equipment disturbance during site preparation and installation activities, and routine noise, traffic, and human disturbance during operations. However, because of the very limited habitat in the proposed areas, such impacts would be minimal for the proposed action.

Furthermore, these impacts were previously considered for the area of construction of the BGCAPP Main Plant, and the conclusion was reached that, because of the abundance of similar habitat next to cleared areas, no impacts on the continued survival of local populations of these species would be expected (PMCD 2002; ACWA 2002; USACE 2004; USACE 2011). Because

the proposed locations of the new SDC are within the vicinity of the area that has already undergone environmental review for the BGCAPP Main Plant, the same conclusion would apply—site preparation and installation of the new SDC would have negligible impacts on terrestrial resources.

3.1.4.2 Threatened and Endangered Species

Various EAs have been prepared that address potential impacts to threatened and endangered species at BGAD: the 2004 EA for the BGCAPP Main Plant and access road (USACE 2004) and its supplement (USACE 2011), and the BGAD EDT EA prepared for the existing SDC (ACWA 2013). These EAs fully addressed potential impacts to threatened and endangered species resulting from those projects.

The INRMP (BGAD 2017a) addresses threatened, endangered, and special species. Three federally listed threatened or endangered species have been documented to occur or could occur on BGAD: running buffalo clover (a plant that is federally listed as endangered and state-listed as threatened), the northern long-eared bat (federally listed as threatened, state-listed as endangered), and the Indiana bat (federally listed as endangered). Other special species that might occur on BGAD are the gray bat and American bald eagle.

Running buffalo clover is most commonly found on rich soils in habitat types that provide filtered light, such as open woodlands, savannas, floodplains, and mesic stream terraces at well-drained sites. It was concluded in previous EAs that no running buffalo clover populations would be impacted by the construction and operation of the BGCAPP Main Plant or the existing SDC as long as best management practices are implemented to control stormwater runoff, soil erosion, and sediment transport. Because the proposed sites for the new SDC would be located wholly within the boundaries of the areas previously evaluated for the BGCAPP project, the same conclusion can be reached for the site of the new SDC. Buffalo clover is not known to occur on any of the proposed locations for the new SDC or the EDS P3, and the habitat is not considered conducive for its growth. Therefore, the conclusion is reached that the proposed action would not impact running buffalo clover at BGAD.

The two federally protected bats (the northern long-eared bat and Indiana bat) and a special species bat (the gray bat) occur or could occur at BGAD. The northern long-eared bat is considered endangered due to diseases that affect this particular species, though this disease has not been identified in bats in Madison County. Foraging habitat for bats exists along the Muddy Creek corridor and at a number of lakes on BGAD. None of the proposed sites contain foraging habitat for bats. Although BGAD contains wooded areas that are potential maternity and summer roosting areas for bats, there are no trees identified on the proposed sites that may provide potential roosting habitat. Therefore, it is concluded that the federally protected species and special species bats would not be affected by the proposed action.

The bald eagle is listed as threatened by the Kentucky State Nature Preserves Commission (KSNPC 2012). This species probably frequents Lake Vega and other water bodies at BGAD as a migrant. There is one nesting bald eagle pair on BGAD, approximately 1.7 miles from the BGCAPP South Gate. Considering other operations on BGAD, it is concluded that the bald eagle's nest would not be affected by the proposed action (Dickson 2019).

The INRMP (BGAD 2017a) provides a list of fauna with known occurrence records for BGAD. This list includes a number of other species listed by the Kentucky State Nature Preserves Commission as threatened, endangered, or special concern (Table 3-12). However, the sites for the proposed new SDC and the EDS P3 provide either no or extremely limited habitat for these additional species. Habitat viable for these species is found elsewhere on BGAD.

Based on the limited habitat, the potential for impacts to federally and state-listed threatened, endangered, and special concern species during site preparation, installation, and operation of the proposed new SDC and the EDS P3 is considered to be negligible.

The potential impacts of noise on wildlife populations resulting from the construction of the BGCAPP Main Plant were previously evaluated (ACWA 2002). The noise levels generated by heavy equipment would be expected to range from 77 to 90 A-weighted decibels (dB(A)) at 50 feet. Noise would diminish to background levels at the northern and northeast BGAD boundaries. The previous evaluation noted that small mammals can be adversely affected by maximum noise levels created by site preparation equipment, and some research has shown that there could be temporary nest abandonment by birds as the result of sudden sonic booms of 80 to 90 dB(A). Songbirds may also abandon habitat due to episodic or continuous noise levels.

Table 3-12. State Listed Fauna Species with Occurrence Records for Blue Grass Army Depot.

Species	Status ^a
Mammals	
Black Bear (<i>Ursus americanus</i>)	Special Concern
Evening Bat (<i>Nycticeius humeralis</i>)	Special Concern
Northern Long-eared Bat (<i>Myotis septentrionalis</i>)	Endangered
Amphibians	
Northern Leopard Frog (<i>Lithobates pipiens</i>)	Special Concern
Birds	
Northern Shoveler (<i>Anas clypeata</i>)	Endangered
Blue-winged Teal (<i>Anas discors</i>)	Threatened
Hooded Merganser (<i>Lophodytes cucullatus</i>)	Threatened
Pied-billed Grebe (<i>Podilymbus podiceps</i>)	Endangered
Double-crested Cormorant (<i>Phalacrocorax auritus</i>)	Threatened
Great Egret (<i>Ardea alba</i>)	Threatened
Osprey (<i>Pandion haliaetus</i>)	Special Concern
Sharp-shinned Hawk (<i>Accipiter striatus</i>)	Special Concern
Northern Harrier (<i>Circus cyaneus</i>)	Threatened
American Coot (<i>Fulica americana</i>)	Endangered
Spotted Sandpiper (<i>Actitis macularius</i>)	Endangered
Short-eared Owl (<i>Asio flammeus</i>)	Endangered
Sedge Wren (<i>Cistothorus platensis</i>)	Special Concern
Henslow's Sparrow (<i>Ammodramus henslowii</i>)	Special Concern
Dark-eyed Junco (<i>Junco hyemalis</i>)	Special Concern

Note:

^a Source: INRMP (BGAD 2017a)

Larger mammals, such as white-tailed deer, may avoid the area during site preparation activities due to the noise and presence of workers. According to the previously conducted analysis, no long-term effects on the hearing ability of wildlife would be expected due to noise generated by site preparation and installation activities associated with the proposed action (ACWA 2002).

The potential impacts of noise on wildlife populations resulting from the operation of the BGCAPP Main Plant also were previously evaluated (ACWA 2002). The maximum noise level adjacent to the BGCAPP Main Plant was estimated at 72 dB(A), with a decrease to approximately 50 dB(A) at a distance of 1,000 feet. The anticipated noise levels of 55 to 60 dB(A) near the BGCAPP Main Plant boundary were evaluated as only having minor impacts on birds and mammals, with abrupt noises potentially resulting in temporary nest abandonment by birds. The estimated noise levels for the BGCAPP Main Plant were evaluated as not likely to interfere with the auditory function of birds and mammals. For an evaluation of the noise levels associated with the operation of the proposed action—which were found to be similar to the estimated noise levels during the operation of the BGCAPP Main Plant—see Section 3.1.7 in this EA. Therefore, it is anticipated that any noise impacts on wildlife resulting from the operation of the SDCs and EDS P3 would only be minor.

There would be some unavoidable impacts on wildlife due to traffic associated with site preparation activities that could result in an increased number of road kills for species such as eastern cottontail rabbit, eastern gray squirrel, eastern fox squirrel, opossum, and eastern chipmunk (ACWA 2002). Larger mammals, such as white-tailed deer, could also be impacted.

3.1.4.3 Ecological Risk Assessment

A screening-level ecological risk assessment (SLERA) was previously conducted to assess the risk from air emissions for each of four technologies being considered for pilot testing at BGAD (ACWA 2002). SLERAs are typically based on very conservative assumptions that are intended to be protective of environmental resources; use of such assumptions enables chemicals that pose negligible risk to be eliminated from further consideration, while chemicals that do pose potential significant threats can be examined further. The details of the overall approach for the previous SLERA are given elsewhere (Tsao 2001) and are summarized here. In the 2002 SLERA, the estimated soil concentrations from the deposition of airborne emissions during normal operations were compared with ecotoxicological benchmark values that were based on conservative ecological endpoints developed by the EPA (EPA 2001). For those chemicals for which the EPA had not developed soil screening values, values developed by state agencies or other sources were used.

The risks to ecological receptors (soil invertebrates, plants, and wildlife) were considered negligible where the SLERA (ACWA 2002) showed negligible effects on soils at BGAD. The comparison of soil deposition and a chemical-specific benchmark value was expressed as a hazard quotient (i.e., a numerical value generated by dividing the predicted soil concentration by the soil benchmark value). Soil concentrations resulting in a numerical hazard quotient value less than or equal to 1.0 are considered to pose negligible risk to ecological receptors, while chemicals having soil concentrations with a numerical hazard quotient value greater than 1.0 are considered contaminants of potential concern that might affect ecological receptors and should be further evaluated.

The SLERA (ACWA 2002) analyzed 44 chemicals in the ACWA emissions inventory for the chemical neutralization followed by SCWO (the technology ultimately selected for pilot

testing at the BGCAPP Main Plant). Assumptions and a detailed description of the analysis are provided elsewhere (Tsao 2001). None of the chemicals evaluated in the 2002 SLERA exceeded the soil benchmark values and thus would not result in a numerical hazard quotient value that exceeded 1.0. In fact, the concentrations of all chemicals emitted from the BGCAPP Main Plant stacks were found to be quite low.

As discussed in Section 3.1.3, a screening-level human health risk assessment (SLHHRA) was prepared to evaluate the human health risks associated with air emissions from the operation of the BGCAPP Main Plant (Franklin 2011). The results of the 2011 SLHHRA demonstrated that operations at the BGCAPP Main Plant for both non-carcinogenic and carcinogenic risk calculations would be approximately one-tenth or less of established and generally accepted and recommended (i.e., for areas on industrial activity) benchmarks. The air modeling and risk calculations clearly indicated that unacceptable non-carcinogenic or carcinogenic human health effects would not be expected.

Subsequently, health risk assessments were prepared (Franklin 2012, 2013) for four types of EDT units considered during the BGAD EDT EA (ACWA 2013). Following completion of the EA, the SDC was selected as the alternative to process the BGAD stockpile of mustard munitions. The results from the health risk assessments (Franklin 2012, 2013) were added to those of the SLHHRA (Franklin 2011) to describe cumulative risks of the SDC in simultaneous operation with the BGCAPP Main Plant. The combined risk values were lower by at least one order of magnitude than the risk levels of concern to the KDEP. The SDC was calculated to add a maximum of approximately 20 percent to the risk discussed and analyzed for the BGCAPP Main Plant in the 2011 SLHHRA. Additional MPHRAs were conducted for the existing SDC (Franklin 2015, 2018) that confirm that estimated emissions from the SDC meet acceptable risk and hazard thresholds.

Although no SLERA has been conducted to assess the ecological risk from the emissions that would be generated by the proposed action, risk to organisms including the surrounding wildlife would be due to the same emitted contaminants as have already been analyzed in the health risk assessments (Franklin 2012, 2013). Section 3.1.3.1.4 compares emissions associated with processing M55 rockets and components in the BGCAPP Main Plant to processing these same M55 rockets in SDCs and EDS P3. The conclusion is that cumulative emissions from the SDCs and EDS P3 are significantly less than emissions from the BGCAPP Main Plant when processing the same total mass of agent. For each munition processed in an SDC or EDS P3 and not in the BGCAPP Main Plant, the total emissions of contaminants would be reduced, thus reducing risk to human health. This same conclusion can be made for risk ecological receptors. This comparison, coupled with the information from the previous SLERA and health risk assessments that conclude there would be negligible affects to ecological receptors from operation of the BGCAPP Main Plant, supports the conclusion that operations of the SDCs and EDS P3 would result in negligible impacts on terrestrial habitat and vegetation.

3.1.4.4 Conclusions about Impacts to Ecological Resources

As explained in the introduction to Section 3.1 and reiterated in Sections 3.1.4.1 through 3.1.4.3, impacts to viable terrestrial resources (including vegetation and wildlife), to aquatic resources, or to wetlands from the implementation of the proposed action would be minimal.

Impacts of site preparation activities on wildlife within the BGCAPP area and associated access road, parking areas, and utilities were addressed in a previous EA (USACE 2004). The

construction of the BGCAPP Main Plant (including support buildings) with the associated access road and parking areas were found to potentially impact upland forest and grassland communities (including a small area of Little Bluestem native grass). However, this habitat is relatively common throughout BGAD. Therefore, impacts to terrestrial resources resulting from the BGCAPP Main Plant would be minimal (USACE 2004).

The BGCAPP Main Plant impacts approximately 119 acres, as compared to up to 4 acres for the proposed installation of a new SDC and the EDS P3. Furthermore, the sites for the proposed new facilities (as shown in Figure 2-4) are in the vicinity of the BGCAPP project footprint or within the existing CLA and would thus impact very little natural terrestrial habitat. Therefore, impacts to terrestrial resources resulting from site preparation and installation of the new units would be minimal.

The potential for impacts to federally- and state-listed threatened, endangered, and special concern species during the site preparation, installation, and operation of the new units is also considered to be negligible, primarily due to the absence of such species or viable habitat at the proposed sites.

A comparison of emissions from the BGCAPP Main Plant with predicted emissions from the SDCs and EDS P3, coupled with the information from the previous SLERA and health risk assessments that concluded there would be negligible effects to ecological receptors from operation of the BGCAPP Main Plant, supports the conclusion that operations of the SDCs and EDS P3 would result in negligible impacts on terrestrial habitat and vegetation.

3.1.5 Socioeconomic Resources

For socioeconomic resources, the affected environment is Madison County because most of BGAD's existing workforce resides in the county and because it is likely that most of the workers in-migrating for the proposed action considered for this EA would also reside there. Thus, to provide an upper bound on the potential direct and indirect impacts of employment and population growth, this analysis assumes that the impacts would be concentrated in Madison County. This analysis is also based on the alternative expected to require the largest workforce—retrofitting the existing SDC and installing a new SDC (either an SDC 1200 or 2000) and an EDS P3.

Typically, the largest socioeconomic impacts of constructing and operating an industrial facility result from population growth associated with the in-migration of workers. As workers in-migrate to a project area for employment during facility construction or operations, they and their families increase the demand for housing and public services, including water and wastewater treatment, solid waste disposal, schools, transportation, and other services. Conversely, the workers and their families also earn direct incomes and make purchases that benefit the local economy by creating indirect jobs and incomes and contributing to local tax revenues. Thus, the in-migration of workers can have both adverse and beneficial socioeconomic impacts. The following subsections discuss the potential socioeconomic impacts of the proposed action associated with this EA.

3.1.5.1 Employment

As discussed in Section 2.1.3, retrofit of the existing SDC, site preparation, and installation of a new SDC 1200 or SDC 2000 and an EDS P3 would require a relatively small workforce (30 to 80 workers), and the workers would be on site for a period of 16 months. This

analysis is based on 80 installation workers. Although these jobs would help the local economy by reducing unemployment, producing direct incomes, contributing to indirect jobs and incomes, and increasing purchases and tax revenues, the overall beneficial impact is likely to be minor and temporary in the context of the regional economy.

Operation of the retrofitted existing SDC 1200, a new SDC 1200 or 2000, and the EDS P3 would require the largest number of workers (140 to 275 operations workers). This analysis is based on 275 operations workers. Workers would be on site for approximately 32 months. These jobs would help the local economy by producing direct incomes, contributing to indirect jobs and incomes, and increasing purchases and tax revenues, but the overall beneficial impact is likely to be very minor and temporary in the context of the regional economy. The long-term economic impacts of the BGCAPP operations jobs have previously been addressed as part of the analyses in the 2002 FEIS (PMCD 2002).

3.1.5.2 Population

For preparing the site, retrofitting the existing SDC, and installing a new SDC and EDS P3, the population growth would be minor because the installation workforce of 80 workers would be small and would come primarily from within the project region. Such work is typically conducted by standard skilled workers (heavy equipment operators, riggers, electricians, plumbers, etc.) available from local businesses. Thus, there would likely be few, if any, workers who would in-migrate with their families.

For operation of the SDCs and the EDS P3, worker-related population growth would be 275 workers. The operations period for the SDCs and EDS P3 is expected to be approximately 32 months. The 275 operations workers would likely in-migrate to Madison County with their families. Assuming that each of the 275 in-migrating workers brings a spouse and one child (the average household size in Kentucky is 2.49 persons [USCB 2017a]), Madison County's population would increase by 723 persons. Such an increase would represent only about 0.8 percent of Madison County's total population of 91,226 persons (USCB 2017b).

3.1.5.3 Housing

The number of workers estimated for the proposed action would not create significant population growth in Madison County and, therefore, would not generate significant additional demand for housing. *The Comprehensive Plan for Madison County, Kentucky 2015* (Madison County 2015) projects that approximately 13,000 housing units would need to be constructed over the next 30 years to meet the county's population increase demand. Approximately 6,000 of these units would need to be built in the unincorporated portion of the county. The Urban Corridor makes up only 21 percent of the total land acreage available in Madison County. Approximately, 66 percent of the land in the Urban Corridor is still undeveloped. This indicates that the county has adequate land to accommodate the projected increase in housing units.

It is likely that the number workers in-migrating to the area would be so small as to create only a very minor increase in housing demand. The upper bound population growth discussed in Section 3.1.5.2 could add 275 new households to Madison County, which would represent only 7.4 percent of Madison County's existing 3,714 vacant housing units (Madison County 2015), and an even smaller percentage of the new housing units that could be built in Madison County over the next 30 years. Thus, retrofitting the existing SDC, installing the new SDC and the EDS

P3, and operating these units is not likely to have a significant impact on the availability or cost of housing in Madison County.

3.1.5.4 Public Services

The number of workers estimated for the proposed action would not create significant population growth or demand for housing in Madison County and, therefore, would not generate significant additional demand for public services.

Water and Wastewater. Most Madison County residents get their water from a public water supply. The City of Richmond operates a large water treatment plant on the Kentucky River and provides water for Richmond Utilities, Madison County Utilities, and the Kirksville Water District. Each of these water providers has excess capacity: Richmond Utilities has 5.1 million gal/day excess capacity, Madison County Utilities has 240,000 gal/day excess capacity, and Kirksville Water District has 152,000 gal/day excess capacity. Water in the southern portion of Madison County is provided by the City of Berea and the Southern Madison Water District. Although the Southern Madison Water District (which gets its water from the City of Berea) has no excess capacity available, the City of Berea has 1.4 million gal/day excess capacity (Madison County 2015). Because the county's largest water suppliers (the cities of Richmond and Berea) have excess capacity, the small population increase that could occur is not likely to have a significant impact on the availability of water in Madison County.

Madison County residents rely on either a public wastewater treatment system or a private on-site septic system for their wastewater disposal. Richmond and Berea each provide public wastewater treatment and have excess capacity: Richmond Utilities has 16 million gal/day excess capacity and the Berea Sewer Commission has 1.7 million gal/day excess capacity (Madison County 2015). In northern Madison County, the North Madison County Sanitation District provides public wastewater treatment, and has 0.8 million gal/day excess capacity. Residents in the unincorporated areas of Madison County rely on private on-site septic systems (Madison County 2015). The small population increase that could occur is not likely to have a significant impact on the ability of Richmond Utilities, Berea Sewer Commission, or North Madison County Sanitation District to provide wastewater treatment.

Solid Waste Disposal. In Madison County, various solid waste disposal services are offered by both public (Madison County, Richmond, and Berea) and private providers. Whether public or private, these providers pay a fee to use private landfill facilities in other counties because no landfill facilities are currently available in Madison County. Over 68,500 tons of solid waste from Madison County are disposed of annually in the Blue Ridge Recycling and Disposal Facility in Irvine, Kentucky (Estill County), the Rumpke Facility in Jeffersonville, Kentucky (Montgomery County), and the Tri-K Landfill in Stanford, Kentucky (Lincoln County) (Madison County 2015).

The small population increase that could occur is not likely to have a significant impact on solid waste disposal in Madison County or the other Kentucky counties. In 2015, per capita solid waste generation in the United States was about 4.4 pounds per day (or about 1,635 pounds per year) (EPA 2015). The 723 new residents in Madison County would generate about 591 tons per year (tons/yr) of additional solid waste ($723 \times 1,635$ pounds per year \div 2,000 pounds per ton = 591 tons/yr). This additional solid waste would represent a very minor increase (about 0.9 percent) ($591/68,500 \times 100 = 0.9$ percent) in the existing solid waste generated in Madison County each year.

Schools. Public education in Madison County is provided by the Madison County School District, which operates 19 elementary schools, 8 middle schools, and 6 high schools with a total enrollment of 12,975 students (2018–2019 school year) (Public School Review 2018). In response to population growth projections for Madison County, new schools have been added and are being proposed (Barker 2017).

It is likely that the number of workers in-migrating to the area with school-age children would be so small as to create almost no increase in school enrollments. However, for 723 new residents associated with operations, and an average household size of 2.49, there could be 290 new school-age children in Madison County. Such an increase would represent only about 2.2 percent of existing enrollment in Madison County, and the new students would be distributed among grades K through 12 and the various schools. Thus, although population growth associated with the proposed action could add to the existing shortage of educational facilities, it is not likely to be large enough to create a significant impact on educational services in Madison County.

Transportation. The BGAD main entrance is located on the facility's southwestern boundary on U.S. Highway 421 (Battlefield Memorial Highway). However, vehicular access to the sites would be via the BGCAPP access road, which intersects Kentucky State Route 52 (KY 52 or Irvine Road) near BGAD's northern boundary. The access road runs southward from KY 52 to the BGCAPP Main Plant, with four lanes from KY 52 to the Access Control Building and then two lanes south to the BGCAPP Main Plant (USACE 2004).

Route KY 52 from the Richmond to the BGCAPP access road is a five-lane highway that becomes a two-lane highway just east of the BGCAPP access road. Route KY 52 has an annual average daily traffic (AADT) count (bi-directional) of over 21,016 vehicles west of the BGCAPP access road, and an AADT count of over 11,984 vehicles east of the BGCAPP access road (KYTC 2017). On a highway with the capacity of KY 52, this volume of traffic represents a volume to service flow (VSF) of 0.7, which indicates that traffic congestion is greater than desirable (which is less than 0.6) (Madison County 2015). According to *The Comprehensive Plan for Madison County, Kentucky 2015* (Madison County 2015), the traditional morning and evening peak commute periods account for regularly occurring congestion in Madison County. During those times, congestion affects KY 52 from the Richmond Bypass to the Estill County line.

Partly as a result of this traffic congestion on KY 52, the intersections of KY 52 with KY 876 and with U.S. Highway 25 (two of the intersections through which drivers pass when driving east from Richmond to BGAD) had the second (124 accidents) and third (107 accidents) highest number of accidents, respectively, of any intersections in Madison County from 2005 to 2008 (Madison County 2015).

The workers associated with this action would increase traffic on KY 52 and the BGCAPP access road as they drive to and from the site each day. There could be 80 workers on site for up to 16 months for retrofitting the existing SDC and installing the new SDC and the EDS P3. To bound the potential traffic impacts from these workers, the analysis in this EA assumes that there would be no carpooling and that all 80 site preparation and installation workers would enter the BGCAPP access road at the same time each morning and exit the BGCAPP access road at the same time each afternoon. Thus, the workers retrofitting the existing SDC and installing the new SDC and new EDS P3 could generate an additional 80 one-way trips each morning and afternoon, for a total of 160 additional round trips each day on KY 52 and the BGCAPP access road.

According to the Kentucky Transportation Center Research Report (KTCR 2015), the VSF ratio is estimated based on a combination of several input factors such as AADT, peak hour volume as a percentage of AADT (K Factor), percentage of peak hour volume flowing in the peak direction (D Factor), and type of highway. While the calculation is complex, this reference also includes charts of sensitivity analysis to indicate how a change in input factors would alter, for example, the peak capacity of a route (which affects the VSF). A 10 percent change in the above factors (AADT, K Factor, D Factor, etc.) would result in 0.5 percent change in the peak capacity. Considering the increase in traffic on KY 52 as a result of installation workers would be small (160 additional vehicles ÷ 21,016 vehicles = 0.76 percent), this small change would not have a significant impact on the peak capacity or the VSF of KY 52. However, to mitigate any minor impacts, BGAD could stagger shift changes or require that the workers carpool to the site.

It is not likely that this increase in traffic would have significant impacts in terms of congestion or safety on the BGCAPP access road, particularly since it was designed to accommodate the larger BGCAPP Main Plant construction and operations workforces. Since the retrofit of the existing SDC and installation of the new SDC and the EDS P3 will be staggered, it is not expected that the full contingent of 80 workers will be present at the site at the same time for any extended period.

As discussed in Section 2.1.3, operations could require 275 workers, but not all of the operations workers would be on site at the same time. The SDC units would operate 24 hours per day, and this assessment assumes that workers would be present in two 12-hour shifts each day (250 workers total). The EDS P3 operations workers (25 workers) would potentially only work day shifts. To bound the potential traffic impacts from these operations workers, this assessment assumes that there would be no carpooling and that half the SDC workforce (125 workers) would enter and half the SDC workforce (125 workers) would exit the BGCAPP access road at each shift change. In addition, the EDS P3 workforce of 25 workers would enter and exit during the day shift. Thus, the operations workers could generate an additional 275 round trips each day, for 550 one-way trips per day on KY 52 and the BGCAPP access road. Although this increase in traffic would be larger than that experienced during retrofitting the existing SDC and installing the new units, it is not likely that it would have significant impacts in terms of congestion or safety on the BGCAPP access road, particularly since it was designed to accommodate the larger BGCAPP Main Plant construction and operations workforces. The impact on KY 52 would also be minor considering that the 550 vehicles compared to 21,016 vehicles represents only a 2.6 percent increase, which would not have a significant impact on the peak capacity or the VSF of KY 52, as discussed earlier. However, to mitigate any minor impacts, BGAD could stagger shift changes or require that the workers carpool to the site.

In addition to the worker vehicles, operation of the units would generate between three and four additional truck shipments of waste per day (see Section 3.1.8.4). Such a small number of additional truck shipments would not have a significant impact on traffic flow or safety on KY 52 or the BGCAPP access road.

3.1.5.5 Agriculture

A separate socioeconomic topic that requires assessment is the potential for the operation of the SDCs and the EDS P3 to adversely affect agriculture in Madison County. Agricultural production, including both crops and livestock, remains vital to Madison County's economy. The most recent data on agriculture are from the U.S. Department of Agriculture's *2017 Census of Agriculture* (USDA 2019). For Madison County in 2012, the total acreage devoted to ranching

and farming was 229,824 acres, the total market value of agricultural products sold was \$50.6 million (M), the total market value of livestock sales in was \$42.8 M, and the total market value of crop sales was \$7.7 M.

A key issue related to agriculture in Madison County is the potential effect of chemical weapons destruction byproducts on livestock or crops in both the short term (emissions during facility operations) and the long term (soil deposition from those emissions). The BGAD EDT EA (ACWA 2013) indicated that any impacts to nearby farmlands associated with the operation of the BGCAPP Main Plant and the existing SDC would not be significant. Section 3.1.3 compares emissions associated with processing munitions in the BGCAPP Main Plant to processing munitions in the SDCs and the EDS P3. The conclusion is that cumulative emissions from the SDCs and the EDS P3 are significantly less than emissions from the BGCAPP Main Plant when processing the same total mass of agent. For each munition processed in the SDCs or EDS P3 and not in the BGCAPP Main Plant, the total emissions of contaminants would be reduced, thus reducing risk to human health. The same conclusions can be made to impact to organic and other farmland.

3.1.6 Environmental Justice

Executive Order 12898 (1994), *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, directs each federal agency to identify and address the “disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority and low-income populations.” CEQ guidance on environmental justice (CEQ 1997) defines “minority” as:

Individual(s) who are members of the following population groups: American Indian or Alaskan Native; Asian or Pacific Islander; Black, not of Hispanic origin; or Hispanic.

CEQ guidance (CEQ 1997) also states that a “minority population” should be identified where either:

(a) the minority population of the affected area exceeds 50 percent or (b) the minority population percentage of the affected area is meaningfully greater than the minority population percentage in the general population or appropriate unit of geographical analysis.

CEQ guidance states that a “low-income population” should be identified using statistical poverty thresholds from the Census Bureau’s Current Population Reports, Series P-60 on Income and Poverty (CEQ 1997).

This EA analysis uses data from the *2013-2017 American Community Survey 5-Year Estimates* (USCB 2017c) to identify minority or low-income populations that could suffer disproportionately high and adverse human health or environmental effects from the proposed action at BGAD. The first step in the analysis is to determine whether there are any minority or low-income populations in the potentially affected area. If any such populations are identified, the second step is to determine whether they would suffer any disproportionately high and adverse human health or environmental effects.

3.1.6.1 Minority and Low-Income Populations

As shown in Figure 3-3, BGAD is located within census tract¹ (CT) 110 in Madison County. However, this analysis also includes CT 101.01, CT 102, CT 103, CT 104, CT 105, CT 106, CT 109.01, CT 109.02, CT 109.03, and CT 111 in Madison County because the boundaries of these census tracts encompass the geographical distribution of the potential human health and environmental effects identified in the BGAD EDT EA's HHRA (Franklin 2013), discussed in Section 3.1.3.1, and potential environmental impacts, as discussed in Sections 3.1.1 through 3.1.5 of this EA.

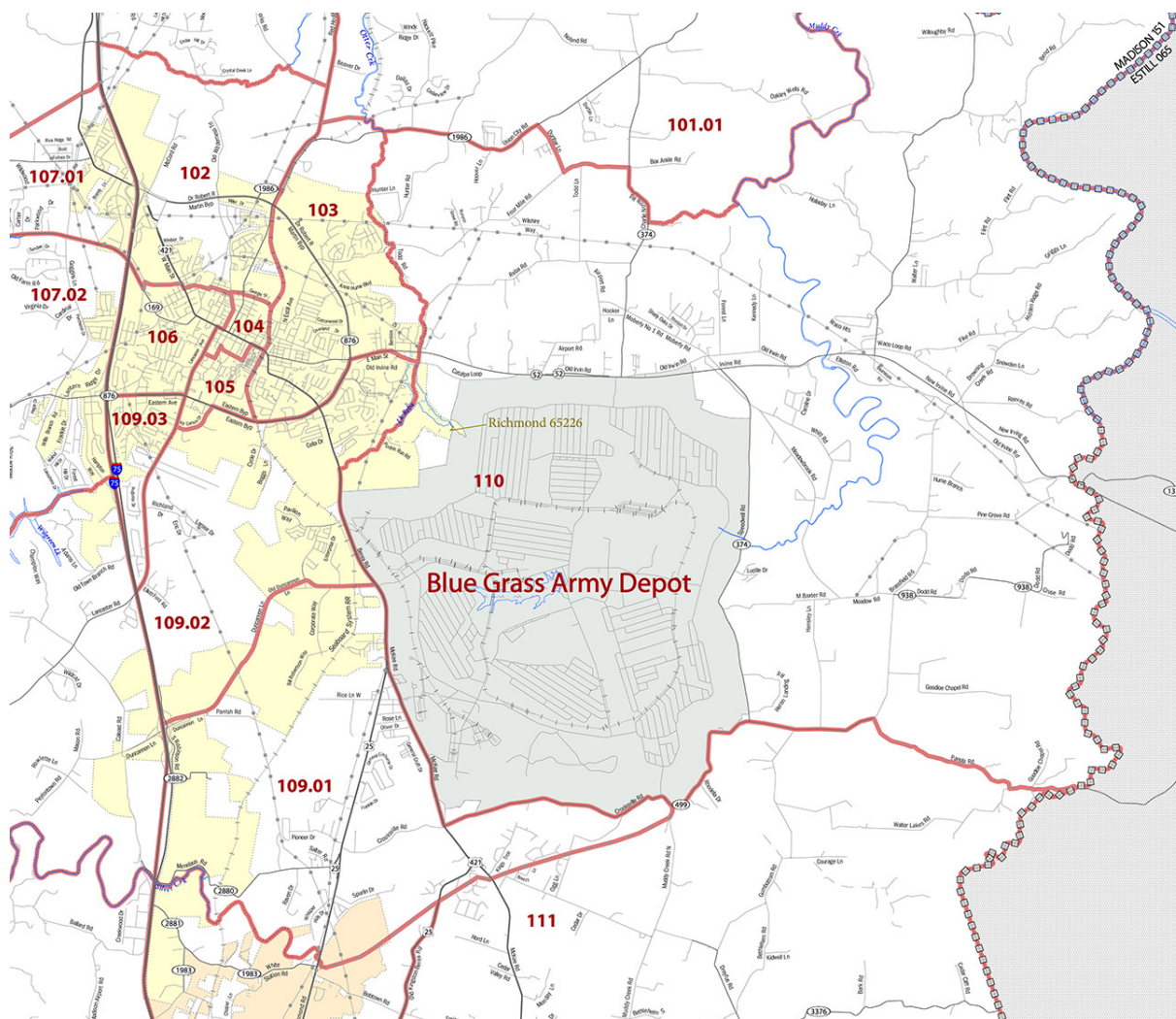


Figure 3-3. Census Tracts Surrounding BGAD.
(Modified from USCB 2010)

¹ The U.S. Census Bureau defines census tracts as small, relatively permanent statistical subdivisions of a county or equivalent entity that are updated by local participants prior to each decennial census. The primary purpose of census tracts is to provide a stable set of geographic units for the presentation of statistical data. Census tracts generally have a population size between 1,200 and 8,000 people, with an optimum size of 4,000 people (USCB 2018).

As indicated by the data in Table 3-13, the percentage of the total population that identifies itself as minority in Madison County (10.2 percent) is lower than that of Kentucky (14.9 percent) and the United States (38.5 percent). Within Madison County, CT 103 (17.9 percent), CT 104 (18.9 percent), and CT 109.03 (18.2 percent), which are in or near the city of Richmond, have minority percentages that are “meaningfully greater” than both Madison County’s and Kentucky’s. Therefore, for this analysis, the populations in CT 103, CT 104, and CT 109.03 are considered minority populations as defined by CEQ guidance (CEQ 1997).

Table 3-13. Minority and Low-Income Data for the United States, Kentucky, Madison County, and Census Tracts Surrounding BGAD.

Location	Percent Minority ^a (2017)	Percent Low-Income ^b (2017)
United States	38.5	14.6
Kentucky	14.9	18.3
Madison County	10.2	19.5
CT 101.01	3.4	12.4
CT 102	10.2	32.4
CT 103	17.9	26.2
CT 104	18.9	44.5
CT 105	15.6	62.9 ^c
CT 106	13.5	31.1
CT 109.01	5.1	6.8
CT 109.02	7.9	15.0
CT 109.03	18.2	30.0
CT 110 (includes BGAD)	4.8	15.9
CT 111	4.0	10.6

Notes:

^a Includes all persons who identified themselves as non-white or as “Hispanic or Latino” regardless of race.

^b Represents individuals below the poverty level as defined by the U.S. Census Bureau.

^c The low-income percentage for CT 105 is abnormally high because almost all of the census tract residents are students at Eastern Kentucky University.

Source: USCB 2017c

The percentage of low-income individuals (i.e., with income below the poverty level) in Madison County (19.5 percent) is slightly higher than that of Kentucky (18.3 percent) and the United States (14.6 percent) (see Table 3-13). Within Madison County, CT 102 (32.4 percent), CT 103 (26.2 percent), CT 104 (44.5 percent), CT 105 (62.9 percent²), CT 106 (31.1 percent), and CT 109.03 (30.0 percent), all of which are at least partially within the city of Richmond, have much higher low-income percentages than those of Madison County, Kentucky, and the

² The low-income percentage for CT 105 is abnormally high because almost all of the census tract residents are students at Eastern Kentucky University.

United States. Therefore, for this analysis, the populations in CT 102, CT 103, CT 104, CT 105, CT 106, and CT 109.03 are considered low-income populations as defined by CEQ guidance (CEQ 1997).

3.1.6.2 Human Health and Environmental Effects

Because this analysis considers CT 102, CT 103, CT 104, CT 105, CT 106, and CT 109.03 minority and/or low-income populations under CEQ guidance (CEQ 1997), the next step is to determine whether those populations would suffer any “disproportionately high and adverse human health or environmental effects” from the proposed action at BGAD.

In terms of human health effects, Section 3.1.3 concluded that emissions from operation of the retrofitted existing SDC, new SDC 1200 or 2000, and EDS P3 for processing M55 rockets and components would have no significant health effects for any population. Further, the health risk assessments reviewed to reach this conclusion used a scenario (namely, subsistence farmer and subsistence fisher) that may be representative of the lifestyles of some minority or low-income populations around BGAD. The subsistence fisher scenario is typically assessed in screening-level HRAs, and it was used in BGCAPP and existing SDC health risk assessments (Franklin 2012, 2013). Those health risk assessments found no health risk concerns for such individuals. Therefore, the minority and low-income populations identified near BGAD would not suffer any disproportionately high and adverse human health effects from the proposed action at BGAD.

Similarly, the analyses in Sections 3.1.1, 3.1.2, 3.1.4, and 3.1.5 conclude that there would be no significant impacts to environmental resources—including air quality, water, ecological resources, and socioeconomic resources—from retrofitting the existing SDC and performing site preparation, installation, and operation of the new SDCs and the EDS P3. In addition, Sections 3.1.7 and 3.1.8 indicate there would be no impacts to local residents due to noise or risk associated with transportation and disposal of wastes. Therefore, the minority and low-income populations identified near BGAD would not suffer any disproportionately high and adverse environmental effects from the proposed action.

3.1.6.3 Cumulative Impacts

The 2002 FEIS (PMCD 2002) assessed the contribution to cumulative impacts of four alternative technologies for destroying the BGAD chemical agent stockpile, including the option of chemical neutralization/SCWO that was selected for pilot testing at the BGCAPP Main Plant. The 2002 FEIS concludes that none of the four alternatives, alone or in combination with other actions, would cause any adverse human health or environmental effects to minority and low-income populations. In addition, the BGAD EDT EA (ACWA 2013) also addressed the cumulative impacts of the existing SDC and concluded that there would be no significant cumulative impacts.

Cumulative impacts would include impacts from the retrofitted existing SDC, new SDC, and EDS P3, in combination with existing BGCAPP Main Plant. Cumulative health impacts, including carcinogenic and non-carcinogenic acute risks, were evaluated and discussed in Section 3.1.3. The conclusion was that there are no significant health risks from operation of the SDCs and EDS P3 in combination with the BGCAPP Main Plant.

Similarly, the analyses in Sections 3.1.1, 3.1.2, 3.1.4, and 3.1.5 conclude that there would be no significant impacts to environmental resources—including air quality, water, ecological

resources, and socioeconomic resources—from operation of the retrofitted existing SDC and site preparation, installation, and operation of the new SDC and the EDS P3 in combination with BGCAPP Main Plant operations. In addition, Sections 3.1.7 and 3.1.8 indicate there would be no cumulative impacts to local residents due to noise or risk associated with transportation and disposal of waste. These results indicate the cumulative impact from the BGCAPP Main Plant and the retrofitted existing SDC, the new SDC, and the EDS P3 would not have any disproportionately high or adverse human health and environmental effects on minority or low-income populations.

3.1.7 Noise

BGAD is located in a rural area primarily occupied by residential, light industrial/commercial, and ranching/farming activities. The major, nearby off-post sources of noise include the vehicle traffic on U.S. Highway 421/25 and the railroad freight line, both of which lie along the western boundary of the depot. Noise-producing activities at BGAD, other than the ongoing activities at the BGCAPP Main Plant, include small arms operations, demolition, and explosive operations. Noise is managed in accordance with the BGAD Installation Operational Noise Management Plan (IONMP) (U.S. Army Public Health Command 2014).

Noise—in the form of sound pressure levels—typically occurs over a wide spectrum of frequencies. For many types of sound measurement, these frequencies are weighted (some contribute more, and some contribute less) to determine the decibel level. The so-called “A weighting” was developed to approximate the way in which the human ear responds to sound, and this decibel weighting—expressed as dB(A)—applies to the values used in the following analysis.

Ambient noise for BGAD and surrounding areas is described in BGAD IONMP (U.S. Army Public Health Command 2014) as being low. Noise sources in rural environments are predominantly natural in origin, including insects, birds, wind, and weather. Background noise levels in such rural areas typically range between 35 and 45 dB(A), with the 45 dB(A) value being representative of agricultural cropland with equipment operating (EPA 1978).

The Noise Control Act of 1972, along with its subsequent amendments (Quiet Communities Act of 1978, *United States Code*, Title 42, Parts 4901–4918), delegates to the states the authority to regulate environmental noise and directs government agencies to comply with local community noise statutes and regulations. Neither the Commonwealth of Kentucky nor Madison County (where BGAD is located) has established any quantitative noise-limit regulations.

Table 3-14 shows the sound levels identified by the EPA as sufficient to protect public health and welfare from the effects of environmental noise. As established by the EPA’s protective noise levels guidance (EPA 1978), “the protective levels contain a margin of safety to insure their protective value, they must not be viewed as standards, criteria, regulations, or goals. Rather, they should be viewed as levels below which there is no reason to suspect that the general population will be at risk from any of the identified effects of noise.”

Noise levels will be calculated in this section for the new SDC and the EDS P3. No noise levels associated with the existing SDC will be calculated since these were found to be within acceptable limits when considered in the BGAD EDT EA (ACWA 2013).

Table 3-14. Summary of Noise Levels that Are Protective of Public Health and Welfare with a Margin of Safety.

Effect	Noise Level	Applicable Area or Zone
Hearing loss or impairment	≤ 70 dB(A) ^a	All
Outdoor activity interference and annoyance	≤ 55 dB(A) ^b	Outdoors in residential areas and farms and other outdoor areas where people spend widely varying amounts of time and other places in which quiet is a basis for use
	≤ 55 dB(A) ^c	Outdoor areas where people spend limited amounts of time, such as school yards, playgrounds, etc.
Indoor activity interference and annoyance	≤ 45 dB(A) ^b	Indoor residential areas
	≤ 45 dB(A) ^c	Other indoor areas with human activities, such as schools, etc.

Notes:

^a To protect against hearing damage, one's 24-hour noise exposure at the ear should not exceed 70 dB(A).

^b The stated decibel (dB) value is the day-night sound level, which includes a 10 dB nighttime weighting.

^c The stated decibel value applies to the sound energy averaged over a 24-hour period.

Source: EPA 1978

The noise levels anticipated from the site preparation, installation, and operation of the proposed action are compared to the EPA protective levels in the following subsections; however, noise measurements are rarely available at the location of concern. Instead, noise measurements are usually obtained in close proximity to the source, and mathematical calculations must be used to estimate the noise level at some more distant location. The following equation was used for the analyses (Ver and Beranek 2006):

$$SPL_2 = SPL_1 + 20 \text{ Log}_{10} (D_1/D_2)$$

where:

SPL₁ is the sound pressure level (i.e., noise level) at the source [in dB(A)],

SPL₂ is the sound pressure level at the distant location of interest [in dB(A)],

D₁ is the distance [in feet] from the source where the sound level was measured, and

D₂ is the distance [in feet] to the location where an estimate of SPL₂ is desired.

3.1.7.1 Impacts of Noise during Site Preparation and Installation Activities

Standard commercial and industrial practices for excavation, moving earth, and erecting concrete and steel structures would be followed during the site preparation and installation activities for the new SDC and the EDS P3. These activities would include noise generated due to the operation of vehicles and heavy equipment. Such equipment typically produces noise levels in the range of 77 to 90 dB(A) at a distance of about 50 feet from the source (EPA 1978). The dominant sources of noise would be generated by the engines of the vehicles and by the alarms that activate when those vehicles are shifted into reverse gear.

The nearest resident is assumed to be at the closest boundary to each unit. Figure 3-4 indicates the distance between the units associated with the worst-case alternatives in relation to BGAD boundary. Noise estimates were calculated using the typical noise levels given above and the equations discussed in Section 3.1.7.

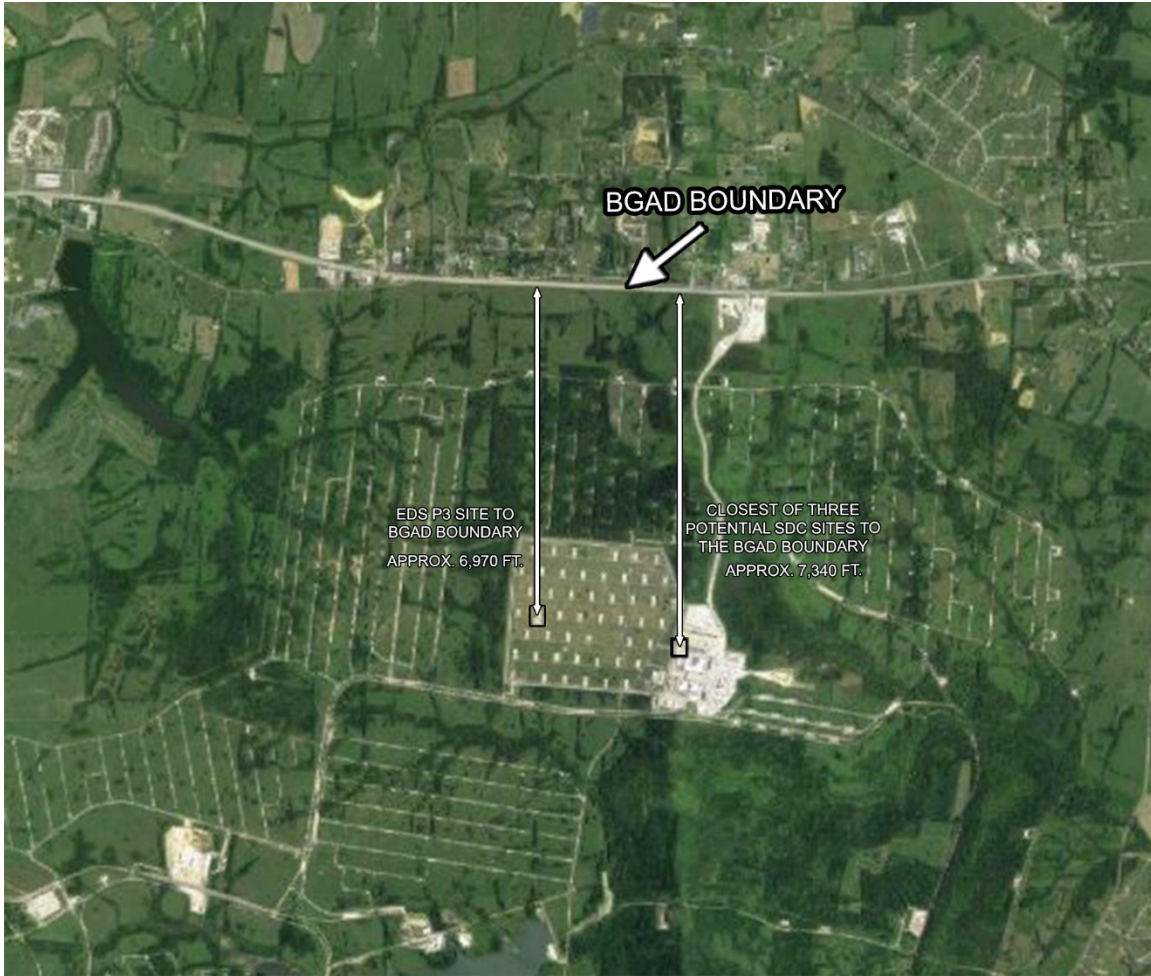


Figure 3-4. Distance between Closest BGAD Boundary and Noise Sources Associated with the Worst-case Alternative Actions.

Table 3-15 indicates that noise levels at the boundary closest to each of the proposed units are estimated to be close to background noise levels associated with rural areas, as described in Section 3.1.7. Because the noise level results are estimated to be less than the 55 dB(A) established as protective for outdoor noise in residential areas (see Table 3-14), it is not anticipated that noise at those locations will cause interference or annoyance (EPA 1978).

Table 3-15. Noise Estimates at BGAD Boundary for Site Preparation and Installation.

Unit	Distance to Nearest Boundary	Estimated Noise Levels
New SDC	7,340 feet	46.7 dB(A)
EDS P3	6,970 feet	47.1 dB(A)

In regard to cumulative impacts of the noise from these activities in combination with other noise sources, such as ongoing activities at the BGCAPP Main Plant, the sound pressure levels from several noise sources are not additive; instead, sound levels increase by 3 dB (regardless of frequency weighting) for each doubling of sound energy (Ver and Beranek 2006). This is consistent with experience in that noises are dominated by the loudest source. Therefore, if other on-post noise-generating activities at BGAD are sufficient to double the sound energy, the corresponding increase of 3 dB(A) in the anticipated noise levels as described in the preceding paragraph would have little effect on the noise perceived at any off-site location. If the nearest off-site residence is assumed to be at the boundary, the maximum noise level for a resident expected during site preparation and installation activities could be audible, but would not be expected to be loud enough to have any impacts in terms of activity interference, annoyance, or hearing impairment.

Noise impacts from site preparation and installation activities for the proposed action are thus expected to be minimal at the nearest BGAD boundary and are not anticipated to cause interference or annoyance to residents at the boundary.

3.1.7.2 Impacts of Noise during Operations

The SDCs and EDS P3 employ some form of detonation. These detonations occur inside thick-walled steel containment vessels; hence, any noise generated by the detonation process would be immediately dampened. In addition, the unit(s) would be installed inside an environmental protection structure that would also provide some slight dampening of the noises generated inside. However, as a conservative measure, the noise analysis conducted for this EA does not take into consideration any dampening due to the environmental enclosure nor does it include any reduction in sound levels that might be associated with intervening vegetation or landforms/terrain.

The primary sources of noise during the operation of the units would be the ventilation fans for the environmental protection structure and/or for the SDC's OTS, as well as the noise generated during the periodic testing of the backup generators.

Noise measurements of 83 dB(A) at 8 feet from the ventilation fans were provided by the SDC vendor for the PCD EDT EA (ACWA 2012) and the BGAD EDT EA (ACWA 2013). Noise estimates for the EDS P3 are reported as 84.5 dB(A) at 7.5 feet (ACWA 2012).

Each unit will include an emergency backup generator. Actual noise measurements for the backup generator at the existing SDC, obtained from a BGCAPP Noise Survey on 14 February 2018, are reported as 103.2 dB(A) at 5 feet (BPBG 2018b).

BGCAPP existing SDC backup generator noise is considered worst-case and is used to estimate the sound levels at the boundary for each unit, even though this noise will only occur approximately 1 hour a week during testing and on the rare occasion that the emergency generators are activated during loss-of-power events. The nearest resident is assumed to be at the closest boundary to each unit. Figure 3-4 indicates the distance between each unit associated with the proposed action in relation to the BGAD boundary. Noise estimates were calculated using the worst-case noise levels given above and the equations discussed in Section 3.1.7.

The results in Table 3-16 indicate that the worst-case noise level at the boundary for each of the sites during operations would be approximately the same as the background noise levels associated with rural areas, as described in Section 3.1.7. Because the anticipated noise levels at the boundary would be less than the 55 dB(A) established as protective for outdoor noise in

residential areas (see Table 3-14), these levels are not be expected to create any activity interference or annoyance (EPA 1978).

Table 3-16. Worst-case Noise Estimates at BGAD Boundary Operations.

Unit	Distance to Nearest Boundary	Estimated Noise Levels
New SDC	7,340 feet	39.9 dB(A)
EDS P3	6,970 feet	40.3 dB(A)

In regard to cumulative impacts of the noise in combination with other noise sources, such as the operation of the BGCAPP Main Plant, the analysis conducted in the 2002 FEIS (PMCD 2002) indicated that anticipated noise at the nearest BGAD boundary due to the operations of the BGCAPP Main Plant would be less than 45 dB(A). Sound pressure levels from several noise sources are not additive; however, logarithmic equations can be used to superimpose one sound level upon another (Ver and Beranek 2006). Using such equations to add the sound level for the noise estimated at the nearest BGAD boundary for the BGCAPP Main Plant operations to the sound level predicted for the operation of the loudest noise source evaluated for this EA, the resulting combined sound level at the nearest boundary would be 43.3(A), which is below the 55 dB(A) level for outdoor areas.

Noise impacts from operations proposed in this EA in conjunction with other nearby noise sources are thus expected to be within acceptable limits at the location of the off-site residence nearest to the proposed facilities.

3.1.7.3 Conclusions on Impacts of Noise

Noise impacts from site preparation, installation, and operation of the new SDC and the EDS P3, even in conjunction with other noise sources, are expected to be within acceptable limits for residents at the nearest BGAD boundary based on results of calculations based on the worst-case noise. Noise levels associated with the existing SDC were found to be within acceptable limits when considered in the BGAD EDT EA (ACWA 2013).

3.1.8 Waste Management

The site preparation, installation, and operation of the proposed action would generate both solid and liquid non-hazardous waste, as well as small amounts of potentially hazardous solid and liquid waste. Section 3.1.8.1 discusses the environmental impacts associated with wastes generated by retrofit, site preparation, and installation activities. Section 3.1.8.2 describes the types and quantities of waste to be generated during operations, and Section 3.1.8.3 discusses the potential impacts of such wastes upon regional waste management capabilities. Section 3.1.8.4 discusses the impacts of transporting these wastes to off-site TSDFs.

3.1.8.1 Waste from Retrofit, Site Preparation, and Installation Activities

The proposed action would involve retrofitting the existing SDC's OTS, installing a new SDC (either a new 1200 model or a 2000 model), and possibly installing an EDS P3 unit. The new equipment will be shipped as modularized components. The pieces will be assembled on

site and connected to utilities. Site preparation and installation will involve minor excavation, as well as installing concrete pads and utility tie-ins.

The non-hazardous solid wastes generated by site preparation and installation activities would primarily be in the form of building-material debris (such as wood, metals, and paper) and excavation soils. Non-hazardous liquid wastes would include wastewater from wash-down of equipment and sanitary waste. All non-hazardous waste would be disposed of in an off-site permitted landfill. Any wastes from portable toilets would be handled through a local vendor and transported to an off-site sewage treatment facility.

Site preparation and installation activities would also generate small quantities of both solid and liquid hazardous waste, such as solvents, cleaning solutions, excess paint, oils, paint thinner, and non-agent-contaminated rags. Wastes would be collected and disposed of in accordance with U.S. Army, state, and federal regulations. Any wastes that are listed or characteristic hazardous wastes in the RCRA regulations would be stored and disposed of as prescribed by the EPA and applicable state and local regulations.

No significant quantities of waste would be generated by the site preparation and installation activities, and no significant impacts from such wastes would be expected to occur.

The OTS of the existing SDC will be retrofitted for nerve-agent processing after the mustard campaign is completed. This will involve anything from removing specific portions of the OTS, such as gaskets, to removing and replacing the entire OTS. If the entire OTS is removed, the equipment will either be clean-closed so it could be reused as a government asset or disposed of as waste. Portions of the OTS after the thermal oxidizer would have never been exposed to agent and would not be considered a hazardous waste for agent. However, as a worst-case scenario, this EA is considering the waste associated with removing the entire existing SDC OTS, including components after the thermal oxidizer, as hazardous waste. The total amount of waste is estimated to be 72 tons.

3.1.8.2 Waste Generated during Operations

All wastes resulting from the processing of nerve agents in the SDCs and EDS P3 would be listed as hazardous (waste codes N001, N002, N901, and/or N902) by the Commonwealth of Kentucky. For the purpose of this EA, this subsection describes the quantities of waste associated with operation of the SDCs and EDS P3, and furthermore assumes a worst-case where all such waste would require management as hazardous waste. That is, the maximum impact of managing the wastes occurs when the waste is hazardous (as opposed to non-hazardous waste). If these wastes were determined to be non-hazardous, then almost any TSDF and/or landfill facility would be able to manage them.

To evaluate whether existing regional TSDF capabilities can manage the anticipated quantities of waste from SDCs and EDS P3 operations, the numerical quantities of such wastes must be estimated. The quantities of waste associated with the SDC 1200, the SDC 2000, and the EDS P3 are shown in Tables 3-17 and 3-18, and these waste quantities are used in the analyses in Section 3.1.8.3. The retrofitted existing SDC 1200 and a new SDC 1200 or SDC 2000 will have almost the same OTS; therefore, waste estimates are anticipated to be the equivalent regardless of the SDC model.

Table 3-17. Hazardous Waste Anticipated to Be Generated during SDC Operations.

Type of Waste	SDC 1200 or 2000 Waste Quantity
Liquid OTS waste ^a	33 tons/yr
Dust collected from the cyclone and dust collection system ^a	6 tons/yr
Solid waste generated from scrubber and electrostatic precipitator ^a	24 tons/yr
Spent filter media from the OTS filtration unit ^a	10.5 tons/yr
Miscellaneous solid wastes (PPE, plastics, maintenance equipment, supplies, etc.) ^a	11.5 tons/yr
Spent decontamination solution (from decontamination activities) ^a	11.5 tons/yr
Wastewater from treatment of byproducts ^b in the OTS	427 tons/yr
Liquid waste (from all sources)	471.5 tons/yr
Solid waste (from all sources)	52 tons/yr

Notes:

^a Data are derived from the PCD SDC EA (ACWA 2018) estimates for waste generation, with a factor of 1.5 added to account for the larger OTS at BGAD.

^b Estimated quantity of the liquid waste generated from treatment of byproducts in the OTS is one 275-gallon tote per day (approximately 8.5 pounds per gallon).

Table 3-18. Hazardous Waste Anticipated to Be Generated during EDS P3 Operations.

Type of Waste	One EDS P3 Waste Quantity
Liquid waste (neutralant plus rinsewater from chamber clean-out activities, and spent decontamination solutions) ^a	518 tons/yr
Solid waste (spent filter media plus PPE and miscellaneous maintenance wastes) ^a	4.8 tons/yr

Note:

^a Data are derived from the BGAD EDT EA (ACWA 2013) with a factor of 2 added for the larger EDS P3.

Tables 3-19 and 3-20 provide a more detailed description and characterization of the types of wastes generated from the SDCs and EDS P3 by identifying the source, applicable waste code, basis for characterization, and disposition method.

Table 3-19. Characterization of Wastes Generated from SDC Units.

Waste Material	Source	Waste Codes ^{a,b}	Basis for Designation	Disposition of Waste Material
Brine from OTS	SDC Treatment Process	D018, D022, N001, and/or N002	Generator analysis; Kentucky listing for GB- and VX-contaminated wastes	Shipped to RCRA-permitted TSDF
Sludge from Scrubber and Sludge from Electrostatic Precipitator	SDC Treatment Process	D007, D011, N001, and/or N002	Generator analysis; Kentucky listing for GB- and VX-contaminated wastes	Shipped to RCRA-permitted TSDF
Salts from Water Recycle System	SDC Treatment Process	N001 and/or N002	Kentucky listing for GB- and VX-contaminated wastes	Shipped to RCRA-permitted TSDF
Scrap Metal Conveyor Dust	SDC Treatment Process	D007, D011, N001, and/or N002	Generator analysis; Kentucky listing for GB- and VX-contaminated wastes	Shipped to RCRA-permitted TSDF
Spent Activated Carbon	SDC Treatment Process	D007, D011, N001, and/or N002	Generator analysis; Kentucky listing for GB- and VX-contaminated wastes	Shipped to RCRA-permitted TSDF
Miscellaneous Solids (PPE, plastics, maintenance equipment, supplies, etc.)	Personnel and maintenance operations	D018, N001, and/or N002	Generator analysis; Kentucky listing for GB- and VX-contaminated wastes	Shipped to RCRA-permitted TSDF
Spent Decontamination Solutions (NaOH, bleach)	Personnel and decontamination activities	D018, D022, N901, and/or N902	Generator analysis; Kentucky listing for GB and VX spent decontamination solutions	Shipped to RCRA-permitted TSDF
OTS Equipment (metals, gaskets, plastics)	Removal of OTS equipment from existing SDC 1200	N003	Kentucky listing for mustard waste ^c	Shipped to RCRA-permitted TSDF

Notes:

^a N001, N002, N003, N901, and N902 are Kentucky waste codes.

^b D codes were provided in CMA 2009.

^c The existing SDC previously processed mustard munitions.

NaOH = sodium hydroxide

Table 3-20. Characterization of Wastes Generated from EDS P3.

Waste Material	Source	Waste Codes^{a,b}	Basis for Designation	Disposition of Waste Material^c
GB Neutralent	Generated from treatment of GB with MEA/water in containment vessel	D018 and/or N001	Generator analysis; Kentucky listing for GB-contaminated wastes	Shipped to TSCA-approved and RCRA-permitted TSDF
VX Neutralent	Generated from treatment of GB with MEA/NaOH in containment vessel	D002, D018, and/or N002	Generator analysis; Kentucky listing for VX-contaminated wastes	Shipped to TSCA-approved and RCRA-permitted TSDF
GB Rinsate	Generated from rinsing EDS P3 containment vessel following treatment	D018 and/or N001	Generator analysis; Kentucky listing for GB-contaminated wastes	Shipped to TSCA-approved and RCRA-permitted TSDF
VX Rinsate	Generated from rinsing EDS P3 containment vessel following treatment	D002, D022, and N002	Generator analysis; Kentucky listing for VX-contaminated wastes	Shipped to TSCA-approved and RCRA-permitted TSDF
Spent Decontamination Solutions (NaOH, bleach)	Personnel and decontamination activities	D018, D022, N901, and N902	Generator analysis; Kentucky listing for GB and VX spent decontamination solutions	Shipped to TSCA-approved and RCRA-permitted TSDF
Spent Filter Media	Generated from changeout activities	D007, D011, N001, and N002	Generator analysis; Kentucky listing for GB- and VX-contaminated wastes	Shipped to TSCA-approved and RCRA-permitted TSDF
Munition and SFT Fragments	Generated from treatment in EDS P3 containment vessel	D007, D011, N001, and N002	Generator analysis; Kentucky listing for GB- and VX-contaminated wastes	Shipped to TSCA-approved and RCRA-permitted TSDF
Miscellaneous Solids (PPE, plastics, maintenance equipment, supplies, etc.)	Personnel and maintenance operations	D018, N001, and/or N002	Generator analysis; Kentucky listing for GB- and VX-contaminated wastes	Shipped to TSCA-approved and RCRA-permitted TSDF

Notes:

^a N001, N002, N901, and N902 are Kentucky waste codes.

^b D codes were provided in CMA 2009.

^c Based on the worst-case assumption that PCBs from the SFTs are not destroyed in the EDS P3 and all waste generated will need to be disposed at a TSCA-approved TSDF

The SDCs and EDS P3 will become operational on a different schedule and will operate for different periods of time. The retrofitted existing SDC will operate for 3 years, the new SDC will operate for 2 years, and the EDS P3 will operate for 1 year (Ware 2019). Table 3-21 provides the determination of the average annual waste-generation rate for the worst-case alternative, which includes the retrofitted existing SDC, a new SDC, and an EDS P3 plus disposal of the existing SDC's OTS over a 4-year period for which the BGCAPP Main Plant will be operational. Therefore, the SDC and EDS P3 waste quantities can be compared with the BGCAPP Main Plant waste quantities.

Table 3-21. Average Annual Waste-Generation Rate for the Worst-case Alternative.

Unit	Operational Duration ^a	Annual Solid Waste Generated ^b	Annual Liquid Waste Generated ^b	Total Solid Waste Generated	Total Liquid Waste Generated
Retrofitted Existing SDC	3 years	52 tons	471.5 tons	228 tons ^c	1,414.5 tons
New SDC	2 years	52 tons	471.5 tons	104 tons	943 tons
EDS P3	1 year	4.8 tons	518 tons	4.8 tons	518 tons
Total				336.8 tons	2,875.5 tons
Avg. Annual over 4 Years		84.2 tons ^d	719 tons ^d		

Notes:

^a Source: Ware 2019

^b From Tables 3-17 and 3-18

^c Includes 72 tons of solid waste from OTS retrofit (Arensmeyer 2019)

^d To enable comparison with BGCAPP Main Plant waste quantities, the average annual waste generated was calculated by dividing the total waste generated by the 4-year BGCAPP Main Plant operational duration.

Wastes from the SDC Units. As shown in Table 3-17, the quantity of liquid waste would be 471.5 tons/yr per SDC during the operation of the SDCs. All of this waste was assumed to be hazardous for the purpose of this EA. Waste quantity estimates for liquid wastes generated from the OTS were based on the PCD SDC EA (ACWA 2018), extrapolated by a factor of 1.5 to account for larger OTSs for the BGCAPP SDCs. Other liquid wastes would include spent decontamination solutions generated during decontamination activities, assumed to be 1.5 times the estimate from the BGAD EDT EA (ACWA 2013). In addition, wastewater from treatment of OTS byproducts will be generated, and is estimated to be one 275-gallon tote (weighing approximately 8.5 pounds per gallon) per day per SDC.

Table 3-16 also shows the quantity of solid waste associated with the operation of the SDCs to be 52 tons/yr for each SDC. All of this waste was assumed to be hazardous for the purpose of this EA. Waste quantity estimates for solid waste generated from operation of the OTS and dust collection system were obtained from the BGAD EDT EA (ACWA 2013), extrapolated to account for the larger OTSs. Other solid wastes would include wastes associated with maintenance activities and agent cleanup in the unlikely event of a spill or leak. These wastes include PPE, plastics (such as hoses), and maintenance supplies. The estimated quantity of the solid waste is based on PCD SDC EA (ACWA 2018), extrapolated by a factor of 1.5 to account for the larger OTSs.

Each SDC would be operated within an environmental enclosure that incorporates engineering controls. The enclosure will be designed to provide negative pressure ventilation to prevent air leakage into the environment. The enclosure for each SDC unit includes a carbon filtration system with approximately 5,712 pounds (Ware 2018) of carbon filter media designed to remove any hazardous vapors inside the enclosure and to ensure that emissions to the atmosphere are safe. The carbon filter media is not expected to be replaced during the operational lifetime of the proposed SDCs; however, it would require disposition after the processing has been completed.

Wastes from the EDS P3. For the purpose of this analysis, all of the water used by the EDS P3 is assumed to become hazardous liquid waste. In addition, liquid waste would be generated by the reagent chemicals used for each detonation in the EDS P3. As shown in Table 3-18, the quantity of liquid waste generated by the EDS P3 would be 518 tons/yr (adapted from the BGAD EDT EA [ACWA 2013] with a factor of 2 applied for the larger EDS P3), assuming that a detonation inside the EDS P3 occurs once every day for 6 days per week. The quantity of solid waste associated with the operation of the EDS units is estimated to be 4.8 tons/yr (adapted from the BGAD EDT EA [ACWA 2013] with a factor of 2 applied for the larger EDS P3), and all of this waste is assumed to be hazardous.

Wastes from the BGCAPP Main Plant. The anticipated quantities of solid waste from the operation of the BGCAPP Main Plant are 1,715 tons/yr (Williams 2019). This quantity is composed of process wastes such as filter media, munitions ash, filter cake, plastics, and PPE. Therefore, the total quantity of solid waste generated by the BGCAPP Main Plant over its assumed 4-year operational lifetime (November 2019 to December 2023) would be approximately 6,860 tons.

The anticipated quantities of liquid waste from the operation of the BGCAPP Main Plant are 21,244 tons/yr (Williams 2019). This quantity is composed of process wastes such as hydrolysates, reverse osmosis reject, spent decontamination solutions, and condensates. The total quantity of liquid waste generated by the BGCAPP Main Plant over its assumed 4-year operational lifetime would therefore be 84,976 tons.

Fixed Common Wastes. Processing munitions would generate recyclable scrap metal from the projectile munition bodies. The total quantity of such scrap metal is fixed by the inventory of projectile munitions currently stored at BGAD, which is estimated to be 1,548 tons (Williams 2019). In addition, metal from the processing of rockets is also fixed by the total number of M55 rockets and is estimated to be 639 tons (Ware 2019), which may not be recyclable because it may be mixed with the SFTs (see Table 3-20). For purposes of this analysis, the metal waste from the rockets is treated as hazardous waste. Regardless of how the munitions are destroyed, the recyclable scrap metal would be shipped off-site to a metals recycling facility for smelting and would be considered a solid waste (not hazardous waste). Under RCRA, there are special provisions for recyclable materials. Per 40 CFR 261.6(a)(3)(ii), scrap metal designated for recycling is not subject to hazardous waste regulation, but remains a solid waste. The non-recyclable metal waste from the rockets would be shipped off-site to a hazardous waste TSDF. The munition packing material (dunnage) is likewise fixed and is estimated to be 273 tons (Williams 2019). The above quantities of metal waste and the dunnage analyzed in this EA are included in Section 3.1.8.4 for the purpose of investigating the potential impacts of shipping and managing such wastes.

Comparison of SDC and EDS Waste Quantities to Those from the BGCAPP Main Plant. It should be noted that for every use of the SDC and EDS units, there may be a reduction of waste generated from the BGCAPP Main Plant. However, in an effort to be conservative, it is assumed that the BGCAPP Main Plant waste does not reduce. The average quantity of solid waste to be generated by the worst-case alternative would be 84.2 tons/yr, from Table 3-21. This quantity would represent about a 4.9 percent increase from the 1,715 tons/yr already anticipated from the operation of the BGCAPP Main Plant, as shown in Table 3-22. The significance of this quantity of solid waste is addressed in Section 3.1.8.3.

Table 3-22. Comparison of EDT Waste Quantities to BGCAPP Main Plant Wastes.

Waste Type	Average Annual Worst-case Alternative Quantity ^a	Waste Quantity (BGCAPP Main Plant) ^b	Increase Due to Proposed Action
Solid Waste	84.2 tons	1,715 tons/yr	4.9%
Liquid Waste	719 tons	21,244 tons/yr	3.4%

Notes:

^a From Table 3-21

^b Source: Williams 2019

The liquid wastes to be generated at the BGCAPP Main Plant are anticipated to be 21,244 tons/yr. The average annual quantity of liquid wastes from the SDCs and the EDS P3 would be 719 tons, from Table 3-21. This represents an increase of 3.4 percent from the BGCAPP Main Plant liquid wastes, as shown in Table 3-22. The significance of this quantity of liquid waste is addressed in Section 3.1.8.3.

3.1.8.3 Management and Disposition of Waste

The hazardous-waste management capacity in the United States is limited. For the purpose of analysis in this EA, the waste management data for Kentucky and its surrounding seven states (i.e., Illinois, Indiana, Missouri, Ohio, Tennessee, Virginia, and West Virginia) were examined to determine the waste-management capability that might be available for use in managing the waste anticipated from the SDCs and EDS P3 (EPA 2017). In addition, Texas was also considered since BGAD's wastes have previously been shipped to TSDFs in Texas (see Section 3.1.8.4).

Table 3-23 shows the best available EPA data (EPA 2017) for the types of hazardous waste management facilities in Kentucky and the surrounding states. The following analysis compares the anticipated annual waste quantities from the SDCs and the EDS P3—in combination with anticipated wastes from the BGCAPP Main Plant and from other activities at BGAD—with the quantities of similar wastes managed within this region. The analysis in this subsection is built around the estimates of annual waste quantities as presented in Section 3.1.8.2. The analysis assumes that all such waste would be classified as hazardous waste. If these wastes were found not to be hazardous, the analysis presented below would nevertheless bound the quantities of waste.

Table 3-23. RCRA Hazardous Waste Managed in Kentucky and Surrounding States plus Texas during 2017.

Management Method	Illinois	Indiana	Kentucky	Missouri	Ohio	Tennessee	Virginia	West Virginia	Texas	Total
Deepwell/ Underground Injection	435,717	452,590	N/A	N/A	1,086,032	N/A	N/A	N/A	14,243,130	16,217,469
Energy Recovery	4,791	262,127	18,263	176,722	92,215	499	N/A	10,259	331,792	896,668
Fuel Blending	19,764	26,627	24,105	3,639	110,002	11,503	81	6,256	21,862	223,839
Incineration	N/A	29,633	2,803	208,005	155,203	21,410	405	5,640	286,487	709,586
Landfill	N/A	124,305	N/A	9,058	39,052	1,002	6	2,267	81,684	257,374
Metals Recovery	104,163	17,902	N/A	7,441	7,560	69,951	8	N/A	2,787	209,812
Other Recovery	N/A	N/A	8,484	5,105	N/A	3	N/A	N/A	105,115	118,707
Other Treatment	N/A	5,504	6,216	N/A	47	21,264	231	78	2,582	35,922
Sludge Treatment/ Stabilization/ Encapsulation	63,376	157,352	8,111	N/A	49,539	6,398	134	N/A	2,017	286,927
Solvents Recovery	31,023	40,534	1,414	6,543	18,231	451	193	22	3,257	101,668
Wastewater Treatment	55,773	125,926	20,217	1,779	54,573	18,664	28	515	1,817,023	2,094,498
Total	714,608	1,242,501	89,612	418,294	1,612,453	151,144	1,086	25,039	16,897,736	21,152,473

Notes:

Numerical units are in tons.

N/A means that no data are available.

Totals may not sum due to rounding.

Source: EPA 2017

Management of Solid Waste. As shown in Table 3-21, the use of the SDCs and the EDS P3 would result in 84.2 tons/yr of solid waste. An additional 1,715 tons/yr of solid hazardous waste from the BGCAPP Main Plant (Williams 2019) and 360 tons/yr of solid hazardous waste from other activities at BGAD (BGAD 2018b) would bring the upper-bound grand total of solid hazardous waste to 2,159 tons/yr.

If all the solid waste generated from the SDCs, EDS P3, BGCAPP Main Plant, and other BGAD activities (2,159 tons/yr) were to be disposed of as hazardous waste in landfills, it would greatly exceed the quantity of hazardous waste disposed of annually in Kentucky by landfill. However, the 2,159 tons/yr of solid waste would represent an increase of only about 1.0 percent in the total quantity of solid waste already being managed by such methods within Kentucky and the surrounding seven states plus Texas (i.e., 2,159 tons/yr compared to 257,374 tons/yr). This small increase would not create a significant impact to regional hazardous waste capabilities for the management of solid waste from the SDCs and the EDS P3 in conjunction with similar wastes from the BGCAPP Main Plant and BGAD waste streams. If the solid waste were to be incinerated, the total quantity of 2,159 tons/yr of solid waste would represent an increase of about 0.3 percent in the existing quantity of hazardous waste disposed of annually by incineration in the nine-state region (i.e., 2,159 tons/yr compared to 709,586 tons/yr). This small increase would not be expected to create any significant impacts to regional management capabilities for solid hazardous waste.

Management of Liquid Waste. As shown in Table 3-21, the use of the SDCs and the EDS P3 would result in 719 tons/yr of liquid waste. An additional 21,244 tons/yr of liquid hazardous waste from the BGCAPP Main Plant (Williams 2019) and 15 tons/yr of liquid hazardous waste from other activities at BGAD (BGAD 2018b) would bring the grand total of liquid hazardous waste to 21,978 tons/yr. The following analysis examines several methods of managing and disposing of this quantity of liquid waste.

The cumulative 21,978 tons/yr of liquid waste would represent an increase of about 0.14 percent in the existing quantity of hazardous waste disposed of annually by deep well injection in the nine-state region (i.e., 21,978 tons/yr compared to 16,217,469 tons/yr). This small increase would not be expected to create any significant impacts to regional hazardous waste management capabilities for liquid hazardous waste.

If the liquid waste were to be incinerated, the cumulative 21,978 tons/yr would represent an increase of about 3.0 percent in the existing quantity of hazardous waste disposed of annually by incineration in the nine-state region (i.e. 21,978 tons/yr compared to 709,586 tons/yr). This small increase would not be expected to create any significant impacts to regional management capabilities for liquid hazardous waste.

If the liquid waste were to require stabilization as part of its management strategy, the data in Table 3-23 show that the cumulative quantities of such liquid waste (i.e., 21,978 tons/yr) would represent about 7.7 percent of the existing quantity of hazardous waste disposed of annually by stabilization in the region (i.e., 21,978 tons/yr compared to 286,927 tons/yr). While existing commercial hazardous waste management facilities in the region might be able to expand their operations to accommodate this large quantity of such liquid waste, it is uncertain as to whether the additional waste that would result from the stabilization process would have significant effects on regional waste management capabilities. However, it should be noted that the stabilization process involves combining the waste with water and a binder such as Portland cement. If the liquid waste were to be used in the process to stabilize other wastes, then the need for fresh water for the stabilization process might be greatly diminished or eliminated entirely.

Thus, the use of liquid waste from the SDCs and the EDS P3 in the waste stabilization process might be viewed by some TSDFs as advantageous and/or desirable.

Conclusions Regarding the Management and Disposition of Waste. Based on the above analyses, adequate waste management capacity appears to exist at TSDFs within Kentucky and the surrounding seven states plus Texas to accommodate the quantities of hazardous wastes anticipated from operation of the SDCs and the EDS P3, as well as the cumulative wastes from the operation of the BGCAPP Main Plant and wastes generated elsewhere at BGAD. No adverse impacts from the off-site management of such solid or liquid wastes would be expected.

3.1.8.4 Off-Site Shipment of Wastes

Two other issues, in addition to the waste management issues discussed in Section 3.1.8.3, are relevant to the potential environmental impacts of off-site shipment of wastes from BGAD: the risk of an accident during transportation and the potential human health and environmental impacts in the event of a spill or release during a transportation accident. These issues are discussed in this subsection.

As discussed in Section 3.1.8.2, recyclable scrap metal would be generated in association with the destruction of the projectile chemical munitions stored at BGAD. The total quantity of recyclable scrap metal associated with the entire BGAD inventory of projectile chemical munitions is about 1,548 tons. This scrap metal would be recycled or smelted for reuse; hence, it is not considered waste. Nevertheless, this scrap metal would presumably be shipped off-site to an appropriate recycling or smelting facility. In addition, non-recyclable metal waste would be generated from the processing of M55 rockets. Off-site shipments of scrap metal are included in the analysis in this subsection.

Table 3-24 summarizes the number of waste shipments that would be associated with the wastes (whether hazardous or non-hazardous) to be generated by the SDCs, EDS P3, BGCAPP Main Plant, and other activities at BGAD. It is estimated that 5,249 waste shipments would be required over the operational lifetimes of the SDC and EDS units and the BGCAPP Main Plant. If these shipments were to occur uniformly over the assumed 4-year operational lifetime of the BGCAPP Main Plant, waste shipments would average between three and four shipments per day. As discussed in Section 3.1.5.4, this level of additional traffic on the roads near BGAD would not create any significant impacts to local traffic.

Wastes from BGAD have previously been shipped to various off-site locations for management and/or disposal. Historically, such shipments have been sent to TSDFs located as close as 25 miles to BGAD; however, one waste shipment went to a TSDF 1,800 miles away. The majority of these shipments were sent to TSDFs between 160 miles and 1,000 miles from BGAD. For the purpose of analysis in this EA, it is assumed that each of the 5,249 waste shipments shown in Table 3-24 would travel a one-way distance of 1,000 miles. This analysis thus provides an upper bound on the total number of vehicle miles that might be traveled by the cumulative off-site waste shipments from BGAD, the BGCAPP Main Plant, and the SDCs and EDS P3.

Table 3-24. Cumulative Waste Shipments from BGAD during the BGCAPP Main Plant 4-year Operational Lifetime.

Waste Source and Type	Waste Quantity (tons)	Total Number of Waste Shipments ^a
<i>SDCs^b</i>		
Solid waste	332	33
Liquid waste	2,358	111
<i>EDS P3^b</i>		
Solid waste	4.8	1
Liquid waste	518	25
<i>BGCAPP Main Plant^c</i>		
Solid waste	6,860	686
Liquid waste	84,976	3,999
<i>Other BGAD Activities^d</i>		
Solid hazardous waste	1,440	144
Liquid hazardous waste	60	3
<i>Fixed Common Wastes^c</i>		
Scrap metal from projectile processing	1,548	155
Metal waste from rockets	639	64
Dunnage	273	28
	Grand Total	5,249

Notes:

- ^a Solid wastes are assumed to be shipped in 10-ton loads. Liquid wastes are assumed to be shipped in 5,000-gal tanker trucks, assuming the liquid waste weighs 8.5 pounds per gallon.
- ^b Data from Section 3.1.8.2 and Table 3-21.
- ^c Source: Williams 2019
- ^d Source: BGAD 2018b

Risk of a Transportation Accident. The DOT has established regulations at 49 CFR Part 177 regarding the transportation of hazardous materials on public highways. These regulations include provisions that provide an appropriate level of safety and that protect the public during such transportation activities.

While not required by the DOT regulations, transportation risk assessments are sometimes prepared to identify and assess the potential risks to members of the public due to accidents during the shipment of hazardous materials.

The Army has conducted several transportation risk assessments for the off-site shipment of hazardous materials from its chemical agent and munitions destruction facilities. This subsection summarizes these previous studies and provides a numerical calculation of risk based on the most recent information available about off-site shipments from BGAD and about national accident statistics for the types of large trucks that would be used for such shipments.

The Army has conducted five prior transportation risk assessments involving materials from its chemical agent and munitions destruction facilities:

- An analysis of the transportation of liquid effluent (also called hydrolysate) from Newport Chemical Depot in Indiana to support NEPA requirements (Zimmerman et al. 2003)
- An analysis of the transportation of hydrolysate from Newport Chemical Depot to support a transportation safety plan (DuPont 2004)
- An analysis of the transportation of 1X wastes from Aberdeen Chemical Agent Disposal Facility (Shaw Environmental 2005)
- An analysis of the transportation of explosives from Pueblo Chemical Agent-Destruction Pilot Plant (CMA 2016)
- An analysis of the transportation of hydrolysate from Pueblo Chemical Agent-Destruction Pilot Plant (CMA 2017).

The National Research Council (NRC) has completed a review of the disposal of the Army's chemical agent secondary wastes (NRC 2007), and that review included a critique of the Newport Chemical Depot transportation risk assessments (Zimmerman et al 2003; DuPont 2004). The NRC concluded that the reports' use of truck crash rates per mile traveled was an appropriate and acceptable approach. A similar approach was taken in the Aberdeen Chemical Agent Disposal Facility transportation risk assessment (Shaw Environmental 2005). Thus, this subsection focuses on an analysis of transportation risk using truck crash statistics based upon the number of miles traveled. The number of potential accidents during off-site waste shipments from BGAD was evaluated against hazardous material transportation statistics available from the DOT. As described below, hazardous materials transporters have a better-than-average safety record.

Crash statistics for large trucks are maintained in the DOT's Fatality Analysis and Reporting System (FARS). This system compiles all types of data from accidents as collected from police reports. The latest version of the FARS report for large trucks (FMCSA 2016) was used as the basis for the accident analysis presented in this subsection. Large trucks are defined as trucks with a gross vehicle weight exceeding 10,000 pounds. The types of vehicles to be used in the transportation of BGAD wastes fall into this category.

The following data are given in the FARS trends report for large-truck crashes that occurred in 2016, the latest year for which such data are available (FMCSA 2016):

- Of the approximately 475,000 police-reported crashes involving large trucks in 2016, there were 3,864 (0.8 percent) fatal crashes and 104,000 (22 percent) injury crashes.
- Single-vehicle crashes (including crashes that involved a bicyclist, pedestrian, non-motorized vehicle, etc.) made up 22 percent of all fatal crashes, 14 percent of all injury crashes, and 24 percent of all property-damage-only crashes involving large trucks in 2016. The majority (62 percent) of fatal large truck crashes involved two vehicles.
- Approximately 61 percent of all fatal crashes involving large trucks occurred in rural areas, 27 percent occurred on Interstate highways, and 15 percent fell into both categories by occurring on rural Interstate highways.
- Thirty-seven percent of all fatal crashes, 23 percent of all injury crashes, and 20 percent of all property-damage-only crashes involving large trucks occurred at night (6:00 pm to 6:00 am).
- The vast majority of fatal crashes (84 percent) and nonfatal crashes (88 percent) involving large trucks occurred on weekdays (Monday through Friday).

- Collision with a vehicle in transport was the first harmful event (the first event during a crash that resulted in injury or property damage) in 73 percent of fatal crashes involving large trucks, 83 percent of injury crashes involving large trucks, and 75 percent of property-damage-only crashes involving large trucks.
- Overturn (rollover) was the first harmful event in 5 percent of all fatal crashes involving large trucks and 2 percent of all nonfatal crashes involving large trucks.
- In 2016, 27 percent of work-zone fatal crashes and 8 percent of work-zone injury crashes involved at least one large truck.
- There were 12.0 fatal large truck crashes per million people in the United States in 2016, a 13 percent increase from 10.6 crashes in 2010.
- In 2016, on average, there were 1.12 fatalities in fatal crashes involving large trucks. In 91 percent of those crashes, there was only one fatality. The majority of fatalities (83 percent) were not occupants of the large truck.

The sets of FARS data from the 10-year period 2007 to 2016 are summarized in Table 3-25. These data show the number of accidents involving large trucks, as well as the consequences of those accidents (as measured by the categories of fatalities, injuries, and property damage only). The data on the numbers of accidents in Table 3-25 have been expressed on a “per vehicle mile traveled (VMT)” basis so that the resulting rates can be applied to the potential routes to be traveled by the BGAD waste shipments.

Table 3-26 shows the results of the statistical accident calculations based upon the accident rates for year 2016 as shown in Table 3-25. For the assumed one-way transportation distance (i.e., 1,000 miles), Table 3-26 shows that the number of anticipated accidents of all types would be small (i.e., 8.9) during the shipment of the cumulative quantity of waste from BGAD for the SDC and EDS units in conjunction with the BGCAPP Main Plant and the other hazardous wastes generated at BGAD. Statistically, far less than one of these accidents (i.e., 0.07) would be expected to result in fatalities, and less than two of these accidents (i.e., 1.9) would be expected to result in injuries. In contrast, the corresponding number of injury accidents (0.06) and fatal accidents (0.0022) for shipment of wastes from the SDCs and EDS P3 are extremely small.

The FARS statistics, as used in this analysis, indicate that no significant number of crashes would be expected to occur during the off-site shipments from BGAD during the lifetimes of the SDCs, EDS P3, and the BGCAPP Main Plant.

Table 3-25. Accident Statistics for Crashes over the Past 10 Years that Have Involved Large Trucks.

Part A. Large truck crashes of all types and crashes with only property damage

Year	Vehicle miles traveled (VMT), in millions	All types of accidents		Number of accidents with property damage only	
		Number of crashes	Accident rate (crashes/VMT)	Number of crashes	Accident rate (crashes/VMT)
2007	304,178	393,000	1.3×10^{-6}	317,000	1.0×10^{-6}
2008	310,680	365,000	1.2×10^{-6}	297,000	9.9×10^{-7}
2009	288,005	286,000	9.9×10^{-7}	232,000	8.1×10^{-7}
2010	286,527	266,000	9.3×10^{-7}	207,000	7.2×10^{-7}
2011	267,594	273,000	1.0×10^{-6}	210,000	7.9×10^{-7}
2012	269,207	317,000	1.2×10^{-6}	241,000	9.0×10^{-7}
2013	275,017	327,000	1.2×10^{-6}	254,000	9.2×10^{-7}
2014	279,132	411,000	1.5×10^{-6}	326,000	1.2×10^{-6}
2015	279,844	415,000	1.5×10^{-6}	328,000	1.2×10^{-6}
2016	287,895	474,864	1.7×10^{-6}	367,000	1.3×10^{-6}

Note: A large truck is one with a gross vehicle weight over 10,000 pounds.

Source: Tables 4, 7, and 10 in FMCSA 2016.

Table 3-25. Accident Statistics for Crashes over the Past 10 Years that Have Involved Large Trucks. (Continued)

Part B. Large truck crashes with fatalities or injuries

Year	Vehicle miles traveled (VMT), in millions	Fatal Crashes				Crashes with Injuries			
		Number of fatal crashes	Accident rate (fatal crashes/VMT)	Number of fatalities	Fatality rate (fatalities/VMT)	Number of crashes with injuries	Accident rate (injurious crashes/VMT)	Number of injuries	Injury rate (injuries/VMT)
2007	304,178	4,204	1.4×10^{-8}	4,822	1.6×10^{-8}	72,000	2.4×10^{-7}	101,000	3.3×10^{-7}
2008	310,680	3,754	1.2×10^{-8}	4,245	1.4×10^{-8}	64,000	2.1×10^{-7}	90,000	2.9×10^{-7}
2009	288,005	2,983	1.0×10^{-8}	3,380	1.2×10^{-8}	51,000	1.8×10^{-7}	74,000	2.6×10^{-7}
2010	286,527	3,271	1.1×10^{-8}	3,686	1.3×10^{-8}	56,000	2.0×10^{-7}	80,000	2.8×10^{-7}
2011	267,594	3,365	1.3×10^{-8}	3,781	1.4×10^{-8}	60,000	2.2×10^{-7}	88,000	3.3×10^{-7}
2012	269,207	3,486	1.3×10^{-8}	3,944	1.5×10^{-8}	73,000	2.7×10^{-7}	104,000	3.9×10^{-7}
2013	275,017	3,554	1.3×10^{-8}	3,981	1.5×10^{-8}	69,000	2.5×10^{-7}	95,000	3.5×10^{-7}
2014	279,132	3,429	1.2×10^{-8}	3,908	1.4×10^{-8}	82,000	2.9×10^{-7}	111,000	4.0×10^{-7}
2015	279,844	3,622	1.3×10^{-8}	4,094	1.5×10^{-8}	83,000	3.0×10^{-7}	116,000	4.2×10^{-7}
2016	287,895	3,864	1.3×10^{-8}	4,317	1.5×10^{-8}	104,000	3.6×10^{-7}	145,000	5.0×10^{-7}

Note: A large truck is one with a gross vehicle weight over 10,000 pounds.

Source: Tables 4, 7, and 10 in FMCSA 2016.

Table 3-26. Statistically Anticipated Accidents and Their Consequences Due to Off-Site Waste Shipments during the Operational Lifetimes of the SDC and EDS Units, BGAD, and the BGCAPP Main Plant.

Source	Number of one-way trips ^a	Predicted Number of Accidents ^b					Accident Consequences	
		Assumed one-way distance (miles) ^a	Total accidents of all types	Accidents with property damage only	Accidents with injuries	Accidents with fatalities	Expected number of injuries	Expected number of fatalities
SDCs and EDS P3	170	1,000	0.29	0.22	0.06	0.0022	0.085	0.0026
BGAD	147	1,000	0.25	0.19	0.053	0.0019	0.074	0.0022
BGCAPP	4,685	1,000	7.96	6.09	1.69	0.06	2.34	0.07
Fixed Common Wastes	247	1,000	0.42	0.32	0.09	0.0032	0.12	0.0038
Total	5,249	1,000	8.9	6.8	1.9	0.07	2.6	0.08

Notes:

^a The number of shipments includes the cumulative number of waste shipments from the sources in Table 3-24. Both the number of one-way trips and the assumed one-way distance in this table represent a reasonable upper bound on the number of anticipated waste shipments and their transportation distances. The actual numbers are expected to be less than the numbers shown.

^b The accident rates used for the calculations were taken from the data for 2016 as shown in Table 3-25.

Consequences of a Transportation Accident; Injuries and Fatalities. In addition to data on the frequency of crashes involving large trucks, Table 3-25 also presents the data for the consequences of those accidents (as measured by the categories of injuries, fatalities, and property damage only). The data on the theoretical numbers of injuries and fatalities in Table 3-26 have been expressed on a “per VMT” basis so that the resulting rates can be applied to the transportation distances to be traveled by BGAD waste shipments. Table 3-26 shows the results of the accident consequence calculations based upon the injury and fatality rates for the year 2016 (as shown in Table 3-25). For the assumed one-way transportation distances to be traveled by the BGAD wastes from all sources, Table 3-26 shows that the number of statistically anticipated injuries would be less than three (2.6) during the lifetimes of the SDCs, EDS P3, and the BGCAPP Main Plant. The total number of fatalities expected from accidents involving off-site waste shipments during this period would statistically be much less than 1 (0.08). In contrast, the number of statistically anticipated injuries for shipment of wastes from the SDCs and EDS P3 would be almost negligible (0.085) and the number of fatalities expected would also be negligible (0.0026).

The FARS statistics, as used in this analysis, indicate that no significant number of injuries or fatalities would be expected to occur during the off-site shipment of wastes from BGAD over the lifetime of the SDCs and EDS P3, even when the shipment of wastes from the BGCAPP Main Plant and wastes from other activities at BGAD are included. In comparison, based on the 2016 data from Table 3-25, there would be 580,000 injuries over the 4-year operational lifetime (145,000 injuries × 4 years) and 17,268 fatalities (4,317 fatalities × 4 years) nationally. The cumulative BGAD shipments represent an increase in injury risk of about 0.0004 percent ($2.6 \div 580,000 \times 100$ [to convert to percentage]) and fatality risk of about 0.0005 percent ($0.08 \div 17,268 \times 100$).

Consequences of a Transportation Accident; Impacts from Spills. In the unlikely event of an accident involving the shipments of waste, the waste could be released from its container and escape into the environment. Any solid waste releases would be expected to be contained within a highly localized area in the immediate vicinity of the accident. While some of the anticipated liquid wastes may exhibit toxicity (under RCRA) due to their heavy metal content, spilled brines would not become the source of any significant airborne toxic hazard. Hence, the potential for environmental impacts from spills would be limited to localized contamination of surface soils and/or to liquid run-off that might reach surface waters or groundwater. Appropriate emergency response actions, as described in the following paragraphs, would be expected to eliminate or reduce the impacts of accidental spills of any liquid or solid waste.

The containers and vehicles used for hazardous waste transport from BGAD would be appropriately placarded and labeled prior to leaving the depot. Furthermore, wastes shipped off-site would be accompanied by either a hazardous waste manifest or bill of lading. All shipping papers would conform to applicable federal, state, and local regulations to provide first responders with the necessary information in the event of an accidental spill or release. In such instances, emergency responders are trained to establish isolation and protective action distances for accidents involving hazardous material and to take appropriate actions to limit the impact of such accidents.

Under the provisions of DOT regulations at 49 CFR Part 172, licensed carriers and shippers are required to provide information to emergency responders about the hazardous nature of their shipments. Specifically, Subpart G of these regulations relates to “Emergency Response

Information” to be carried by each transporter, and Subpart H relates to “Training” for hazardous materials transport personnel.

Conclusions Regarding the Off-Site Shipment of Waste. The risk of transportation accidents during the off-site shipment of waste from the SDCs and EDS P3 has been evaluated and has been found not to be significant. Furthermore, the consequences of any such accidents have also been statistically evaluated and found not to be significant. It was concluded that the Army’s intent to ship wastes from BGAD to permitted TSDFs does not pose any unique safety concerns or unacceptable environmental impacts relative to those associated with routine commercial and trade industry hazardous waste shipments because (1) nationwide, there are millions of highway shipments of hazardous materials each year, for which the states already provide capable emergency response, and (2) some of these shipments involve chemicals (such as sulfuric acid) that present far more toxic hazards than the wastes to be shipped from BGAD.

Based on the transportation analyses conducted in this EA, no significant number of accidents would be expected to occur during the off-site shipment of waste from the SDCs and EDS P3, nor would there be any significant consequences if such accidents were to actually occur.

3.1.9 Resource Requirements

The proposed action would require the consumption of electricity, natural gas, diesel fuel and/or fuel oil, water, and reagent chemicals for the SDCs, EDS P3, and/or their off-gas treatment systems. Table 3-27 shows the numerical quantities that would be required for each of these resources. Table 3-27 also shows the resource requirements for the BGCAPP Main Plant. The 2002 FEIS (PMCD 2002) found no significant impacts associated with the projected resource consumption requirements of the BGCAPP Main Plant.

The quantities of electricity, natural gas, diesel fuel and/or fuel oil, and reagent chemicals required for the operation of the proposed alternatives are comparable or less than the quantities of the resources to be used during BGCAPP Main Plant operations, and none of these commodities are in short supply. For these reasons, the potential impacts to the resources required to operate the proposed alternatives would not be expected to be significant.

Table 3-27. Comparison of Alternative and BGCAPP Main Plant Requirements.

Resource Required	Alternative 1 (Existing SDC 1200 with retrofitted OTS and new SDC 2000)	Alternative 2 (Existing SDC 1200 with retrofitted OTS, new SDC 1200, and EDS P3)	Alternative 3 (Existing SDC 1200 with retrofitted OTS, new SDC 2000, and EDS P3)	BGCAPP Main Plant
Electricity	2380 kW ^a	2980 kW ^b	2980 kW ^b	60,000 kWh
Propane/natural gas	6,120 ft ³ /hr ^a	6,120 ft ³ /hr ^a	6,120 ft ³ /hr ^a	7,850 ft ³ /hr
Water	7.5 million gal/yr ^c	7.83 million gal/yr ^d	7.83 million gal/yr ^d	12.7 million gal/yr ^e
Diesel fuel and fuel oil	17.8 gal/hr per SDC ^f	17.8 gal/hr per SDC ^f 20 gal/hr (EDS P3)	17.8 gal/hr per SDC ^f 20 gal/hr (EDS P3)	7.2 gal/hr
Reagent chemicals and other substances	166.26 tons/yr (KOH) ^g	166.26 tons/yr (KOH) ^g 13.7 tons/yr (MEA) ^c	166.26 tons/yr (KOH) ^h 13.7 tons/yr (MEA) ^h	190 tons/yr (NaOH) ⁱ

Notes:

- ^a The new thermal oxidizer in the retrofitted and/or new OTS will have 1.7 times the existing SDC 1200 requirements for electrical resources (Diggs 2019).
- ^b Based on estimates (see note a) plus EDS P3 resource estimates provided by RCMD (Bird 2019).
- ^c Based on estimate for the PCD SDC EA (ACWA 2018), multiplied by 2 to account for the larger OTSs on the SDC 1200 and 2000 (Diggs 2019), plus personnel water usage
- ^d Based on modified PCD SDC EA (ACWA 2018) estimates (see note g), plus estimate provided by RCMD (Bird 2019), plus personnel water usage at EDS P3.
- ^e Based on 2002 FEIS (PMCD 2002) predicted numbers
- ^f Diesel fuel and fuel oil requirements are based on usage of the emergency generators. Each SDC would have a dedicated generator that would be tested monthly and would only be in use during an emergency loss of power.
- ^g SDC chemical estimates based on conversations with Dynasafe (Diggs 2019)
- ^h Based on EDS P3 estimate provided by RCMD (Bird 2019)
- ⁱ Derived from the average quantity of nerve agent to be processed annually by the BGCAPP Main Plant and the assumed quantity of NaOH required to react with these nerve agents in the chemical neutralization process

ft³/hr cubic feet per hour
gal/hr gallons per hour
KOH potassium hydroxide
kW kilowatt
kWh kilowatt-hours

3.1.10 Decommissioning and Closure

The activities to be undertaken for decommissioning and closure of the proposed action are described in Section 2.1.6. At the conclusion of M55 rocket disposal operations, and upon the decommissioning and closure of the facilities, the sites would become available for other uses. Closure activities would encompass decontamination and/or removal of all equipment, process systems, structures, or other materials containing or contaminated with chemical agents or other hazardous constituents associated with the operation of the proposed facilities. The plans are to clean-close (i.e., remove or decontaminate all hazardous wastes and residues to levels below applicable standards and limits) the facilities and associated supporting equipment.

It is anticipated that the decommissioning and closure requirements of the new SDC and the EDS P3 would be similar to those for the existing SDC as specified in the Hazardous Waste Facility Permit, Explosive Destruction Technology Section (EDT) (Kentucky Division of Waste Management 2019). The existing SDC's RCRA permit specifies the objective of closure is to render the facility "clean" in accordance with KDEP and RCRA criteria and to close the facility with no requirement for post-closure care. All closure activities would be performed in accordance with the requirements of the Closure Plan as specified in Appendix I to the RCRA permit. Possible reuse of the facility is under consideration by BGAD. Final closure plans cannot be determined until after the Army and the Commonwealth of Kentucky agree on the final end state for the existing SDC. The federal and Kentucky Statutes are expected to require the Kentucky Governor's approval for reuse of any RCRA facilities. A RCRA Closure Plan will be submitted pending a final decision on demolition, layup, or reuse of the SDC by BGAD.

The Closure Plan describes the closure strategy and performance standards, defines the closure activities, describes the general decontamination procedures and techniques, discusses the management of wastes generated by the closure activities, and describes the sequence/schedule for the final closure of the existing SDC. The overarching objective of the Closure Plan is to assure the closure will be protective of human health and the environment.

The potential environmental impacts of implementing the Closure Plan for either the retrofitted existing SDC, the new SDC, or the EDS P3 would be expected to be similar to those of constructing those respective facilities, with the additional consideration of the management and disposition of the hazardous wastes generated by decommissioning and closure activities. These wastes may require interim storage, further on-site treatment, and/or shipment to an approved off-site hazardous waste TSDF for further management. Certain hazardous waste management units, equipment, systems, and areas that perform functions essential to protecting human health and the environment will remain operational at BGAD during the closure activities.

Section 4.25 of the 2002 FEIS (PMCD 2002) described the closure of the BGCAPP Main Plant upon the completion of its mission to destroy the BGAD inventory of chemical munitions. The 2002 FEIS did not identify any significant adverse impacts that would accompany the decommissioning and closure of the plant. The RCRA permit for the existing SDC requires the development of a Closure Plan for that facility (Kentucky Division of Waste Management 2019), and the closure requirements for the new SDC and the EDS P3 are expected to be similar. Thus, it can be similarly concluded that the decommissioning and closure of the proposed facilities would create no significant adverse environmental impacts.

3.2 THE IMPACTS OF THE NO-ACTION ALTERNATIVE

Under the no-action alternative, no augmentation to the chemical weapons destruction process proposed would be implemented, and BGAD M55 rockets and components would be destroyed exclusively in the BGCAPP Main Plant instead of in SDCs and the EDS P3.

Under the no-action alternative, the site modifications required to support the additional facility would not be performed, and no additional facilities would be constructed or operated at BGAD. Therefore, none of the impacts associated with the proposed action as described in Section 3.1 would occur.

The potential environmental impacts associated with the destruction of the entire BGAD inventory of chemical weapons have been previously assessed in the 2002 FEIS (PMCD 2002). The FEIS concluded that the operation of a chemical weapons destruction facility (such as what is now called the BGCAPP Main Plant) would not result in any significant adverse environmental impacts.

Under the no-action alternative, there would be no changes in land use and no potential for disturbance of cultural (i.e., historic and archaeological) resources. Nor would there be any adverse effects from modifications to or disturbances of existing terrestrial and/or aquatic communities, wetlands, or threatened and endangered species habit areas. Impacts to such resources would therefore not be significant.

No significant number of additional workers would be required under the no-action alternative, and no adverse socioeconomic impacts (such as to public services and traffic) would be anticipated; conversely, there would be no beneficial effects derived from any increases in public employment, direct incomes, or tax revenues. No disproportionate impacts to minority or low-income populations would be expected.

No significant quantities of additional solid or liquid wastes—beyond those currently anticipated during the operation of the BGCAPP Main Plant—would be generated under the no-action alternative. However, some unknown quantities of spent decontamination solutions and expended PPE would be associated with the additional manual processing operations. The manual operations also would increase the overall processing time and would adversely affect the efficiency of BGCAPP Main Plant operations as measured by throughput rate. The costs and schedule implications of any modifications to the BGCAPP Main Plant are outside the scope of this EA; nevertheless, such impacts could be significant.

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4. CONCLUSIONS

The information and analyses presented in this EA indicate that the proposed action—augmentation of the chemical weapons destruction capability of the BGCAPP Main Plant to process M55 rockets and/or components with the existing retrofitted SDC 1200, a new SDC 1200 or SDC 2000, and potentially an EDS P3—would produce no significant environmental impacts. Additional details on these findings are presented in Section 4.1. Section 4.2 describes the findings for the no-action alternative, and Section 4.3 presents an overall statement of findings for this EA.

4.1 SUMMARY OF IMPACTS FOR THE PROPOSED ACTION

4.1.1 Land Use

The land use for installing the proposed new SDC unit would occur within the vicinity of the existing BGCAPP Main Plant site. The land use for installing the proposed EDS P3 unit would occur with the fence line of the existing CLA. These areas has been previously disturbed. Therefore, installation of SDCs and/or EDS P3 would have no significant impacts to land use.

4.1.2 Aesthetics

The physical layout of the proposed units would resemble that of any small-scale industrial facility. The structures would blend in with the other structures at the BGCAPP Main Plant and BGCA igloo storage areas. The proposed locations are not visible from the installation boundary. Hence, the presence of the units would not be expected to adversely affect viewsheds or the aesthetic characteristics of the area. Therefore, no significant impacts to aesthetic resources would occur as a result of the proposed action.

4.1.3 Air Quality

The air quality analysis conducted for this EA shows that retrofitting the existing SDC, adding another SDC (either SDC 1200 or SDC 2000), and adding an EDS P3 would produce negligible impacts on the ambient air quality. Therefore, no significant impacts to air quality would be expected from implementation of the proposed action.

4.1.4 Surface Water Resources

No surface-water bodies would be diverted or affected by installation or operation of the units for the proposed action. All water resource requirements would be provided by BGAD. Water usage from operation of the worst-case alternative is estimated to be less than the predicted water usage of the BGCAPP Main Plant. On an annual basis, the combined quantity of BGAD's current water usage, the predicted BGCAPP Main Plant water usage, and the worst-case alternative water usage is estimated to be 41 percent of the existing capacity of BGAD's on-post treated water and 21 percent of the BGAD surface water source. Therefore, no significant impacts to surface water resources would occur as a result of the proposed action.

4.1.5 Groundwater Resources

None of the water used at BGAD originates from groundwater sources. No groundwater would be consumed, diverted, or affected by the proposed action. Therefore, no significant impacts to groundwater resources would occur as a result of the proposed action.

4.1.6 Human Health and Safety

Previous risk reports from operation of SDCs and EDSs were evaluated. Information from these reports was used to predict risk and hazard from emissions generated by the worst-case alternative to the proposed action; the emissions predictions were well below limits considered protective of human health. In addition, the predicted total emissions from the BGCAPP Main Plant while processing the M55 rockets were compared to the predicted total emissions for the worst-case alternative while processing M55 rockets. This comparison indicates that emissions from the worst-case alternative of the proposed action are significantly less than predicted from the BGCAPP Main Plant for processing the same total mass of agent and energetics. This information is sufficient to conclude that operation of the existing SDC, a new SDC, and the EDS P3 to augment the BGCAPP Main Plant to process M55 rockets and/or components is not likely to impact the health of workers or local residents.

In addition, no significant human health impacts would be expected to occur to workers during the site preparation and installation of the new units, or from operation of the retrofitted existing SDC, the new SDC, and the EDS P3.

4.1.7 Aquatic Resources and Wetlands

There are no aquatic resources or wetlands on or near the proposed locations of the new SDC and the EDS P3. Furthermore, implementation of best management practices for erosion and siltation control during site preparation would prevent any significant impacts to aquatic resources and wetlands as a result of the proposed action.

4.1.8 Terrestrial Ecological Resources

The sites for the proposed new facilities are either near the BGCAPP Main Plant footprint or in the existing CLA and have been previously disturbed. The sites have very little natural terrestrial habitat. Therefore, impacts to terrestrial resources resulting from site preparation and installation of the new units would be minimal.

The potential for impacts to federally and state-listed threatened, endangered, and special concern species during the site preparation, installation, and operation of the units is also considered to be negligible, primarily due to the absence of such species or viable habitat at the proposed sites.

A comparison of emissions from the BGCAPP Main Plant with predicted emissions from the SDCs and EDS P3, coupled with the information from the previous SLERA, conclude there would be negligible affects to ecological receptors from the proposed action.

4.1.9 Socioeconomic Resources

It is estimated that 80 workers would be required to retrofit the existing SDC and install the new SDC and EDS P3 during a period of about 1 year. In addition, it is estimated that 275 employees would be required to operate the SDCs and the EDS P3 for approximately 3 years. Analysis indicates that if this small number of workers and their families moved to the Madison County area, there would be no adverse impact on housing and public services such as schools, waste disposal, wastewater treatment, transportation, and water supply. Analysis also indicates that there would be no negative impact on agriculture, including public and market perception from the proposed action.

4.1.10 Cultural Resources

Cultural resources on and within BGAD are managed under BGAD's existing Integrated Cultural Resources Management Plan (DA 2016). Because the proposed action would occur within and/or adjacent to the previously disturbed vicinity of the BGCAPP Main Plant and inside the previously disturbed CLA, the potential to disturb or affect cultural resources is low. Therefore, no significant impacts to cultural resources are expected to occur as a result of the proposed action. If items are found during site preparation that indicate historical human activity, operations will stop and the items will be evaluated in accordance with the Integrated Cultural Resources Management Plan before proceeding.

4.1.11 Environmental Justice

The most recent data from the U.S. Census Bureau indicate that parts of Madison County near BGAD contain residents that represent minority and/or low-income populations; hence, an analysis was conducted to determine whether those populations would suffer any "disproportionately high and adverse human health or environmental effects" from the proposed action.

Analysis concludes that there would be no significant impacts to air quality, water, human health, ecological resources, and socioeconomic resources from site preparation, installation, or operation of the proposed action in combination with the BGCAPP Main Plant. Therefore, the minority and low-income populations identified near BGAD would not suffer any disproportionately high and adverse environmental effects from the proposed action.

4.1.12 Noise

Noise levels associated with the existing SDC were previously found to be within acceptable limits. Noise impacts from site preparation, installation, and operation of the new SDC and the EDS P3, even in conjunction with other noise sources at BGAD, were calculated to be within acceptable limits for residents at the nearest BGAD boundary.

4.1.13 Waste Management

Operation of the worst-case alternative to the proposed action generates less regulated waste than estimated for the BGCAPP Main Plant without the proposed action, as shown in Table 4-1.

Table 4-1. Comparison of Worst-case Alternative Waste Quantities to BGCAPP Main Plant.

Waste Type	Waste Quantity (Worst-case Alternative)	Waste Quantity (BGCAPP Main Plant)	Waste Quantity (Worst-case Alternative + BGCAPP Main Plant)
Solid Waste	84.2 tons/yr	1,715 tons/yr	1,799.2 tons/yr
Liquid Waste	719 tons/yr	21,244 tons/yr	21,963 tons/yr

Adequate waste management capacity exists at TSDFs within Kentucky and the surrounding seven states plus Texas to accommodate the quantities of hazardous wastes anticipated from operation of the SDCs and the EDS P3, as well as wastes from the BGCAPP Main Plant operations and wastes generated elsewhere at BGAD. No adverse impacts from the off-site management of such solid or liquid wastes would be expected. Transportation analyses indicate no significant number of accidents would be expected to occur during the off-site shipment of waste from the proposed action, nor would there be any significant consequences if such accidents were to actually occur.

4.1.14 Resource Requirements

The proposed action would require the consumption of electricity, natural gas, diesel fuel and/or fuel oil, water, and chemicals. The quantities of resources required would be comparable or less than the quantities to be used during BGCAPP Main Plant operations, and none of these commodities are in short supply. For these reasons, the potential impacts to the resources required to operate the proposed action would not be expected to be significant.

4.1.15 Decommissioning and Closure

At the conclusion of operations, RCRA clean-closure would be performed. Identification and removal of any contamination would be conducted prior to removal of the SDCs and the EDS and all associated equipment. Once cleaned, the site would become available for other uses. Closure of the proposed facilities would create no significant adverse environmental impacts.

4.2 IMPACTS OF THE NO-ACTION ALTERNATIVE

Under the no-action alternative, no augmentation to chemical weapons destruction process proposed would be implemented, and the BGAD M55 rockets and components would be destroyed exclusively in the BGCAPP Main Plant instead of in the SDCs and the EDS P3.

Under the no-action alternative, the site modifications required to support the additional facility would not be performed, and no additional facilities would be constructed or operated at BGAD. Therefore, none of the impacts associated with the proposed action as described in Section 3.1 would occur.

The potential environmental impacts associated with the destruction of the entire BGAD inventory of chemical weapons were previously assessed in the 2002 FEIS (PMCD 2002). The FEIS concluded that the operation of a chemical weapons destruction facility (such as what is

now called the BGCAPP Main Plant) would not result in any significant adverse environmental impacts.

Under the no-action alternative, there would be no changes in land use and no potential for disturbance of cultural (i.e., historic and archaeological) resources, nor would there be any adverse effects from modifications to or disturbances of existing terrestrial and/or aquatic communities, wetlands, or threatened and endangered species habit areas. Impacts to such resources would therefore not be significant.

No significant number of additional workers would be required under the no-action alternative, and no adverse socioeconomic impacts (such as to public services and traffic) would be anticipated; conversely, there would be no beneficial effects derived from any increases in public employment, direct incomes, or tax revenues. No disproportionate impacts to minority or low-income populations would be expected.

No significant quantities of additional solid or liquid wastes—beyond those currently anticipated to be generated during BGCAPP Main Plant operations—would be generated under the no-action alternative. However, some unknown quantities of spent decontamination solutions and expended PPE would be associated with the additional manual processing operations. The manual operations also would increase the overall processing time and would adversely affect the efficiency of BGCAPP Main Plant operations as measured by throughput rate.

4.3 OVERALL FINDING AND CONCLUSION

Based on the considerations outlined in Sections 4.1 and 4.2, it is concluded that the proposed action to augment the BGCAPP Main Plant capabilities for processing M55 rockets and/or components in the retrofitted existing SDC, a new SDC (either 1200 or 2000), and possibly an EDS P3 will have no significant adverse environmental effects. A draft FONSI documenting these conclusions has been prepared, which will be published for public comment along with this EA.

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5. PERSONS CONTACTED AND CONSULTED

This EA could not have been prepared and completed without the assistance and contributions of many individuals who provided data, information and/or text that has been incorporated into the analyses during the development of this document, as well as those who provided review comments on the early versions of this EA and made constructive suggestions for improvements. It would have been impossible to prepare this EA without their aid. The preparers, contributors, and reviewers are listed below.

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