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May 31, 2018

Ms. Michelle Walker Owenby, Director
Tennessee Department of Environment and Conservation
Division of Air Pollution Control
William R. Snodgrass Tennessee Tower
312 Rosa L. Parks Avenue, 15th Floor
Nashville, TN 37243

Reference: BAE Systems Ordnance Systems Inc., Holston Army Ammunition Plant, source 37-0028 New Source Review Application submittal for new construction of sources supporting the HSAAP Expansion Project. This application includes three separate processes supporting the first of three phases of construction and results in emissions above the significance thresholds for volatile organic compounds, greenhouse gases, and provisionally for carbon monoxide.

Dear Ms. Owenby:

BAE Systems Ordnance Systems Inc. (OSI), operating contractor for Holston Army Ammunition Plant (HSAAP) in Kingsport (Emission Source Reference Number 37-0028), respectfully submits the enclosed Prevention of Significant Deterioration (PSD) construction permit application for sources to be located at the Area B facility in Hawkins County, Tennessee. A request was flowed down by the Office of Secretary of Defense (OSD) and other Department of Defense (DoD) Services with high visibility and support due to an urgent DoD need to increase the amount of explosives produced at HSAAP. The Army and OSI have developed an Expansion Project, which involves the addition of [redacted] new process buildings as well as the retirement of the existing coal-fired boilers. This project has an aggressive schedule and execution plan to assure the needs of DoD are met as quickly as possible. The following process sources are included in this PSD construction permit application submittal to meet an incremental need in support of the overall expansion project:

- New Natural Gas-fired Steam Generating Boilers with fuel oil backup
- New [redacted] at [redacted]
- [redacted] Milling at [redacted]
- Diesel-fired emergency generators
- Fuel oil storage tanks

These sources are the first of the [redacted] sources to be permitted and are considered new facilities subject to evaluation under the New Source Review (NSR) regulations. This application submittal is the first of three applications for an aggregation of projects designed to support an overall expansion of the HSAAP facility. Emission increases from the new processes, increases in emissions from increased utilization of existing processes, increases associated with insignificant emissions units, and related decreases from existing sources have been evaluated for comparison to the PSD significance thresholds under the NSR regulations. A detailed description of these sources, including a summary of the emissions accounting, is included in the Process Description and Regulatory Analysis sections of the enclosed PSD Application document. In accordance with the Pruitt Memo dated March 13, 2018, the accounting in the first step of the PSD process includes the reduction in emissions directly related to this project. As stated above, the existing coal-fired steam facility will be retired as part of this project and these emissions are accounted appropriately. Support facilities and other existing operations were also evaluated for reductions and are included in the emissions summary. The operation of these sources will require additional steam to be generated but the new natural gas-fired steam generating boilers are lower emitting sources and will meet all applicable air regulations for new sources.

Of the PSD applicable pollutants, emissions of volatile organic compounds (VOCs), greenhouse gases (GHGs), and provisionally carbon monoxide (CO) were determined to be above the PSD significance thresholds. All other pollutants, including particulate matter (PM) at the PSD relevant particle sizes, nitrogen oxides (NO_X), and Sulfur Dioxide (SO_2) are below these PSD significance thresholds. The PSD construction permit application consists of Section 1 through 6 with Appendices A through E. These documents provide information consistent with the requirements of Rules 1200-03-09-.01(4) of the Tennessee Department of Environment and Conservation, Division of Air Pollution Control Regulations.

Benefits of these projects beyond meeting the urgent DoD need include improving the efficiency of the processes through current technology, reducing energy needs of the new processes, providing safe facilities for operations personnel, and reducing overall emissions, with SO_2 emissions being reduced by 1,719 tons per year, all while providing economic development, jobs, and a renewed commitment to the local area and Tennessee by the DoD for years to come. The Army has committed to a significant investment in this facility through these projects, which will ensure that HSAAP continues to have the capabilities necessary to provide safe and versatile products needed to support our United States Armed Forces. OSI looks forward to working closely with TDEC and is available to provide any information necessary to ensure issuance of this PSD construction permit. An application for a significant modification to the Title V operating permit will be submitted separately along with proposed permit language.

A portion of the information provided in this application is considered confidential business information (CBI). A hard copy of this document will be hand delivered to the division on 31 MAY 2018 marked as CBI. OSI requests that this entire document be considered confidential and not for public distribution in accordance with TDEC-DAPC rule 1200-03-09-.02(11)(d)(iii). A separate follow-on redacted version suitable for public viewing will be submitted electronically by 1 JUNE 2018.

All known regulatory requirements for this project are included with this application. Therefore, a request is being made in accordance with TDEC-DAPC rule 1200-03-09-.02(11)(e)6 rule to expressly include in the permit a provision stating that compliance with the conditions of the permit shall be deemed compliance with any applicable requirements as of the date of the permit.

6233RO

BAE SYSTEMS

Pursuant to Tennessee Air Pollution Control regulation 1200-03-09 and 40 CFR 52.21, I have reviewed the information contained in this PSD Construction Permit Application dated May 31, 2018, in its entirety. To the best of my knowledge, and based on information and belief formed after reasonable inquiry, the statements and information contained in this application are true, accurate, and complete.

Mr. James Ogle serves as OSI's primary contact for air program issues and may be reached at (423) 578-6231 or by email at james.ogle@baesystems.com. Please do not hesitate to contact Mr. Ogle should questions arise or additional information be needed.

Sincerely,

BAE SYSTEMS Ordnance Systems Inc.

Robert E. Winstead
Director EHSS

cc Environmental Affairs/Ogle
HSAAP/Vestal
Environmental Affairs Files 1305/2018

Enclosure: OSI HSAAP Expansion Project 31 MAY 2018 – PSD Application CONFIDENTIAL
OSI HSAAP Expansion Project 31 MAY 2018 – PSD Application REDACTED

Prevention of Significant Deterioration (PSD) Construction Permit Application

Expansion Project

Holston Army Ammunition Plant (HSAAP)
Kingsport, Tennessee

Prepared by:

BAE SYSTEMS

BAE Systems Ordnance Systems Inc.
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And

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May 2018

TABLE OF CONTENTS

TABLES

APPENDICES

1.0 INTRODUCTION

The Holston Army Ammunition Plant (HSAAP) located in Kingsport, Tennessee is an important part of the U.S. Army industrial base and produces many products which support the military. Spanning more than 6,000 acres, the HSAAP is the major supplier of explosive materials primarily Research Department eXplosive (RDX) and High Melting eXplosive (HMX)-based products, as well as Insensitive Munitions eXplosive (IMX), to the U.S. Department of Defense. The facility has equipment and capabilities for nitration chemistry, acid handling and recovery, and other chemical-processing operations. The plant is a government-owned and contractor-operated (GOCO) facility. BAE Systems Ordnance Systems Inc. (OSI) has been the operating contractor of the plant since 1999. The Department of Defense has determined there is an urgent need to increase the amount of explosives produced at HSAAP. The need exceeds the current capacity of the facility.

The HSAAP installation is currently divided into two facilities, connected by pipeline and rail, identified as Area A in Sullivan County and Area B in Hawkins County. Area A of HSAAP (Title V permit number 558407 and emission source reference number 82-0018) is located approximately 4 miles from the main production facility at Area B (Title V permit number 558406 and emission source reference numbers 37-0028, 37-1028, and 37-1029).

The main process for manufacturing the core nitramine-based explosives products uses nitric acid, acetic acid, and acetic anhydride in conjunction with select organic materials to manufacture the crude RDX and HMX explosives. From here, the crude explosives are then washed, recrystallized, coated, conditioned, and integrated into the various formulations used in multiple military applications. The acids from the crude explosive process are recycled and re-concentrated as part of an internal loop for re-use in crude explosives manufacturing. These combined processes are currently at capacity to meet the product demand for the U.S. Military.

2.0 EXPANSION PROJECT DESCRIPTION

An approximate [redacted] minimum increase in capacity is needed to meet the projected orders for the currently forecasted years. This equates to approximately [redacted] new process buildings. Two other process buildings are also scheduled to be added during the same construction period. Emissions from all new process buildings and support equipment include nitrogen oxides (NO_X), carbon monoxide (CO), particulate matter (PM), volatile organic compounds (VOC), hazardous air pollutants (HAP), and greenhouse gases (GHG). Process types include combustion for steam, chemical manufacturing, milling, distillation, coating operations, chemical storage, etc. This increase in capacity is hereinafter referred to as the Expansion Project.

The proposed permitting process for the Expansion Project includes the following:

- Expansion Project processes will be aggregated for PSD permitting purposes.
- The Expansion Project will include the retirement of the existing coal-fired boilers.
- Permitting of the Expansion Project will occur in three phases.
- Three separate PSD construction permit applications will be submitted over the next two years.
- Expansion Project is PSD Significant for VOC, GHG, and provisionally CO.

2.1 Proposed Operations

2.1.1 Phased Permitting Approach and Summary of Phase I Emissions

Construction of the Expansion Project emission units is expected to take place over several years. As a result, design of several of the emission units has not begun or is in the very early stages, therefore emission rates, locations, and stack parameters are not known with certainty. Consequently, OSI proposes to permit the Expansion Project in three phases. This permit application is for Phase I, which includes four new steam generating boilers, a new [redacted] process at existing building [redacted], a new [redacted] operation at existing building [redacted], three new diesel-fired emergency generators, and two new fuel oil storage tanks. In addition, Phase I will include the retirement of the existing coal-fired steam generating boilers when the new natural gas-fired steam generating boilers are operational. The design of the Phase I emission units is either complete, or nearing completion, and emission rates have been determined either as the result of the control technology review (Best Available Control Technology (BACT) analysis) described in Section 4.0 or by detailed design.

Because uncontrolled emission rates for the emission units in Phases II and III have not been determined by the project design teams, it is not possible to perform the control technology review for the emission units included on those phases. As the application for each subsequent phase of the Expansion Project is developed, a control technology review will be performed for the emission units included in that phase.

In addition, future phases may include emission units that are subject to additional regulatory requirements. Each subsequent application will include a complete regulatory review for not only the emission units involved in that phase, but also the emission units included in previous phases. The regulatory review presented in Section 3.0 is a complete review of the regulatory requirements of the emission units included in Phase I.

The source impact analysis described in Section 5.0, and the results of which are provided in Appendix C, includes emissions from all emission units that are a part of the Expansion Project. The emission rates, locations, and stack parameters for the emission units in Phase I are well known. The emission rates, locations, and stack parameters of the emission units in Phases II and III are uncertain but have been estimated based on the best current information and have been included in the source impact analysis. As the applications for subsequent phases are developed, more up-to-date rates, locations, and parameters will be used to update the source impact analysis.

In like manner, emissions from all the emission units included in the Expansion Project have been included in the PSD analysis presented in this application.

Table 2-1 summarizes the emissions from the new Phase I emission units as well as the emissions due to increased utilization of existing sources, and the retirement of the coal-fired boilers and support sources.

Table 2-1
Summary of Phase I Emissions

Phase	Process	PM_{10} (tpy)	$PM_{2.5}$ (tpy)	SO_2 (tpy)	NOx (tpy)	CO (tpy)	VOC (tpy)	GHGs as CO_2e (tpy)
Existing	Existing Sources Increased Utilization (Open Burning)	9.4	9.4	0.4	5.1	38.2	10.2	1,283.8
	Existing Sources Increased Utilization (various)	6.4	6.4	0	0	0	3.2	0
	Retirement of Existing Coal Fired Boilers	-57.9	-57.9	-1,733.1	-334.5	-152.0	-6.7	-171,446.4
	Coal Fired Support Sources	-1.5	0	0	0	0	0	0
I	Natural Gas Boilers	15.9	15.9	6.4	226.4	100.6	22.9	678,139
	Diesel-Fired Internal Combustion Engines	0.3	0.3	0.02	10.6	5.8	0.7	1,931.9
	[redacted]	0.01	0.01	0	0.6	0	6.2	0
	[redacted] ([redacted] Milling)	6.0	6.0	0	0	0	0	0
	Back-up Fuel Oil Storage	0	0	0	0	0	0.2	0
	Phase I Total:	-21.4	-19.7	-1,726.3	-91.8	-7.4	36.7	509,908.3

2.1.2 New Natural Gas with Fuel Oil Backup Steam Generating Boilers

The HSAAP Area B facility is installing four (4) new boilers that will be dual fuel-fired. In the event natural gas is unavailable, HSAAP will maintain a back-up supply of fuel oil onsite. Each new boiler is rated at 250,000 pounds per hour (PPH) of steam and has a total heat input capacity of 327 million British thermal units per hour (MMBtu/hr.) when firing natural gas and 310 MMBtu/hr. when firing fuel oil. The boilers will be used to provide steam to the new processes as well as to existing processes. Installation of the new boilers will take place in Phase I and will be installed in a way that allows for the concurrent decommissioning of the existing coal-fired boilers.

Emissions from the boilers will consist of the products of combustion. HSAAP proposes to install catalytic oxidation, selective catalytic reduction in addition to low NOx burners, and an electrostatic precipitator to control emissions from the boilers. See the Control Technology Review portion of the application (Section 4.0) for further information regarding emission controls.

2.1.3 New [redacted] at [redacted]

Building [redacted] will house [redacted] trains, designed to operate in parallel, and [redacted] vessel. The processes will be similar to existing processes located in Buildings [redacted] (37-0028-83 and 37-0028-84) and [redacted] (37-0028-23). This new process will be designed to [redacted] of crude explosives in campaigns requiring a shutdown to switch between products. This is a batch process design. All process functions will be automated using a PLC-based control system located in a central control room to minimize manual tasks and allow interlocks and permissives to be established.

[redacted] of one of the explosive types will result in emissions of volatile organic compounds (VOC) while the other emits an insignificant amount of nitrogen oxides (NO_X). Each individual process train will consist of a dissolver and a [redacted] still. All [redacted] trains will share a common slurry tank and multiple dewatering stations. Bag filters with steam-jacketed housings will be used for filtering hot product liquor. One vent condenser will serve as emission control and product capture for all [redacted] process trains. The coating operation emissions are VOC with a small potential for insignificant quantities of particulate matter (PM) emissions. In addition to the process equipment, there will be four tanks associated with the process. Each tank will have potential emissions below five tons per year, meeting the definition of an insignificant emission unit.

2.1.4 New [redacted] Milling Operation at [redacted]

Building [redacted] will house the [redacted] Facility. This process will be an unmanned batch process. When the [redacted] is processing material, operators must be out of the building, controlling the process from the remotely located control room at [redacted]. Building [redacted] will include two operations: the tray dryer and [redacted] trains.

[redacted]

[redacted] edicated baghouses will be used to collect product from each FEM train with follow-on HEPA filtration control. Control devices for the tray dryer and hoods consist of a separate scrubber for each.

2.1.5 Insignificant Emissions Units (IEUs)

New Emergency Diesel Generators

The Expansion Project will also include installation of three (3) diesel-fired stationary internal combustion engines with associated emergency generators. Each engine will have a rated capacity less than 1,000 kilowatts (1,490 horsepower) and will burn ultra-low sulfur diesel fuel. Based on potential emissions from each engine, each qualifies as an insignificant emission unit.

Fuel Oil Storage Tanks

In addition, two new fuel oil storage tanks will be installed to provide fuel oil storage for the dual fuel steam generating boilers. The storage tanks will provide capacity adequate for storing enough fuel oil to operate the four new boilers at maximum steam production for fourteen days as required by the US Army installation owner. Based on emission calculations for these tanks using EPA Tanks 4.0.9d, each tank qualifies as an insignificant emission unit.

2.1.6 Retirement of Existing Coal-Fired Steam Generating Boilers and Reductions from Other Existing Sources

2.1.6.1 Coal-fired Steam Boilers

Retirement of the existing coal-fired steam generating boilers and the related coal handling facilities will result in a significant reduction in emissions. HSAAP calculated the reduction in emissions in accordance with 40 CFR 52.21(b)(48)(i)(d)(ii). The 10-year lookback period for calculating the baseline actual emissions ends at the end of April 2018, as does the 24-consecutive month lookback. The details of the calculation of baseline actual emissions are provided in Appendix B.

Emissions during the 24-month period ending with April 2018 are based on steam production records and emission factors. The emission factors used for the boilers are summarized below in Table 2-1.

Table 2-2
Boiler Emission Factor Summary

Pollutant	Emission Factor	Units	Source
SO_2	57	lb SO_2 per ton of coal	AP-42, Table 1.1-3
NO_X	11	lb NO_X per ton of coal	AP-42, Table 1.1-3
CO	5	lb CO per ton of coal	AP-42, Table 1.1-3
VOC	0.22	lb VOC per ton of coal	Title V permit limit
$PM/PM_{10}/PM_{2.5}$	0.07	lb/MMBtu	Title V permit limit
GHG as CO_2e	207.3	lb/MMBtu	40 CFR 98

The AP-42 emission factor for SO_2 for a spreader stoker boiler firing bituminous coal (as well as the current Title V permit limit) is 38S pounds per ton of coal burned where the S is the percent sulfur of the coal (Table 1.1-3). The current Title V permit limit for the sulfur content of coal burned in the HSAAP coal-fired boilers is 1.5%. Consequently, the AP-42 emission factor is calculated as follows:

$$38 \text{ X } 1.5 = 57 \text{ lb } SO_2\text{/ton of coal}$$

The AP-42 emission factor for NO_X for a spreader stoker boiler firing bituminous coal is 11 lb/ton of coal. The current Title V permit limit for NO_X is 0.4 lb/MMBtu. Assuming the heat content of the coal burned at HSAAP is 27.2 MMBtu/ton, an emission factor based on the current Title V permit limit would be calculated as follows:

$$0.4 \text{ lb/MMBtu X } 27.2 \text{ MMBtu/ton} = 10.9 \text{ lb } NO_X\text{/ton of coal}$$

The AP-42 emission factor for CO for a spreader stoker boiler burning bituminous coal is 5 pounds per ton of coal burned (Table 1.1-3). The applicable Boiler MACT CO limit (40 CFR 63, Subpart DDDDD, Table 2) is 340 ppm corrected to 3% O_2 based on a 30-day rolling average.

That concentration equates to an emission rate of 0.282 lb/MMBtu. Assuming the heat content of the coal burned at HSAAP is 27.2 MMBtu/ton, an emission factor based on the applicable Boiler MACT limit would be calculated as follows:

0.282 lb/MMBtu X 27.2 MMBtu/ton = 7.7 lb CO/ton of coal

Since the AP-42 emission factor is lower than the applicable Boiler MACT limit, to be conservative, the AP-42 emission factor was used for these calculations.

The current Title V permit limit for VOC is 1.5 lb/hr. In addition, coal usage is limited by the Title V permit to 60,716 tons per year per boiler, which is equal to an average coal usage of 6.93 T/hr. So, the emission factor used for these calculations is calculated as follows:

1.5 lb/hr / 6.93 T/hr = 0.22 lb VOC/ton of coal

The current Title V permit limit for total suspended particulate (TSP) is 0.07 lb/MMBtu. The applicable Boiler MACT limit is 0.04 lb/MMBtu for filterable PM (PM_F), only. Since PM_F is usually no more than half of TSP for boilers with baghouses for PM control, the equivalent applicable Boiler MACT limit for TSP would be 0.08 lb/MMBtu or greater. Therefore, to be conservative, the current Title V permit limit of 0.07 lb/MMBtu was used for these calculations. In addition, since the boilers have baghouses for PM control, it was assumed that $PM=PM_{10}=PM_{2.5}$.

The GHG emission factor is based on emission factors from 40 CFR 98, Subpart C (General Stationary Fuel Combustion Sources), Tables C-1 and C-2. The global warming factors from 40 CFR 98, Subpart A, Table A-1 were also used to calculate the emission factor as CO_2e.

Table 2-2 summarizes the emission calculations for the reduction in emissions due to the retirement of the coal-fired boilers.

Table 2-3
Summary of Emissions from the Retirement of the Coal-Fired Boilers

Pollutant	Future Potential Emissions (TPY)	Baseline Actual Emissions (TPY)	Difference in Emissions (TPY)
SO_2	0	1,733.1	(1,733.1)
NO_X	0	334.5	(334.5)
CO	0	152.0	(152.0)
VOC	0	6.7	(6.7)
$PM/PM_{10}/PM_{2.5}$	0	57.9	(57.9)
GHG as CO_2e	0	171,446.4	(171,446.4)

The details of the baseline actual emission calculations are provided in Appendix B.

2.1.6.2 Coal Support

Coal support facilities associated with the coal-fired boilers will be retired when the boilers are retired. These facilities include a coal crusher, conveyors, and enclosed conveyors. PM emissions from these facilities are controlled by bag filters and wet suppression. The current Title V permit limit for PM emissions from these facilities is 3.5 lb/hr, with a potential to emit of less than 5 tons.

Using a Tennessee Division of Air Pollution Control emission factor of 0.39 lb PM/ton of coal handled, the annual coal usage for the coal-fired steam generating boilers during the 24-month lookback period of 60,814 tons (see Appendix B), an estimated 75% reduction due to the use of stoker graded coal, and 50% control efficiency from the wet suppression system, the annual baseline actual emissions for the coal support system is calculated as shown below. The emissions are assumed to be PM. Future potential emissions when the coal-fired boilers are retired will be zero.

(60,814 tons of coal/yr X 0.39 lb PM/ton of coal X 0.25 X 0.5)/2000 lb/ton = 1.5 ton PM/yr

2.1.6.3 Other Existing Sources

One existing production facility is shutting down once construction of a duplicate new facility is complete. The existing [redacted] is building [redacted]. This facility is made up of sources 37-0028-92, 37-0028-94, 37-1028-86, and 37-1028-98. Emissions from this facility are VOCs. These processes [redacted]. [redacted]

Current plans are to construct a new facility, which has the same throughput capacity as the existing facility. This process would be a part of the Phase II application. Due to infrastructure and facility issues, the existing process can no longer meet the originally designed production levels. Emissions from this facility during the 24-month lookback period of May 1, 2016 and April 30, 2018 are calculated based on the number of batches and the specific batch rates for each product. The annual average VOC emissions is 3.0 TPY. These emissions are considered a reduction in VOCs.

2.1.7 Increase in Utilization of Existing Sources Including IEUs

2.1.7.1 Open Burning Ground Activities

The Expansion Project will result in an increase in the generation of potentially explosive-contaminated combustible wastes that will require thermal treatment at the permitted open burning grounds of HSAAP. The current Title V permit for Area B (37-0028/558406) limits the amount of combustible wastes going to the open burning grounds to 1,440 tpy.

To determine the increase in open burning emissions resulting from the Expansion Project, HSAAP developed a comprehensive set of calculations based on the best information available from historical open burning records. These calculations were made using the process described below. Additional details are presented in Appendix B.

- Detailed information exists for the source (i.e. building/process), volume, and type (i.e. cardboard, wood, plastic, etc.) of wastes going to open burning for thermal treatment during the years 2012 through 2015.

- Using that information and average densities for waste components (i.e. cardboard, wood, plastic, etc.), the average mass of combustible waste going to open burning from each source during those years was computed.

- Based on the source of the combustible waste (i.e. building/process), the mass of the combustible waste was allocated to one of the three HSAAP product groups (RDX, HMX, and IMX).

- Using the annual production of RDX, HMX, and IMX during the four-year period (2012 through 2015), the average pounds of combustible waste generated per pound of HSAAP product produced was calculated.

- A 10-year lookback at HSAAP product-specific production levels was used to calculate baseline actual emissions from open burning. The 24-consecutive month period used for the calculation was the 24-month period beginning with May 2016 and ending with April 2018.

- Using the average annual production of HSAAP products during this 24-month period and the calculated average pounds of combustible waste generated per pound of HSAAP product mentioned above, the annual mass of combustible wastes generated during the 24-month lookback period for each HSAAP product was calculated.

- Using these annual masses of combustible wastes for each HSAAP product and emission factors from AP-42 and other sources (Additional sources of emission factors are detailed in Appendix B), the baseline actual annual emissions were calculated.

- Since HSAAP proposes not to increase the current Title V permit limit for combustible wastes going to the open burning grounds, the future potential emissions were calculated using the aforementioned emission factors and the 1,440 tpy of combustible waste permit limit.

Table 2-3 provides a summary of the results of these calculations.

Table 2-4
Calculation of Increase in Open Burning Emissions Due to the Expansion Project

Pollutant	Baseline Actual Emissions	Future Potential Emissions	Emission Increase Due To Expansion Project
	(tpy)	(tpy)	(tpy)
PM_{10}	7.7	17.1	9.4
$PM_{2.5}$	7.7	17.1	9.4
SO_2	0.4	0.8	0.4
NO_X	3.4	8.5	5.1
CO	36.9	75.1	38.2
VOC	11.9	22.2	10.2
GHG as CO_2e	1,372	2,656	1,284

2.1.7.2 Increases from Other Existing Sources and IEUs

The Expansion Project will result in an increase in utilization of some of the existing sources. For the majority of the existing sources the operations are already at capacity, initiating the need for the DoD Expansion Project. The projected increase in emissions for the sources in this section were determined by calculating the annual average past actual emission during the lookback period and subtracting if from the PTE in most cases or the projected maximum utilization. [redacted] sources, [redacted] washing facilities, and an acetic acid recovery facility, emit VOCs. [redacted] product drying and incorporation IEUs emit particulate matter.

Existing Product Wash Facilities [redacted] and [redacted]

HSAAP products begin in the nitration process were raw materials are mixed with acids which produces crude explosives. This material is then washed to remove the residual acids and prepare it for further processing. There are currently two washing facilities at HSAAP. Buildings [redacted] and [redacted] source numbers 37-0028-17 and 37-0028-78, respectively. The lookback period to determine past actual emissions of May 2016 to April 2018 was selected based on the overall facility emissions. Emission factors for these facilities is based on the December 2013 Title V Renewal Application. For each source the VOC emissions factor is 2.63 pounds per hour. [redacted] herefore the past actual VOC emissions are 9.2 TPY for [redacted] and 10.6 TPY. Therefore, the future increase in emissions based on the remaining hours is 2.1 TPY for [redacted] and 0.7 TPY for [redacted]. This excludes [redacted] days annually for maintenance.

Existing Weak Acetic Acid Recovery Process [redacted]

The existing Weak Acetic Acid Recovery Process located at [redacted], currently considered an IEU, is the first step in this acetyl loop process. Here columns are used in the recovery of and separation of materials from the dilution liquor coming from the crude explosive wash facilities. Nitrates, explosives, and a portion of the water are stripped from the weak acetic acid. The weak acetic acid is transferred to another process for concentration back to glacial acetic acid. This building routinely operates at capacity. [redacted] Therefore, using the PTE the projected increase in emissions is 0.38 TPY. This excludes eight days annually for maintenance.

Table 2-5
Summary of Emission Increases from Other Existing Sources

Exiting Building	PM (tpy)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)	SO_2 (tpy)	NO_X (tpy)	CO (tpy)	VOC (tpy)	Source
[redacted]	0.00	0.00	0.00	0.0	0.0	0.0	2.1	37-0028-17
[redacted]	0.00	0.00	0.00	0.0	0.0	0.0	0.7	37-0028-78
[redacted]	0.00	0.00	0.00	0.0	0.0	0.0	0.4	IEU
Total	0	0	0	0	0	0	3.2	

Existing Drying, Milling, and Incorporation Buildings at HSAAP

The existing drying, milling, and incorporation buildings at HSAAP that are not currently at capacity include Buildings [redacted], and [redacted]. Each of these sources are insignificant emissions units and are calculated to be below 5 tons per year (TPY) potential to emit (PTE).

Building [redacted]. When applied to future emissions increases this equals approximately 0.93 TPY of PM.

Building [redacted] When applied to future emissions increases this equals approximately 1.5 TPY of PM.

Building [redacted] When applied to future emissions increases this equals approximately 1.5 TPY of PM.

Building [redacted] When applied to future emissions increases this equals approximately 1.1 TPY of PM.

Building [redacted] When applied to future emissions increases this equals approximately 1.4 TPY of PM.

Table 2-6
Summary of Emission Increases from IEUs

Existing Building	PM (tpy)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)	SO_2 (tpy)	NO_X (tpy)	CO (tpy)	VOC (tpy)	Source
[redacted]	0.9	0.9	0.9	0	0	0	0	IEU
[redacted]	1.5	1.5	1.5	0	0	0	0	IEU
[redacted]	1.5	1.5	1.5	0	0	0	0	IEU
[redacted]	1.1	1.1	1.1	0	0	0	0	IEU
[redacted]	1.4	1.4	1.4	0	0	0	0	IEU
Total	6.4	6.4	6.4	0	0	0	0	

2.1.8 Phase II Planned Sources

A second phase of the Expansion Project will be needed to support additional processing of ingredients and recycling of raw materials including solvent-based lacquers, acetic acid, and anhydride. As discussed in Section 2.1.1, the Phase II emissions estimates have been included in the overall project accounting and PSD determination for Phase I. When the application for Phase II is submitted, the refined emissions estimates will be provided, as well as the BACT review, regulatory review, and revisited PSD determination. The Phase II types of processes are currently utilized at the facility and are either duplicate or expanded processes. All Phase II sources are detailed below along with the basis of estimate for future emissions. As stated, the details and design for these sources are still being finalized so the emissions have been conservatively estimated from existing source processes.

Weak Acetic Acid Recovery Process (WAARP)

Two of the primary raw materials used in the manufacturing of explosives is Concentrated Acetic Acid and Acetic Anhydride. The first step in this acetyl loop process is recovery of and separation of materials from the dilution liquor coming from the crude explosive wash facilities. Nitrates, explosives, and a portion of the water are stripped from the weak acetic acid. The emissions from these processes are VOCs only. This process is subject to the New Source Performance Standards and requires control for BACT. The emissions estimates used for PSD evaluation are based on the WAARP section of the December 2013 Title V Renewal Application and an estimate of the currently planned storage tanks.

Table 2-7
Emissions Estimate for Weak Acetic Acid Recovery Process

Process or Tank	VOC Emissions TPY
Vacuum System	1.40
Stripping Column Vent Condenser	0.001
Storage Tanks	2.40
Total VOC Emissions TPY	3.8

Third Train Acetyl Processing

Once the weak acetic acid is recovered, it is further concentrated through distillation columns and then used to produce acetic anhydride through ketene furnaces and refining processes. Emissions from these processes are primarily VOCs and CO but do have a small amount of combustion emissions. Control devices include scrubbers and a thermal oxidizer. The emission estimates used for the PSD evaluation are based on the existing calculations for the current sources. With the exception of the VOC and NOx pollutants, identical emissions used in the latest December 2013 Title V Renewal Application were used. The VOC emissions only are expected to be higher as the distillation columns throughput design is expected to be [redacted] higher. Another planned change involves the use of a thermal oxidizer rather than a flare to control ketene furnace off-gas emissions; however, both are estimated to have a 98% control efficiency.

Table 2-8
Emissions Estimate for Third Train Acetyl Processing

Pollutant	PM	SO_2	NOx	CO	VOCs
New Process Trains	2.2	4.4	4.0	33.1	8.2

Acetic Acid Tank Farm

This tank farm is a duplication of the existing tank farm used in the current Acetic Acid Concentration and Acetic Anhydride manufacturing area. Emissions are VOCs and estimates are derived from the existing tank farm with scrubber control. The design for this tank farm has not been finalized. As a conservative approach four of the largest tanks currently in use for acetic anhydride and acetic acid storage each with estimated emissions of 0.68 TPY was used for this basis of estimate. A total of 2.72 TPY is estimated for the planned tank farm expansion.

New [redacted] Facility

Many products at HSAAP are [redacted] urrent plans are to construct a new facility which has the same throughput capacity as the existing facility. Due to facility infrastructure issues the existing process can no longer meet these production levels. Emissions from this facility are VOCs and the estimate for PSD review is based on the APC 28 form for the four existing sources that make up building [redacted] (37-0028-92, 37-0028-94, 37-1028-86, and 37-1028-98). VOC calculated emission total PTE is 36.3 TPY.

Insensitive Munitions Drying and Incorporation

[redacted] facilities are being reconstructed to better support the insensitive munitions product expansion. Building [redacted] is being designed for drying of material. Building [redacted] will contain incorporation kettles. Emissions from these buildings consist of particulate matter only. Both buildings will have new high efficiency scrubbers. Emissions estimates are based on the following: For building [redacted] there will be [redacted] identical IMX product [redacted] Each train is estimated to contribute [redacted] per hour of PM 10 for a maximum rate. The conveyor line and corresponding ventilation hoods for coated material would also contribute approximately [redacted] per hour at the maximum rate. These rates were determined based on potential throughput to the building and maximum potential loss for each piece of equipment.

At these maximum scrubber inlet rates with both incorporation trains and the conveyor in operation, and the scrubber minimum efficiency at 98%, the emissions rate is 0.68 lbs/hour or approximately 3.0 TPY. The incorporation trains also utilize ingredients that contains a small percentage of material at the 2.5 micron size. Particle matter 2.5 (PM 2.5) maximum emissions rate is estimated to be 8.5 pounds per hour per train. Based on maximum estimated rates from both trains and scrubber minimum efficiency of 97.5%, emissions of PM 2.5 are 0.43 pounds per hour or 1.875 TPY.

For building [redacted], the tray dryers use carefully temperature controlled air to dry materials. The airflow is minimal as the material is spread [redacted] over the trays. Maximum contribution to the scrubber system, taking into account ventilation hoods for material transfers, is approximately [redacted] per hour. All of these emissions would be PM 10. At a scrubber efficiency of 98%, PM 10 emissions would be approximately 0.18 pounds per hour or 0.79 TPY.

Analytical Lab

The last process included with the Phase II portion of the Expansion Project is a new analytical lab. This lab is used to verify the products meet the required specifications and are cleared for shipment or further incorporation. Emissions from this facility are primarily VOCs. Each emissions point are well below insignificant levels. Emissions estimates are based on the following information.

Current estimates of existing lab hoods are 0.1 lb/hr or 0.5 TPY for each vent. Currently there is a potential for six lab hood vents. Therefore, the analytical lab total VOC emissions would be 3.0 TPY. Two vents for NOx emissions are also included in the total calculations at the same rates for a total of 1.0 TPY NOx emissions. PM is estimated to be 1.0 TPY from material handling.

Table 2-9
Expansion Project Phase II Emissions Summary

Process	PM (tpy)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)	SO_2 (tpy)	NO_x (tpy)	CO (tpy)	VOC (tpy)	GHG as CO_2e (tpy)
WAARP (Weak Acetic Acid Recovery)	0.0	0.0	0.0	0.0	0.0	0.0	3.8	NA
3rd Train Acetyl Processing	2.2	2.2	2.2	4.4	4.0	33.1	8.2	NA
Acetic Acid Tank Farm	0.0	0.0	0.0	0.0	0.0	0.0	2.7	NA
New [redacted]r Facility	0.0	0.0	0.0	0.0	0.0	0.00	36.3	NA
[redacted] (Insensitive Product Support)	3.8	3.8	1.9	0.0	0.0	0.0	0.0	NA
Analytical Lab	1.0	1.0	1.0	0.0	1.0	0.0	3.0	NA

2.1.9 Phase III Planned Sources

Phase III of the Expansion Project further expands the capacity of the facility to manufacture explosive mixtures and to process recycle and byproduct streams. As discussed in Section 2.1.1, the Phase III emissions estimates have been included in the overall project accounting and PSD determination for Phase I. When the application for Phase III is submitted, the refined emissions estimates will be provided, as well as the BACT review, regulatory review, and revisited PSD determination. Phase III will complete the expansion project. Emission estimates for Phase III are based on either existing sources (as these new facilities duplicate current processes) or on estimated throughputs in comparison to similar sources elsewhere. Although the design of these sources has not begun due to funding availability, they are scheduled and the emission estimates provided are adequate for the PSD review at this time. Specific information on the Phase III processes are detailed below along with the basis of estimate for relevant emissions.

Insensitive Products Nitration

The Expansion Project will also increase HSAAP's capacity to produce IMX, a formulation designed to resist premature detonation when subjected to actions such as fire, projectiles including bullets and other explosive devices, and blunt impacts. This product was designed with the protection of the soldier in mind. The planned facility to accomplish this increase is a duplication of an existing source. Currently source 37-1029-20 is designed for nitration of materials with Nitric Acid to produce the IMX products. The emissions produced by this process are nitrogen oxides (NOx) and carbon monoxide (CO).

One of the nitration processes does generate a HAP at quantities which are estimated to be below the insignificant emission unit levels. The generation of HAP by this process does not impact the current PSD review.

Emission determinations for this source used the existing source applications. Using the APC-28 forms for source 37-1029-20, the following emissions totals are to be used for PSD review for determination of the overall accounting in relation to the PSD significance levels.

Table 2-10
Insensitive Products Nitration Emission Estimate

	SO_2	NOx	CO
New Insensitive Facility	0.0	10	13.8

For particulate matter emissions are included only for raw materials. These are normally considered insignificant and are fugitive emissions. Current estimates for are less than 1 TPY.

VOC may be emitted if certain formulations are produced. These would be campaigned batch processes. Emissions for a limited campaign for the products producing these emissions would result in a potential of up to 2 TPY of VOC.

Spent Nitric Acid Tank Farm

This emission unit consists of storage tanks for the spent acid, wastewater, and other byproducts produced from the Insensitive Products Nitration facility. The estimated emissions for this facility do not result from a continuous hourly exhaust or from tank calculations. The use of [redacted] nitric acid could result in reactions in the spent acid with residual organic materials. For PSD review purposes the emissions estimates are 1 TPY of PM, 1 TPY of NOx, and 1 TPY of CO. These emissions are based on the following assumptions: an emission rate of 1 pound per hour for each of the pollutants and reactions producing the pollutants for 20% of the available hours (i.e., 1,752 hr/yr). This calculates out to 0.88 TPY. For PSD review estimates 1 TPY is used.

Additional Acid Concentration Train for Insensitive Products

During the manufacturing of IMX ingredients, nitric acid needs to be recycled for continuous use to minimize waste production and for continued sustainability. The process for recycling this spent nitric acid utilizes a nitric acid concentrator/sulfuric acid concentrator unit. This again is a duplication of an existing process. Estimates used for the process emissions are derived from the permit for 37-1029-22 detailed in the table below.

Table 2-11
Emission Estimate for Nitric Acid Concentration Train

	PM	SO_2	NOx	CO	VOC
New NAC/SAC	0.1	4.4	2.8	10.3	0.02

Nitration, Wash, and Recrystallization Facility — [redacted]

HSAAP products begin with the nitration process where raw materials are mixed with acids which produces crude explosives. This material is then washed to remove the residual acids and to prepare it for further processing. Solvent is used to [redacted] the materials to meet the necessary product specifications. [redacted] Emissions from these sources include NOx and VOC. Emission estimates for this source are based on the existing sources with certain assumed changes. A breakdown of these emissions are in the following table.

Table 2-12
Emissions Estimate for Nitration, Wash, and Recrystallization Facility

	PM	SO_2	NOx	CO	VOC
New Nitration, Wash, and Recrystallization Facility	1.0	0	7.9	0	16

The particulate matter emissions are included only for raw materials. These are normally considered insignificant and are fugitive emissions. Current estimates for are less than 1 TPY. Emissions estimates are calculated based on the stack test results of source 37-1029-09 of 1.81 pounds per hour of NOx. Using these rates the annual emissions are 7.9 TPY. Emissions estimates are calculated based on the stack test results of source 37-1029-09 of 0.45 pounds per hour of VOC. Using these rates the annual emissions are 1.97 TPY for the nitration process. This in addition to the other sources (11.4 TPY from 37-0028-17 and 2.4 TPY from 37-0028-83) the annual emissions are 15.77 TPY.

Ammonium Nitrate Solution (ANSOL) Treatment

As described in the Phase II section acetic acid is recovered at the WAARP facility through the separation of materials from the dilution liquor coming from the crude explosive wash facilities. The nitrates are stripped from the weak acetic acid with the addition of ammonia. An ammonium nitrate solution is produced as a byproduct. [redacted] Little information is known about the selection of the design or the size of this facility.

Emissions generated would include NOx, CO, PM, and potentially VOC and SO_2, if combustion is required. Emission rates could vary depending on the design. The following assumptions are being made at this point. If the material is converted to another nitrate form, NOx, CO, and PM could be produced. NOx is controllable and CO and PM would be dependent on the organics or non-nitrate material concentrations. PM would likely be in the form of other compounds that conglomerate to form particles. PM emissions could also be controlled effectively. Given the potential volumes of material that could be processed, the likely emissions rate would not be higher than the existing sources where nitration occurs. Using the emissions rate from source 37-1029-09 of 1.81 pounds per hour of NOx and assuming as a worst case scenario, two vessels could be used, the total NOx emission could be 15.9 TPY. This would be a controlled emission rate. CO emissions would be expected if NOx emissions are being generated. CO emission estimates are based on a duplication of the NAC/SAC emission for two vessels or 20.6 TPY of CO. Particulate matter emissions are based on the worst case of PM formation as a result of chemical interaction. Based on engineering estimates, the resulting hourly rate would be 0.91 pounds per hour or an annual total of 4 TPY. VOC and SO_2 would only be generated if the design involved combustion of natural gas. In that case VOC and SO_2 emissions would both be less than 1 TPY.

Table 2-13
Expansion Project Phase III Emissions Summary

Processes	PM_{10} (tpy)	$PM_{2.5}$ (tpy)	SO_2 (tpy)	NO_X (tpy)	CO (tpy)	VOC (tpy)	GHG as CO_2e (tpy)
Insensitive Products Nitration	1	0	0.0	10.0	13.8	2.0	NA
Spent Nitric Acid Tank Farm	1	0	0.0	1	1	0.0	NA
Additional Acid Concentration Train for Insensitive Products	0.1	0.1	4.4	2.8	10.3	0.02	NA
Nitration, Wash, and Recrystallization Facility — [redacted]	1	1	0.0	7.9	0.0	16	NA
Ammonium Nitrate Solution (ANSOL) Treatment	4	4	1	15.9	20.6	1	NA

"NA" indicates that the GHG emissions from this emission unit has not yet been determined.

2.2 Project Emissions Accounting

Table 2-14 provides a summary of the emissions from the Expansion Project, including Phase I, II, and III sources.

Table 2-14
Expansion Project Emissions Accounting

Phase	Process	PM_{10} (tpy)	$PM_{2.5}$ (tpy)	SO_2 (tpy)	NO_X (tpy)	CO (tpy)	VOC (tpy)	GHGs as CO_2e (tpy) [1]
ALL	Existing Sources Increased Utilization (Open Burning)	9.4	9.4	0.4	5.1	38.2	10.2	1,283.8
	Existing Sources Increased Utilization (various)	6.4	6.4	0	0	0	3.2	0
	Retirement of Existing Coal Fired Boilers	(57.9)	(57.9)	(1,733.1)	(334.5)	(152.0)	(6.7)	(171,446.4)
	Coal Fired Support Sources	(1.5)	0	0	0	0	0	0
	[redacted] (Existing [redacted] Facility) [2]	0	0	0	0	0	(3) [2]	0
I	Natural Gas Boilers	15.9	15.9	6.4	226.4	100.6	22.9	678,139
	Fuel Oil Fired Internal Combustion Engines	0.3	0.3	0.02	10.6	5.8	0.7	1,931.9
	[redacted]	0.01	0.01	0	0.6	0	6.2	0
	[redacted] Milling)	6.0	6.0	0	0	0	0	0
	Back-up Fuel Oil Storage	0	0	0	0	0	0.2	0
	Project Running Subtotal:	(21.4)	(19.9)	(1,726.3)	(91.8)	(7.4)	36.7	509,908.3
II	3rd Train Acetyl Processing	2.2	2.2	4.4	4	33.1	8.2	NA
	Acetic Acid Tank Farm	0	0	0	0	0	2.7	NA
	Analytical Lab	1	1	0	1	0	3	NA
	WAARP (Weak Acetic Acid Recovery)	0	0	0	0	0	3.8	NA
	New [redacted] Facility	0	0	0	0	0	36.3	NA
	[redacted] (Insensitive Product Support)	3.8	1.9	0	0	0	0	NA
	Project Running Subtotal:	(14.4)	(14.8)	(1,721.9)	(86.8)	25.7	87.7	509,908.3
III	ANSOL Treatment	4	4	1	15.9	20.6	1	NA
	[redacted] (Insensitive Products Nitration)	1	0	0	10	13.8	2	NA
	[redacted] (Spent Nitric Acid Tank Farm)	1	0	0	1	1	0	NA
	[redacted] (Nitration, Wash, and Recrystallization)	1	1	0	7.9	0	15.8	NA
	3rd Train NAC/SAC (Acid Concentration)	0.1	0.1	4.4	2.8	10.3	0.02	NA
	Project Total:	(7.3)	(9.7)	(1,716.5)	(49.2)	71.4	106.5	509,908.3
	PSD Threshold:	15	10	40	40	100	40	75,000

1. "NA" indicates that the GHG emissions from this emission unit has not yet been determined.

2. The reduction in emissions from this emission unit will occur in Phase II.

3.0 REGULATORY ANALYSIS

HSAAP is subject to both federal and State of Tennessee air quality regulations. These regulations impose permitting requirements and specific standards for expected air emissions. The standards and regulations that apply to HSAAP include:

- National Ambient Air Quality Standards (NAAQS) established by the U. S. Environmental Protection Agency (U. S. EPA) for specific criteria pollutants (40 Code of Federal Regulations (CFR) Part 50);

- New Source Review to determine if the facility meets the requirements of the Prevention of Significant Deterioration (PSD) regulations (40 CFR Part 52.21);

- New Source Performance Standards (NSPS) which impose emission standards on new facilities (Clean Air Act (CAA) Section 111; 40 CFR Part 60);

- Hazardous Air Pollutant (HAP) regulations for specific categories and subcategories of hazardous air pollutants (Clean Air Act Section 112(b)(1); 40 CFR 63); and

- Tennessee Air Pollution Control Regulations.

Detailed discussions of these regulations as they pertain to the HSAAP are provided in the following sections.

3.1 National Ambient Air Quality Standards (NAAQS)

The Clean Air Act Amendments of 1970 mandated that the EPA establish NAAQS to protect the public health and welfare. The EPA has promulgated standards for six criteria pollutants: particulate matter less than or equal to 10 microns in size (PM_{10}) and less than or equal to 2.5 microns in size ($PM_{2.5}$), sulfur dioxide (SO_2), carbon monoxide (CO), ozone (O_3), nitrogen dioxide (NO_2), and lead (Pb).

The primary NAAQS are promulgated to protect the public health, and the secondary NAAQS are promulgated to protect the public welfare from any known or anticipated adverse effects associated with the presence of pollutants in the ambient air. Areas in violation of the NAAQS are designated as nonattainment areas and new sources to be located in or near these areas may be subject to more stringent air permitting requirements. The existing applicable NAAQS are presented in Table 3-1.

3.2 Prevention of Significant Deterioration (PSD) Requirements

3.2.1 General Requirements

Under federal and State of Tennessee PSD review requirements, all major new or modified sources of air pollutants regulated under the CAA must be reviewed and a pre-construction permit issued. Tennessee's State Implementation Plan (SIP), which contains PSD regulations, has been approved by EPA, and EPA has granted PSD approval authority to the Tennessee Division of Air Pollution Control (TDAPC).

A "major facility" is defined as any one of 28 named source categories that have the potential to emit 100 tons per year (TPY) or more or any other stationary facility that has the potential to emit 250 TPY or more of any pollutant regulated under the CAA. "Potential to emit" means the capability, at maximum design capacity, to emit a pollutant after the application of control equipment.

A "major modification" is defined under PSD regulations as a change at an existing major facility that increases emissions by greater than significant amounts. PSD significant emission rates are shown in Table 3-2.

EPA has promulgated regulations that define certain increases above ambient air quality baseline concentrations for criteria pollutants as constituting significant deterioration. The EPA class designations and allowable PSD increments are presented in Table 3.1. The State of Tennessee adopted the EPA class designations and allowable PSD increments for PM_{10}, SO_2, and NO_2 increments.

Table 3-1
NAAQS and PSD Increments and Significance Levels
(µg/m^3, unless otherwise noted)[1,2]

Pollutant and Time Period	NAAQS		PSD		
	Primary	Secondary	Class I Increment	Class II Increment	Significance Levels
Particulate Matter – 10 microns or less (PM_{10})					
24-Hour Average	150	150	8	30	5
Particulate Matter – 2.5 microns or less ($PM_{2.5}$)					
Annual Arithmetic Mean	12.0	15.0	1	4	—
24-Hour, 98th Percentile	35	35	2	9	—
Sulfur Dioxide (SO_2)					
3-Hour Average	—	0.5 ppm	25	512	25
1-Hour Average	75 ppb	—	—	—	7.86 [3]
Nitrogen Dioxide (NO_2)					
Annual Arithmetic Mean	0.053 ppm	0.053 ppm	2.5	25	1
1-Hour Average	100 ppb	—	—	—	7.5
Carbon Monoxide (CO)					
8-Hour Average	9 ppm	—	—	—	500
1-Hour Average	35 ppm	—	—	—	2,000
Ozone (O_3)					
8-Hour Average	0.070 ppm	0.070 ppm	—	—	—
Lead (Pb)					
Rolling 3-Month Average	0.15	0.15	—	—	—
Quarterly Arithmetic Mean [4]	1.5	1.5	—	—	—

Notes:

1. NAAQS Sources: 40 CFR Part 50 and TAPCR 1200-03-03-.03(1)(a); PSD Class Increments and Significance Level Sources: 40 CFR Part 52.21(c) and TAPCR 1200-03-09-.01(m)
2. µg/m^3 denotes microgram per cubic meter
3. Interim SIL from EPA Memorandum from Stephen D. Page, "Guidance Concerning the Implementation of the 1-hour SO_2 NAAQS for the Prevention of Significant Deterioration Program," August 23, 2010.
4. In areas designated nonattainment for the Pb standards prior to the promulgation of the current (2008) standards, and for which implementation plans to attain or maintain the current (2008) standards have not been submitted and approved, the previous standards (1.5 µg/m3 as a calendar quarter average) also remain in effect.

Table 3-2
PSD Significant Emission Rates and Monitoring *De Minimis* Levels [1]

Pollutant	PSD Significant Emission Rate (tons/year)	*De Minimis* Ambient Levels	
		Concentration ($\mu g/m^3$)	Averaging Time
Particulate Matter (PM)	25	—	—
Particulate Matter – 10 microns or less (PM_{10})	15	10	24-Hour
Particulate Matter – 2.5 microns or less ($PM_{2.5}$)	10	—	—
Sulfur Dioxide (SO_2)	40	13	24-Hour
Nitrogen Oxides (NO_X)	40	14	Annual
Carbon Monoxide (CO)	100	575	8-Hour
Ozone (Volatile organic compounds or NO_X)	40	—	—
Lead (Pb)	0.6	0.1	3-Month
Fluorides	3	0.25	24-Hour
Sulfuric Acid Mist	7	—	—
Hydrogen Sulfide (H_2S)	10	0.2	1-Hour
Total Reduced Sulfur (including H_2S)	10	10	1-Hour
Reduced Sulfur Compounds (including H_2S)	10	10	1-Hour

Notes:
1. Source: 40 CFR 52.21

PSD review is used to determine whether significant air quality deterioration will result from the new or modified facility. Federal PSD requirements are contained in 40 CFR 52.21, Prevention of Significant Deterioration of Air Quality. The State of Tennessee has adopted PSD regulations in TAPCR 1200-03-09-.01(4). Major new facilities and major modifications are required to undergo the following analysis related to PSD for each pollutant emitted in significant amounts:

- Control technology review,
- Source impact analysis,
- Air quality analysis (monitoring),
- Source information, and
- Additional impact analyses.

In addition to these analyses, a new facility must also be reviewed with respect to Good Engineering Practice (GEP) stack height regulations. Discussions concerning each of these requirements are presented in the following sections.

3.2.2 Control Technology Review

PSD regulations concerning control technology review require that all applicable federal and state emission standards be met, and that best available control technology (BACT) be applied to control emissions of subject pollutants from the source. The BACT requirements are applicable to all regulated pollutants if the facility is a new source that qualifies as a major PSD source, or to all regulated pollutants for which the increase in emissions from the facility or modification exceeds the significant emission rates listed in Table 3.2. Basically, major sources must install the most effective emission controls considered technically feasible by the permitting authority, taking into consideration environmental, energy, and economic impacts. As defined by EPA (40 CFR 52.21(b)(12)):

> *Best available control technology* means an emissions limitation (including a visible emission standard) based on the maximum degree of reduction for each pollutant subject to regulation under Act which would be emitted from any proposed major stationary source or major modification which the Administrator, on a case-by-case basis, taking into account energy, environmental, and economic impacts and other costs, determines is achievable for such source or modification through application of production processes or available methods, systems, and techniques, including fuel cleaning or treatment or innovative fuel combustion techniques for control of such pollutant. In no event shall application of best available control technology result in emissions of any pollutant which would exceed the emissions allowed by any applicable standard under 40 CFR parts 60 and 61. If the Administrator determines that technological or economic limitations on the application of measurement methodology to a particular emissions unit would make the imposition of an emissions standard infeasible, a design, equipment, work practice, operational standard, or combination thereof, may be prescribed instead to satisfy the requirement for the application of best available control technology. Such standard shall, to the degree possible, set forth the emissions reduction achievable by implementation of such design, equipment, work practice or operation, and shall provide for compliance by means which achieve equivalent results.

The requirement for BACT was contained in the PSD requirements prescribed by the Clean Air Act Amendments of 1977. The premise behind the BACT requirement was that it would optimize the consumption of the available PSD air quality increments and thereby maximize the potential for future economic growth without significantly degrading air quality. Guidelines for the evaluation of BACT can be found in EPA's *Guidelines for Determining Best Available Control Technology (BACT)* (EPA, 1978) and the *PSD Workshop Manual* (EPA, 1980). These guidelines were established by EPA to provide a consistent approach to BACT and to ensure that the impacts of alternative emission control systems are measured by the same set of parameters. In addition, through implementation of these guidelines, BACT in one area may not be identical to BACT in another area. According to EPA (1980), "BACT analyses for the same types of emissions unit and the same pollutants in different locations or situations may determine that different control strategies should be applied to the different sites, depending on site-specific factors. Therefore, BACT analyses must be conducted on a case-by-case basis."

The BACT requirements are intended to ensure that the control systems incorporated in the design of a proposed facility reflect the latest in control technologies used in a particular industry and take into consideration existing and future air quality in the vicinity of the proposed facility. BACT must, at a minimum, demonstrate compliance with New Source Performance Standards (NSPS) for a source (if applicable). An evaluation of the air pollution control techniques and systems, including a cost-benefit analysis of alternative control technologies capable of achieving a higher degree of emission reduction and the proposed control technology, is required. The cost-benefit analysis requires the documentation of the materials, energy, and economic penalties associated with the proposed and alternative control systems, as well as the environmental benefits derived from these systems. A decision on BACT is to be based on sound judgment, balancing environmental benefits with energy, economic, and other impacts.

Despite EPA's definition of BACT, many of the intricacies of BACT selection have never been formally addressed in actual regulation. In December 1987, the EPA Assistant Administrator for Air and Radiation issued guidance establishing a "top-down" approach to BACT determinations. The basic steps of the top-down BACT analysis include the following:

1. Identify all potential control technologies;
2. Eliminate technically infeasible options;
3. Rank remaining control technologies; and
4. Evaluate the most effective controls.

The top-down BACT approach essentially starts with the most stringent (or top) technology and emissions limit that have been applied elsewhere to the same or similar source category. The applicant must next provide a basis for rejecting this technology in favor of the next most stringent technology or propose to use it. Rejection of control alternatives may be based on technical or economic infeasibility. Such decisions are made on the basis of physical differences (e.g., fuel type), locational differences (e.g., availability of water), or significant differences that may exist in the environmental, economic, or energy impacts. The differences between the proposed facility and the facility on which the control technique was applied previously must be justified.

3.2.3 Source Impact Analysis

All PSD applicants must conduct air quality analyses to assess the ambient impacts associated with construction and operation of the facility. A separate air quality analysis must be submitted for each regulated pollutant for which the applicant proposes to emit in a significant amount from a new or modified major source. The main purpose of the analysis is to demonstrate that the new emissions from the source, in conjunction with related emissions from other sources, will not cause or contribute to a violation of any applicable NAAQS or PSD increment. Additional studies are performed to evaluate effects on visibility and soils and vegetation.

The PSD regulations specifically provide for the use of atmospheric dispersion models in performing analyses, estimating baseline and future air quality levels, and determining compliance with NAAQS and allowable PSD increments. Designated EPA models normally must be used in performing the impact analysis. Specific applications for other than EPA approved models require EPA's consultation and prior approval. Guidance for the use and application of dispersion models is presented in 40 CFR Part 51, Appendix W – Guideline on Air Quality Models. The source impact analysis for criteria pollutants to address compliance with the NAAQS and PSD Class II Increments may be limited to the new or modified source if the net increase in impacts as a result of the new or modified source is below significance levels, as presented in Table 3.1. As is demonstrated in Section 5.0, Source Impact Analysis, the increase in ambient concentrations of the regulated pollutants is below the significance levels and therefore a source impact analysis for increment consumption is not required.

The EPA has specified significant impact levels for Class I areas. As the designated agency for oversight in air quality impacts to Class I areas, the National Park Service (NPS) has accepted EPA's significant impact levels for PSD Class I areas (see Table 3-3).

Table 3-3
EPA PSD Class I Significant Impact Levels

Pollutant	Averaging Time	Significant Impact Levels (µg/m^3)
SO_2	Annual	0.1
	24-Hour	0.2
	3-Hour	1.0
$PM_{2.5}$	Annual	0.06
	24-Hour	0.07
PM_{10}	Annual	0.2
	24-Hour	0.3
NO_2	Annual	0.1

Various lengths of record for meteorological data can be used for impact analysis. A five-year period can be used with corresponding evaluation of highest, second-highest short-term concentrations for comparison to NAAQS or PSD increments. The term "highest, second-highest" (HSH) refers to the highest of the second-highest concentrations at all receptors (i.e., the highest concentration at each receptor is discarded). The second-highest concentration is significant because short-term NAAQS specify that the standard should not be exceeded at any location more than once per year. If fewer than five years of meteorological data are used in the modeling analysis, the highest concentration at each receptor normally must be used for comparison to air quality standards. Even with five years of meteorological data, the highest concentration at each receptor must be used for comparison with the PSD significance levels.

A PSD increment represents the maximum increase in ambient concentration allowed above an established baseline concentration for the pollutant of concern. The baselines act as yardsticks representing the actual ambient concentrations measured at the inception of the PSD program in a given area. By limiting the extent to which new sources may increase ambient concentrations above the baseline, the deterioration of air quality is managed within acceptable limits. PSD increments have been established for PM_{10}, SO_2, and NO_2, and are shown in Table 3-1.

In effect, the emissions from each new source "consume" a portion of the allowed PSD increment for a particular location. "Significant deterioration" is said to occur when new emissions would cause the applicable PSD increment to be exceeded. Finally, even if a proposed source demonstrates that not all of the available PSD increment would be consumed, emissions from a new source can never be permitted to cause pollutant concentrations above the applicable NAAQS. PSD increments are pollutant specific and vary based on whether the affected area is a Class I, II, or III area. Most parts of the country are Class II areas and are afforded allowances (i.e. increments) for normal economic growth. The EPA designated certain pristine areas, such as the National Parks and Wilderness Areas, as Class I areas. Class I areas are afforded special protection. Besides having smaller PSD increments, Class I areas are also protected against pollutants that contribute to visibility impacts such as SO_2, PM_{10}, $PM_{2.5}$ and NO_x.

The HSAAP facility is located in a Class II area. There are two (2) Class I areas located within 100 kilometers (km) of the facility, and two (2) additional Class I areas located within 200 km of the facility. Table 3-4 lists the Class I areas within 300 km of the HSAAP facility and their relative distances from the facility.

Table 3-4
Class I Areas within 300 km of HSAAP

Class I Area	Managed By	Distance from HSAAP (km)
Linville Gorge	US Forest Service	91
Great Smoky Mountains NP	National Park Service	92
Shining Rock	US Forest Service	123
Joyce Kilmer - Slickrock	US Forest Service	169
Cohutta	US Forest Service	240

OSI consulted with the Federal Land Managers (FLMs) responsible for the Class I areas within 300 km of HSAAP regarding the need for modeling analyses to assess the impacts of emissions from this source on Class I visibility and air quality related values (AQRV). Copies of correspondence with the FLMs are included in Appendix D.

In accordance with *Federal Land Managers' Air Quality Related Values Work Group (FLAG), Phase I Report – Revised (2010)*, OSI calculated Q/D to be below zero, therefore no further analysis of Class I related values is required.

3.2.4 Air Quality Monitoring Requirements

In accordance with requirements of 40 CFR 52.21(m), any application for a PSD permit must contain an analysis of continuous ambient air quality data in the area affected by the proposed major stationary facility or major modification. For a new major facility, the affected pollutants are those that the facility potentially would emit in significant amounts. For a major modification, the pollutants are those for which the new emissions increase exceeds the significant emission rate.

Ambient air monitoring for a period of up to one year generally is appropriate to satisfy the PSD monitoring requirements. A minimum of four months of data is required. Existing data from the vicinity of the proposed source may be used if the data meet certain quality assurance requirements, otherwise, additional data may be needed. Guidance in designing a PSD monitoring network is provided in EPA's *Ambient Monitoring Guidelines for Prevention of Significant Deterioration* (EPA, 1987a).

The regulations include an exemption [TAPCR 1200-3-9-.01(4)(d)(6)] that excludes or limits the pollutants for which an air quality analysis must be conducted. This exemption states that the Technical Secretary of the Tennessee Air Pollution Control Board may exempt a proposed major facility or major modification from the monitoring requirements with respect to a particular pollutant if the emission increase of the pollutant from the facility or modification would cause, in any area, air quality impacts less than the de minimis levels presented in Table 3-2.

3.2.5 Source Information/Good Engineering Practice (GEP) Stack Height

Source information must be provided to adequately describe the proposed project. The general type of information required for this project is presented in Section 2.0.

The 1977 CAA Amendments require that the degree of emission limitation required for control of any pollutant not be affected by a stack height that exceeds GEP or any dispersion technique. On July 8, 1985, EPA promulgated final stack height regulations (EPA, 1985a). Identical regulations have been adopted by Tennessee (TAPCR 1200-3-24). GEP stack height is defined as the highest of:

1. 65 meters (213 feet); or
2. A height established by applying the formula:

$$H_g = H + 1.5L \quad [3.1]$$

Where H_g is the GEP stack height, H is the height of the structure or nearby structure, and L is the lesser dimension (height or projected width) of nearby structure(s); or

3. A height demonstrated by a fluid model or field study.

"Nearby" is defined as a distance up to five times the lesser of the height or width dimensions of a structure or terrain feature, but not greater than 0.8 km. Although GEP stack height regulations require that the stack height used in modeling for determining compliance with NAAQS and PSD increments not exceed the GEP stack height, the actual stack height may be greater.

The stack height regulations also allow increased GEP stack height beyond that resulting from the above formula in cases where plume impaction occurs. Plume impaction is defined as concentrations measured or predicted to occur when the plume interacts with the elevated terrain. Elevated terrain is defined as terrain that exceeds the height calculated by the GEP stack height formula.

3.2.6 Additional Impact Analysis

In addition to air quality impact analyses, federal and TDAPC PSD regulations require analyses of the impairment to visibility and the impacts on soils and vegetation that would occur as a result of the proposed source [40 CFR 52.21(o)]. These analyses are to be conducted primarily for PSD Class I areas. Impacts as a result of general commercial, residential, industrial, and other growth associated with the source also must be addressed. These analyses are required for each pollutant emitted in significant amounts.

3.3 Nonattainment Rules

Based on the current nonattainment provisions, all major new facilities and modifications to existing major facilities located in a nonattainment area must undergo nonattainment review. A new major facility is required to undergo this review if the proposed pieces of equipment have the potential to emit 100 TPY or more of the nonattainment pollutant. A major modification at a major facility is required to undergo review if it results in a significant net emission increase of 40 TPY or more of the nonattainment pollutant or if the modification is major (i.e. 100 TPY or more).

3.4 Emission Standards

3.4.1 New Source Performance Standards (NSPS) — 40 CFR 60

The NSPS are a set of national emissions standards that apply to specific categories of new sources. As stated in the CAA Amendments of 1977, these standards "shall reflect the degree of emission limitation and the percentage reduction achievable through application of the best technological system of continuous emissions reduction the Administrator determines has been adequately demonstrated."

3.4.2 National Emission Standards for Hazardous Air Pollutants (MACT) — 40 CFR 63

The EPA has promulgated emissions standards for HAPs for various industrial categories. These new National Emission Standards for Hazardous Air Pollutants (NESHAPs) that resulted from the 1990 CAA Amendments are based on the use of Maximum Achievable Control Technology (MACT). The adopted standards are contained in 40 CFR 63. New sources that emit more than 10 tons per year of a single HAP or 25 tons per year of total HAPs (i.e., major HAP sources) are required to apply MACT for the promulgated industrial category or to obtain a case-by-case MACT determination from the applicable regulatory authority after submitting a MACT analysis.

3.4.3 Tennessee Air Permitting Requirements

The TDAPC regulations require any new source to obtain an air permit prior to construction. Major new sources must meet the appropriate PSD and nonattainment requirements as discussed previously. Required permits and approvals for air pollution sources include NSR for nonattainment areas, PSD, NSPS, NESHAP, Construction Permits, and Operating Permits. The requirements for construction permits are contained in TAPCR 1200-03-09-.01.

3.5 Source Applicability

3.5.1 Area Classification

This proposed project will be located in Hawkins County, which is currently designated by EPA as attainment or unclassified for all criteria pollutants. As noted in Section 3.2.3, the nearest Class I Areas to the site are Linville Gorge Wilderness Area in North Carolina, and the Great Smoky Mountains National Park, which lies on the border between Tennessee and North Carolina.

3.5.2 PSD Review

OSI has evaluated the emissions from the Expansion Project for PSD applicability. The Expansion Project is a major modification, and thus subject to NSR permitting, if it causes a significant emissions increase (Step 1 of the determination process) and a significant net emissions increase (Step 2) of any regulated air pollutant. For the purposes of determining applicability of NSR permitting to the Expansion Project, OSI has considered the calculated emissions from the Phase I processes as well as the estimated emissions from Phase II and Phase III processes.

The projected emissions from Phase I of the proposed Expansion Project are estimated to exceed the PSD significant emission rates for VOC and GHG, as summarized in Table 3-5. When combined with the estimated emissions of the Phase II and III projects, the overall potential emissions from the proposed Expansion Project have the potential to exceed the PSD significant emissions rates for VOC and GHG. Therefore, PSD review is required. Because there is some uncertainty in the estimates of CO emissions in Phases II and III, OSI has decided to consider CO emissions to be above the PSD significant emission rate at this point in the process. If, in the future, is determined that CO emissions for the entire Expansion Project are below the PSD significant emission rate, CO will not be considered in those future applications.

In relation to significant net emissions increase (Step 2) and as stated in section 2.1.7 there will be no contemporaneous or credible increase or decrease requiring action under Step 2.

Table 3-5 summarizes the Expansion Project emissions (Step 1).

Table 3-5
Expansion Project Emissions Accounting (Step 1)

Phase	Process	PM_{10} (tpy)	$PM_{2.5}$ (tpy)	SO_2 (tpy)	NO_X (tpy)	CO (tpy)	VOC (tpy)	GHGs (tpy) [1]
ALL	Existing Sources Increased Utilization (Open Burning)	9.4	9.4	0.4	5.1	38.2	10.2	1,283.8
	Existing Sources Increased Utilization (various)	6.4	6.4	0	0	0	3.2	0
	Retirement of Existing Coal Fired Boilers	(57.9)	(57.9)	(1,733.1)	(334.5)	(152.0)	(6.7)	(171,446.4)
	Coal Fired Support Sources	(1.5)	0	0	0	0	0	0
	[redacted] (Existing [redacted] Facility) [2]	0	0	0	0	0	(3) [2]	0
I	Natural Gas Boilers	15.9	15.9	6.4	226.4	100.6	22.9	678,139
	Fuel Oil Fired Internal Combustion Engines	0.3	0.3	0.02	10.6	5.8	0.7	1,931.9
	[redacted]	0.01	0.01	0	0.6	0	6.2	0
	[redacted] Milling)	6.0	6.0	0	0	0	0	0
	Back-up Fuel Oil Storage	0	0	0	0	0	0.2	0
	Project Running Subtotal:	(21.4)	(19.9)	(1,726.3)	(91.8)	(7.4)	36.7	509,908.3
II	3rd Train Acetyl Processing	2.2	2.2	4.4	4	33.1	8.2	NA
	Acetic Acid Tank Farm	0	0	0	0	0	2.7	NA
	Analytical Lab	1	1	0	1	0	3	NA
	WAARP (Weak Acetic Acid Recovery)	0	0	0	0	0	3.8	NA
	New [redacted] Facility	0	0	0	0	0	36.3	NA
	[redacted] (Insensitive Product Support)	3.8	1.9	0	0	0	0	NA
	Project Running Subtotal:	(14.4)	(14.8)	(1,721.9)	(86.8)	25.7	87.7	509,908.3
III	ANSOL Treatment	4	4	1	15.9	20.6	1	NA
	[redacted] (Insensitive Products Nitration)	1	0	0	10	13.8	2	NA
	[redacted] (Spent Nitric Acid Tank Farm)	1	0	0	1	1	0	NA
	[redacted] (Nitration, Wash, and Recrystallization)	1	1	0	7.9	0	15.8	NA
	3rd Train NAC/SAC (Acid Concentration)	0.1	0.1	4.4	2.8	10.3	0.02	NA
	Project Total:	(7.3)	(9.7)	(1,716.5)	(49.2)	71.4	106.5	509,908.3
	PSD Threshold:	15	10	40	40	100	40	75,000

1. "NA" indicates that the GHG emissions from this emission unit has not yet been determined.

2. The reduction in emissions from this emission unit will occur in Phase II.

Table 3-7 summarizes the overall Expansion Project emissions and compares them to the PSD significance rates for all PSD pollutants.

Table 3-6
PSD Significance Levels Compared to Proposed Expansion Project Emissions

Pollutant	PSD Significant Emission Rate (tons/year)	Emissions (tons/year)				PSD Significant Emission Rate Exceeded?
		Phase I	Phase II	Phase III	Project Total	
PM	25					No
PM_{10}	15	(21.4)	7	7.1	(7.3)	No
$PM_{2.5}$	10	(19.9)	5.1	5.1	(9.7)	No
SO_2	40	(1,726.3)	4.4	5.4	(1,716.5)	No
NO_X	40	(91.8)	5	37.6	(49.2)	No
CO	100	(7.4)	33.1	45.7	71.4	No
Ozone (VOCs)	40	36.7	51.0	18.8	106.5	Yes
Lead	0.6	—	—	—	—	No
Fluorides	3	—	—	—	—	No
Sulfuric Acid Mist	7	—	—	—	—	No
Hydrogen Sulfide	10	—	—	—	—	No
Total Reduced Sulfur	10	—	—	—	—	No
Reduced Sulfur Compounds	10	—	—	—	—	No
GHG	75,000	509,908.3	—	—	509,908.3	Yes

As part of the PSD review, a PSD Class I increment analysis is required if the proposed project's impacts are greater than the EPA Class I significant impact levels. Based on previously mentioned calculation of Q/D, no modeling analysis for Class I impacts is required.

3.5.3 Nonattainment Review

The HSAAP site is located in Hawkins County, which is designated as attainment or unclassified for all criteria pollutants. Therefore, nonattainment requirements are not applicable.

3.5.4 New Source Performance Standards (NSPS) — 40 CFR 60

3.5.4.1 Steam Generating Boilers

The steam generating boilers are subject to 40 CFR 60, Subpart Db — Standards of Performance for Industrial-Commercial-Institutional Steam Generating Units for emissions of PM, SO_2, and NO_X. These boilers are also subject to the General Provisions of 40 CFR 60, Subpart A, which describe performance testing, recordkeeping, reporting, and monitoring.

3.5.4.2 [redacted]

The proposed [redacted] process was reviewed for NSPS applicability. The following potentially applicable subparts were reviewed:

40 CFR 60, Subpart Kb - Standards of Performance for Storage Vessels (Including Petroleum Liquid Storage Vessels) for Which Construction, Reconstruction, or Modification Commenced after July 23, 1984 for emissions of VOC. The provisions of this subpart do not apply to the [redacted] storage tanks since their volumes are less than 75 cubic meters.

40 CFR 60, Subpart VVa — Standards of Performance for Equipment Leaks of VOC in the Synthetic Organic Chemicals Manufacturing Industry for which Construction, Reconstruction, or Modification Commenced After November 7, 2006. The provisions of this subpart apply to process units in synthetic organic chemicals manufacturing industries that produce as intermediates or final products one or more of the specific chemicals listed in §60.489. This process emission source does not produce one of the specific chemicals listed, therefore it is not subject to Subpart VVa.

40 CFR 60, Subpart NNN — Standards of Performance for Volatile Organic Compound Emissions From Synthetic Organic Chemical Manufacturing Industry (SOCMI) Distillation Operations. The provisions of this subpart apply to process units that produce any of the chemicals listed in §60.667 as a product, co-product, by-product or intermediate. This process emission source does not produce one of the specific chemicals listed, therefore it is not subject to Subpart NNN.

Upon review, it has been determined that there are no applicable NSPS requirements for this proposed source.

3.5.4.3 [redacted] Milling (FEM)

The proposed [redacted] process was reviewed for NSPS applicability. Upon review, it has been determined that there are no applicable NSPS requirements for this proposed source.

3.5.4.4 Stationary Reciprocating Internal Combustion Engines (Emergency Generators)

The proposed new emergency engines are subject to 40 CFR 60, Subpart IIII – Standards of Performance for Stationary Compression Ignition Internal Combustion Engines. The new units will be subject to emission standards, fuel, monitoring, compliance, notification, recordkeeping, and reporting requirements under Subpart IIII.

3.5.4.5 Fuel Oil Storage Tanks

The proposed new petroleum storage tanks were reviewed for applicability of 40 CFR 60, Subpart Kb - Standards of Performance for Storage Vessels (Including Petroleum Liquid Storage Vessels) for Which Construction, Reconstruction, or Modification Commenced after July 23, 1984 for emissions of VOC. Based on the vapor pressure of the fuel oil that will be stored in the tanks, which is less than 3.5 kilopascals, the fuel oil storage tanks will not be subject to Subpart Kb.

3.5.5 National Emission Standards for Hazardous Air Pollutants (MACT) — 40 CFR 63

3.5.5.1 Steam Generating Boilers

The proposed new duel fuel-fired boilers will be subject to the applicable requirements of *40 CFR 63, Subpart DDDDD – National Emission Standards for Hazardous Air Pollutants for Industrial, Commercial, and Institutional Boilers and Process Heaters.* The boilers will also be subject to the General Provisions of 40 CFR 63, Subpart A, which describe performance testing, recordkeeping, reporting, and monitoring.

3.5.5.2 [redacted]

The proposed [redacted] process was reviewed for MACT applicability. The following potentially applicable subparts were reviewed:

40 CFR 63, Subpart F — National Emission Standards for Organic Hazardous Air Pollutants from the Synthetic Organic Chemical Manufacturing Industry. The provisions of this subpart apply to emission units that manufacture as a primary product one or more of the specific chemicals listed in the subpart. This process does not produce one of the chemicals listed, therefore it is not subject to Subpart F. For the same reason, this process is not subject to Subparts G or H.

40 CFR 63, Subpart FFFF — National Emission Standards for Hazardous Air Pollutants: Miscellaneous Organic Chemical Manufacturing. The provisions of this subpart apply to miscellaneous organic chemical manufacturing process units (MCPU) located at, or part of, a major source of HAP which satisfy all of the conditions specified in §63.2435(b)(1) through (3). This MCPU does not satisfy the conditions in §63.2435(b)(2) as it does not process, use, or generate any of the organic HAP listed in in section 112(b) of the CAA or hydrogen halide and halogen HAP, as defined in §63.2550. Therefore, this process will not be subject to Subpart FFFF.

3.5.5.3 [redacted] Milling (FEM)

The proposed [redacted] process was reviewed for MACT applicability. The following potentially applicable subpart was reviewed:

40 CFR 63, Subpart FFFF – National Emission Standards for Hazardous Air Pollutants: Miscellaneous Organic Chemical Manufacturing. The provisions of this subpart apply to miscellaneous organic chemical manufacturing process units (MCPU) located at, or part of, a major source of HAP. Explosives are classified as organic chemicals using the 1987 version of SIC code 289. This MCPU does not satisfy the conditions in §63.2435(b)(2) as it does not process, use, or generate any of the organic HAP listed in in section 112(b) of the CAA or hydrogen halide and halogen HAP, as defined in §63.2550. Therefore, this process will not be subject to Subpart FFFF.

3.5.5.4 Stationary Reciprocating Internal Combustion Engines (Emergency Generators)

The stationary reciprocating internal combustion engines used to power the emergency generators will be subject to *40 CFR 63, Subpart ZZZZ – National Emission Standard for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines*. Per §63.6590(b)(i), the engines are only subject to the initial notification requirements of §63.6645(f).

3.5.5.5 Fuel Oil Storage Tanks

Upon review, it has been determined that there are no applicable MACT requirements for this proposed source.

3.5.6 NO_X Budget Standard (NO_X SIP Call) — 40 CFR 96

The steam generating boilers, when operational, will be subject to 40 CFR 96 and TAPCR 1200-03-27-.12, *NO_X SIP Call Requirements for Stationary Boilers and Combustion Turbines*.

3.5.7 Other Requirements

3.5.7.1 Title V Program

The 1990 Clean Air Act (CAA) Amendments also established a federally mandated air operating permit program. The program requires the states to adopt regulations consistent with the CAA and the implementing regulations promulgated by EPA in 40 CFR 70. The program applies to Title V or Part 70 sources that include major stationary sources of air pollutants. The State of Tennessee has adopted the requirements of 40 CFR 70 in TAPCR 1200-03-09-.02 which specify that all affected sources, such as the proposed for this project, have a Title V permit to operate.

4.0 CONTROL TECHNOLOGY REVIEW (BEST AVAILABLE CONTROL TECHNOLOGY (BACT) ANALYSIS)

4.1 Definition of BACT

BACT is defined at 40 CFR 52.21(b)(12) as:

> "an emissions limitation (including a visible emission standard) based on the maximum degree of reduction for each pollutant subject to regulation under the Clean Air Act which would be emitted from any proposed major stationary source or major modification which the Administrator, on a case-by-case basis, taking into account energy, environmental and economic impacts and other costs, determines is achievable for such a source or modification through application of production processes or available methods, systems, and techniques, including fuel cleaning or treatment or innovative fuel combustion techniques for the control of such pollutant. In no event shall application of best available control technology result in emissions of any pollutant which would exceed the emissions allowed by any applicable standard under 40 CFR Parts 60 and 61. If the Administrator determines that technological or economic limitations on the application of measurement methodology to a particular emissions unit would make imposition of an emissions standard infeasible, a design, equipment, work practice, operational standard, or combination thereof, may be prescribed instead to satisfy the requirement for the application of best available control technology. Such standard shall, to the degree possible, set forth the emissions reduction achievable by implementation of such design, equipment, work practice, or operation, and shall provide compliance by means which achieve equivalent results."

4.2 BACT Analysis Process

The analysis and proposal of BACT emission limits and controls is performed on a case-by-case and pollutant-by-pollutant basis. U.S. EPA has developed a process for conducting BACT analyses. This method is referred to as the "top-down" method. The steps to conducting a "top-down" analysis are listed in *U.S. EPA's New Source Review Workshop Manual* (U.S. EPA, 1990). The steps are summarized below:

Step 1: Identify All Control Technologies

The list of potential controls should be comprehensive.

Step 2: Eliminate Technically Infeasible Options

A demonstration of technical infeasibility should be clearly documented and should show, based on physical, chemical, and engineering principles, that technical difficulties would preclude the successful use of the control option on the emissions unit under review.

Step 3: Rank Remaining Control Technologies by Control Effectiveness

This ranking includes:

- control effectiveness (percent pollutant removed);
- expected emission rate (tons per year);
- expected emissions reduction (tons per year);

- energy impacts (Btu, kWh);
- environmental impacts (other media and the emissions of toxic and hazardous air emissions); and
- economic impacts (total cost effectiveness and incremental cost effectiveness).

Step 4: Evaluate Most Effective Controls and Document Results
This includes:

- A case-by-case consideration of energy, environmental, and economic impacts.
- Rejection of options with unacceptable energy, environmental, or economic impacts.

Step 5: Select BACT
The most effective option not rejected is proposed as BACT. However, as described above (in the definition of BACT), in no event shall application of BACT result in emissions of a pollutant which would exceed the emissions allowed by any applicable standard under 40 CFR Part 60 (New Source Performance Standard or NSPS) and 40 CFR Part 61 (National Emission Standard for Hazardous Air Pollutants or NESHAP).

Based on this 5-step analysis process and the BACT limit and control proposed by the applicant, the permitting authority selects BACT.

4.3 Point Source Emissions

New Expansion Project emission units to be installed at the HSAAP facility in Phase I which will emit VOC, CO, and GHG's must be considered in the BACT analysis. A summary of these individual emission units is shown in Table 4-1.

Table 4-1
HSAAP Expansion Project Phase 1 Emission Sources and Respective Potential Emissions (TPY)

Source Description	VOC	CO	GHG as CO_2e
Natural Gas Fired Boilers	22.9	100.6	678,139
Fuel Oil Tanks	0.2	—	—
[redacted]	6.2	—	—
Emergency Generators	0.7	5.8	1,932

4.4 BACT for Steam Generating Boilers

4.4.1 Process Description

HSAAP proposes to install four dual fuel boilers (natural gas and #2 fuel oil) to provide steam needed to operate production processes at HSAAP. The four proposed boilers are rated at 250,000 pounds per hour (PPH) of steam with a total heat input capacity of 327 MMBtu/hr when firing natural gas and 310 MMBtu/hr when firing fuel oil. To provide fuel oil storage for the boilers, HSAAP proposes to install two 1,024,000-gallon fuel oil storage tanks. The fuel oil storage tanks qualify as insignificant emission units.

4.4.2 BACT Analysis for VOC Emissions from the Steam Generating Boilers

Step 1: Identify All Control Technologies

Potential VOC control technologies include:

- Thermal Oxidation
- Recuperative Thermal Oxidation
- Regenerative Thermal Oxidation
- Catalytic Oxidation
- Clean Fuel and Good Combustion Practices (GCP)

Thermal Oxidation

Thermal oxidation is the process of oxidizing combustible materials by raising the temperature of the material above its auto-ignition point in the presence of oxygen, and maintaining it at high temperature for sufficient time to complete combustion to CO_2 and H_2O. Thermal incinerators can be used to reduce emissions from almost all VOC sources. Their fuel consumption is high, so thermal units are best suited for smaller process applications with moderate to high VOC loadings. Typical gas flow rates are 500 to 50,000 scfm. VOC destruction efficiency depends upon design criteria (i.e., chamber temperature, residence time, inlet VOC concentration, compound type, and degree of mixing). Typical thermal incinerator design efficiencies range from 98 to 99.99% and above depending on system requirements and characteristics of the contaminated stream.

Recuperative Thermal Oxidation

These systems incorporate a heat exchanger with a combustion chamber and can handle a wide range of process flow rates and VOC concentrations. The heat exchanger is used to preheat the VOC laden air prior to entering the combustion chamber to reduce operating costs.

Regenerative Thermal Oxidizers

Regenerative thermal oxidizers can be used to reduce emissions from a variety of stationary sources. Generally, high flow (greater than 5,000 scfm) and low VOC concentration (less than 1,000 ppmv) applications are best suited to control with regenerative incineration systems. Typical gas flow rates are 5,000 to 500,000 scfm. VOC destruction efficiency depends upon design criteria (i.e., chamber temperature, residence time, inlet VOC concentration, compound type, and degree of mixing). Typical regenerative incinerator design efficiencies range from 95 to 99% depending on system requirements and characteristics of the contaminated stream. Lower control efficiencies are generally associated with lower concentration flows. Particulate matter (PM), which can clog the incinerator's packed bed, would have to be removed by an internal filter or some pretreatment technology prior to entering the reactor chamber.

Catalytic Oxidation

Catalytic oxidation is a well-known control technology for both VOC and CO emissions and has been widely used with natural gas-fired combined cycle turbines. The products of combustion in the exhaust are introduced into a catalytic bed where the VOC is oxidized to CO_2 and H_2O. A catalytic oxidizer uses a precious metal catalyst in the packed bed, allowing oxidation to occur at approximately 800 °F. The lower temperature requirement reduces the amount of natural gas needed to fuel the VOC abatement system and the overall size of the incinerator. Catalysts typically used for VOC incineration include platinum and alumina. Typical catalytic oxidation design efficiencies range from 90% to 99%, depending on system requirements and characteristics of the contaminated stream.

Clean Fuel and GCP

Good combustion generally requires the following:

- High temperatures;
- Sufficient excess air;
- Sufficient residence times; and
- Good air/fuel mixing.

GCP's maximize combustion efficiency and minimize emissions of incomplete combustion products such as VOC. Most modern combustion systems do not produce high concentrations of VOC emissions when the system is operated and maintained properly. Natural gas is considered one of the cleanest fuels that can be used in boilers of this type.

The results of a US EPA RACT/BACT/LAER Clearinghouse (RBLC) search for 200-400 MMBtu/hr, boilers identified fifteen (15) similar sources with VOC permit limits. The lowest VOC emission limit for boilers in this size range identified in the RBLC is 0.004 lb/MMBtu when burning natural gas. Of these 15 boilers, only one has a specific permit limit listed when burning fuel oil. That limit is 0.0055 lb/MMBtu. (See Table 4-2.)

The results of a search of active PSD permits issued by TDAPC at http://environment-online.state.tn.us:8080/pls/enf_reports/f?p=19031:34001:0::NO:::, identified five (5) recently permitted boilers with VOC emission limits. The lowest emission limit for the boilers in active PSD permits issued by TDAPC is also 0.004 lb/MMBtu (10 ppm @ 3% O_2), when burning both natural gas and fuel oil. (See Table 4-3.)

Table 4-2
Summary of RBLC Search for VOC Emission Limits for Boilers in the 200-400 MMBtu/hr Range

Facility Name	State	Process	Throughput (MMBtu/hr)	Control	VOC Emission Limit Natural Gas (lb/MMBtu)	Fuel Oil [1]
Plant McDonough Combined Cycle	GA	Auxiliary Boiler	200	None Listed	0.0051	—
AGP Soy	NE	Boilers	200	None Listed	0.0054	—
M&G Resins USA, LLC	TX	Boiler	250	GCP	0.004	—
Green River Soda Ash Plant	WY	Auxiliary Boiler	254	GCP	0.0054	—
Kenai Nitrogen Operations	AK	Package Boilers	243	No Controls	0.0054	—
El Dorado Chemical Company	AR	Startup Boiler	240	Good and Efficient Operating Practices	0.004	—
Ohio Valley Resources, LLC	IN	Four Boilers	218	Proper Design and GCP	0.0054	—
Midwest Fertilizer Company, LLC	IN	Auxiliary Boilers	218.6	GCP	0.0054	—
Indorama Lake Charles Facility	LA	Boiler	229	GCP and Proper O&M	0.0054	—
Indorama Lake Charles Facility	LA	Boilers	248	GCP and Proper O&M	0.0054	—
Dyno Nobel Louisiana Ammonia, LLC	LA	Commissioning Boilers	217.5	GCP	0.0054	—
Port Dolphin Energy, LLC	FL	Boilers	278	None Listed	0.0054	—
Ninemile Point Electric Generating Plant	LA	Auxiliary Boiler	338	GCP and Use of Pipeline Quality Natural Gas	0.0054	—
St. James Methanol Plant	LA	Boilers	350	GCP	0.0054	—
Celanese Acetate, LLC	VA	Boilers	400	GCP	0.0055	0.0055

1. A "—" indicates that either the permitted fuel is natural gas only or there is no specific permit limit for VOC emissions when the boiler is burning fuel oil.

Table 4-3
Summary of TDAPC Search for VOC Emission Limits for Boilers

Facility Name	Permit Number	Process	Throughput (MMBtu/hr)	Control	VOC Emission Limit	
					Natural Gas	Fuel Oil [1]
					(lb/MMBtu)	
Dupont Titanium Technologies	966878F	Boilers	432	None Listed	0.0075	—
Hankook Tire Manufacturing	971720	Boilers	41.31 [2]	None Listed	0.0054	0.0507
Eastman Chemical Company	966859F	Boilers	[3]	None Listed	0.004 [4]	0.004 [4]
General Motors, Spring Hill	964132	Boilers	18.5	None Listed	0.0054	—
Packaging Corporation (PCA)	963239P	Combination Boiler	1,000 [5]	None Listed	0.247	—

Notes:
1. A "—" indicates that either the permitted fuel is natural gas only or there is no specific permit limit for VOC emissions when the boiler is burning fuel oil.
2. Four boilers limited to 101 MMBtu/hr. Two boilers are natural gas only and two are dual fuel (natural gas and fuel oil).
3. Five boilers limited to a total of 35.04 TBtu/year.
4. Permit limit is 10 ppm @ 3% O_2 on both natural gas and fuel oil.
5. Boiler is limited to an annual average of 860 MMBtu/hr.

Step 2: Eliminate Technically Infeasible Options

Add-on VOC controls are typically applied to exhaust streams with high VOC concentrations and relatively high temperatures. Modern dual fuel boilers are inherently designed with high fuel combustion efficiency and low VOC emissions. Based on the review of the VOC controls applied to natural gas-fired boilers of similar size (See Table 4-2.) and boilers permitted by TDAPC (See Table 4-3.), none of the add-on VOC controls have been applied to control VOC emissions from boilers of similar size. Therefore, add-on VOC controls are generally considered inappropriate and infeasible for boilers of the size of the steam generating boilers. However, to ensure that a VOC emission rate of 0.004 lb/MMBtu can be consistently achieved, and because catalytic oxidation will control both VOC and CO emissions, catalytic oxidation, along with clean fuels and GCP are considered technically feasible.

Step 3: Rank Remaining Control Technologies by Effectiveness

The remaining control technologies are catalytic oxidation and clean fuels plus GCP. Of these two, catalytic oxidation can achieve the highest control efficiency (90-99%).

Step 4: Evaluate Most Effective Controls and Document Results

Since catalytic oxidation is being proposed as BACT, no further evaluation is required.

Step 5: Select BACT

There are no applicable NSPS or NESHAP rules that would establish a baseline VOC emission rate for the boilers.

Based on this analysis, catalytic oxidation with a VOC emission limit of 0.004 lb/MMBtu when burning both natural gas and fuel oil is proposed as BACT for the steam generating boilers.

4.4.3 BACT Analysis for CO Emissions from the Steam Generating Boilers

Step 1: Identify All Control Technologies

Potential CO control technologies include:

- Catalytic Oxidation
- Clean Fuel and GCP

Catalytic Oxidation

As stated in Section 4.4.2, catalytic oxidation is a well-known control technology for both VOC and CO emissions and has been widely used with natural gas-fired combined cycle turbines. The products of combustion in the exhaust are introduced into a catalytic bed where the CO is oxidized to CO_2. A catalytic oxidizer uses a precious metal catalyst in the packed bed, allowing oxidation to occur at approximately 800 °F. The lower temperature requirement reduces the amount of natural gas needed to fuel the CO abatement system and the overall size of the incinerator. Catalysts typically used for CO and VOC incineration include platinum and alumina. Typical catalytic oxidation design efficiencies range from 90% to 99%, depending on system requirements and characteristics of the contaminated stream.

Clean Fuel and GCP

Good combustion generally requires the following:

- High temperatures;
- Sufficient excess air;
- Sufficient residence times; and
- Good air/fuel mixing.

GCP's maximize combustion efficiency and minimize emissions of incomplete combustion products such as VOC. Most modern combustion systems do not produce high concentrations of VOC emissions when the system is operated and maintained properly. Natural gas is considered one of the cleanest fuels that can be used in boilers of this type.

The results of a US EPA RACT/BACT/LAER Clearinghouse (RBLC) search for 200-400 MMBtu/hr, boilers identified eleven (11) similar sources with CO permit limits. The lowest CO emission limit for boilers in this size range identified in the RBLC is 0.035 lb/MMBtu when burning natural gas. Of these 11 boilers none has a specific permit limit listed when burning fuel oil. (See Table 4-4.)

The results of a search of active PSD permits issued by TDAPC at http://environment-online.state.tn.us:8080/pls/enf_reports/f?p=19031:34001:0::NO:::, identified four (4) recently permitted boilers with CO emission limits. The lowest emission limit for the boilers in active PSD permits issued by TDAPC is also 0.036 lb/MMBtu when burning natural gas and 0.04 lb/MMBtu when burning fuel oil. (See Table 4-5.)

Table 4-4
Summary of RBLC Search for CO Emission Limits for Boilers in the 200-400 MMBtu/hr Range

Facility Name	State	Process	Throughput (MMBtu/hr)	Control	CO Emission Limit	
					Natural Gas	Fuel Oil [1]
					(lb/MMBtu)	
Plant McDonough Combined Cycle	GA	Auxiliary Boiler	200	None Listed	0.037	—
Karn Weadock Generating Complex	MI	Auxiliary Boiler	220	Efficient Combustion	0.035	—
Kraton Polymers	OH	Boilers	249	GCP and Clean Fuel	0.036	—
Shintech Plaquemine Plant 2	LA	Utility Boilers	25	GCP	0.0362	—
Kenai Nitrogen Operations	AK	Package Boilers	243	No Controls	0.0369	—
El Dorado Chemical Company	AR	Startup Boiler	240	Good and Efficient Operating Practices	0.037	—
Ohio Valley Resources, LLC	IN	Four Boilers	218	Proper Design and GCP	0.0365	—
Midwest Fertilizer Company, LLC	IN	Auxiliary Boilers	218.6	GCP	0.0365	—
Indorama Lake Charles Facility	LA	Boiler	229	GCP and Proper O&M	0.037	—
Indorama Lake Charles Facility	LA	Boilers	248	GCP and Proper O&M	0.082	—
Power County Advanced Energy Center	ID	Package Boilers	250	GCP	0.074	—

Note:
1. A "—" indicates that either the permitted fuel is natural gas only or there is no specific permit limit for CO emissions when the boiler is burning fuel oil.

Table 4-5
Summary of TDAPC Search for CO Emission Limits for Boilers

Facility Name	Permit Number	Process	Throughput (MMBtu/hr)	Control	CO Emission Limit	
					Natural Gas	Fuel Oil [1]
					(lb/MMBtu)	
Dupont Titanium Technologies	966878F	Boilers	432	None Listed	0.084	—
Hankook Tire Manufacturing	971720	Boilers	41.31 [2]	None Listed	0.036	0.040
TVA Johnsonville Cogeneration	972969	Boilers	450	Good Combustion Design and Practices	0.084	—
General Motors, Spring Hill	964132	Boilers	18.5	None Listed	0.082	—

Notes:
1. A "—" indicates that either the permitted fuel is natural gas only or there is no specific permit limit for VOC emissions when the boiler is burning fuel oil.
2. Four boilers limited to 101 MMBtu/hr. Two boilers are natural gas only and two are dual fuel (natural gas and fuel oil).

Step 2: Eliminate Technically Infeasible Options

Based on the review of the CO controls applied to natural gas-fired boilers of similar size (See Table 4-4.) and boilers permitted by TDAPC (See Table 4-5.), add-on CO controls have not been applied to control CO emissions from boilers of similar size. Therefore, add-on CO controls are generally considered inappropriate and infeasible for boilers of the size of the steam generating boilers. The use of clean fuels and GCP are considered technically feasible.

Step 3: Rank Remaining Control Technologies by Effectiveness

The use of clean fuels plus GCP is the only remaining technically feasible option.

Step 4: Evaluate Most Effective Controls and Document Results

Since use of clean fuels is being proposed as BACT, no further evaluation is required.

Step 5: Select BACT

Because it is proposed to permit the boilers to burn fuel oil for 336 hours per year, the boilers will be classified in the "Unit designed to burn gas 2 (other) subcategory" in accordance with 40 CFR 63, Subpart DDDDD, *National Emission Standards for Hazardous Air Pollutants for Major Sources: Industrial, Commercial, and Institutional Boilers and Process Heaters* (Boiler MACT). Based on that classification, the emissions from the boilers are limited to a CO concentration of 130 ppm corrected to 3% O_2. That concentration is equivalent to an emission rate of 0.096 lb/MMBtu based on heat input to the boilers.

Based on this analysis, use of clean fuels and GCP with a CO emission limit of 0.035 lb/MMBtu when burning natural gas and 0.04 lb/MMBtu when burning fuel oil is proposed as BACT for the steam generating boilers. It should be noted that catalytic oxidation was proposed as BACT for VOC (See Section 4.4.2). Since catalytic oxidation will reduce emissions of both VOC and CO, actual CO emission rates will be lower than the proposed CO BACT rates.

4.4.4 BACT Analysis for GHG Emissions from the Steam GeneratingBoilers

Carbon dioxide is the primary GHG resulting from the combustion of natural gas and fuel oil. Emissions of CH_4 and N_2O also result from fuel combustion and have been addressed below and are included in the CO_2e totals. Because the primary GHG emitted is CO_2, the control technologies and measures presented in this section focus on CO_2 control technologies.

Step 1: Identify All Control Technologies

Potential GHG control technologies include:

- Carbon Capture and Storage (CCS)
- Combustion of Clean Fuels
- Combined Heat and Power (CHP)
- Design and Operational Energy Efficiency Measures

<u>CCS</u>

CCS systems involve the concentration of the CO_2 stream resulting from the combustion of fuels like natural gas and fuel oil. The concentrated CO_2 is then compressed for transport via a pipeline to an appropriate location for underground injection into a suitable geological storage reservoir or for use in crude oil production for enhanced oil recovery (EAR). CCS could potentially reduce GHG emissions from the boiler flue gas by 50 to 90%.

Combustion of Clean Fuels
Natural gas is the fossil fuel with the lowest GHG emission rate.

CHP
CHP, also referred to as cogeneration, is the production of useful heat and electricity from a single thermal source, such as the combustion of natural gas and/or fuel oil. Significant efficiency gains are derived from employing CHP. While thermal electric generation processes typically lose 50–70% of the input fuel energy in the form of waste heat, by recovering this energy for steam or hot water production on-site, the overall efficiency of the process increases from 30–50% to 70–80%. The subsequent reduction in fuel requirements translates directly into reduced CO_2 and other GHG emissions.

Design and Operational Energy Efficient Measures
Several energy efficient design elements are available for dual fuel boilers. These efficiency elements can reduce the natural gas and/or fuel oil required, thus resulting in less CO_2 and other GHGs emissions.

The results of a RBLC search for 200-400 MMBtu/hr, boilers identified eleven (11) similar sources with GHG permit limits. All of the GHG emission limits for boilers in this size range that were identified in the RBLC, except for one, are based on (or consistent with) Tables C-1 and C-2 of Subpart C (Stationary Fuel Combustion Sources) of the Mandatory GHG Reporting Rule (40 CFR Part 98). These emission rates were then converted to CO_2 equivalents (CO_2e) using the global warming potential (GWP) values from Table A-1 of 40 CFR Part 98, Subpart A (General Provisions). None of the 11 boilers have a specific permit limit listed when burning fuel oil. (See Table 4-6.)

The results of a search of active PSD permits issued by TDAPC at http://environment-online.state.tn.us:8080/pls/enf_reports/f?p=19031:34001:0::NO:::, identified three (3) recently permitted boilers with GHG permit limits. All of the GHG emission limits for boilers in active PSD permits issued by TDAPC are also based on (or consistent with) Tables C-1 and C-2 of Subpart C (Stationary Fuel Combustion Sources) of the Mandatory GHG Reporting Rule (40 CFR Part 98). These emission rates were then converted to CO_2e using the global warming potential (GWP) values from Table A-1 of 40 CFR Part 98, Subpart A (General Provisions). None of the 3 boilers have a specific permit limit listed when burning fuel oil. (See Table 4-7.)

Table 4-6
Summary of RBLC Search for CO_2e Emission Limits for
Boilers in the 200-400 MMBtu/hr Range

Facility Name	State	Process	Throughput (MMBtu/hr)	Control	CO_2e Emission Limit [1] (lb/MMBtu) Natural Gas	Fuel Oil [2]
Ohio Valley Resources, LLC	IN	Boilers	218	Energy Efficiency and 80% Thermal Efficiency	116.9	—
Sabic Innovative Plastics	IN	Auxiliary Boilers	249	None Listed	122.4	—
El Dorado Chemical Company	AR	Startup Boiler	240	Good Operating Practices	117.4	—
Kenai Nitrogen Operations	AK	Three Package Boilers	243	None Listed	116.9	—
Agrium	TX	Package Boiler	240	Good Engineering Practices	117.1	—
Iowa State University Power Plant	IA	Boiler	213.6	None Listed	117.1	—
Indorama Lake Charles Facility	LA	Boiler	229	Gaseous fuels, GCP and Proper O&M	117.1	—
Indorama Lake Charles Facility	LA	Boilers	248	Gaseous fuels, GCP and Proper O&M	117.1	—
Southern Minnesota Sugar Beet Cooperative	MN	Boiler	257.3	Use of Natural Gas and Equipped with an Economizer and Oxygen Trim System	117.0	—
Cargill Incorporated	NE	Boiler	300	GCP	117.0	—
St. James Methanol Plant	LA	Boilers	350	GCP	117.1	—

Notes:
1. Some of these lb/MMBtu emission limits were computed based on annual CO_2e and annual heat input permit limits and are provided here for the sake of comparison. The annual permit limits were obtained from permits.
2. A "—" indicates that either the permitted fuel is natural gas only or there is no specific permit limit for VOC emissions when the boiler is burning fuel oil.

Table 4-7
Summary of TDAPC Search for GHG Emission Limits for Boilers

Facility Name	Permit Number	Process	Throughput (MMBtu/hr)	Control	CO_2e Emission Limit (lb/MMBtu) Natural Gas	Fuel Oil [1]
Dupont Titanium Technologies	966878F	Boilers	432	None Listed	117.0	—
Hankook Tire Manufacturing	971720	Boilers	41.31 [2]	None Listed	117.2	—
TVA Johnsonville Cogeneration	972969	Boilers	450	Use of Natural Gas	117.0	—

Notes:
1. A "—" indicates that either the permitted fuel is natural gas only or there is no specific permit limit for VOC emissions when the boiler is burning fuel oil.
2. Four boilers limited to 101 MMBtu/hr. Two boilers are natural gas only and two are dual fuel (natural gas and fuel oil).

Step 2: Eliminate Technically Infeasible Options

In its *Draft New Source Review Workshop Manual*, October 1990, U.S. EPA explains that "two key concepts are important in determining whether an undemonstrated technology is feasible:" availability" and "applicability." In *PSD and Title V Permitting Guidance for Greenhouse Gases*, EPA-457/B-11-001, March 2011, U.S. EPA states that it "generally considers CCS to be an "available" add-on pollution control technology for facilities emitting CO_2 in large amounts and industrial facilities with high-purity CO_2 streams." Therefore, the issue is whether CCS is "applicable" to the control of the GHG emissions from the steam generating boilers. In *Draft New Source Review Workshop Manual*, U.S. EPA further states the following: "Technical judgment on the part of the applicant and the reviewing authority is to be exercised in determining whether a control alternative is applicable to the source type under consideration. In general, a commercially available control option will be presumed applicable if it has been or is soon to be deployed (e.g., is specified in a permit) on the same or a similar source type. Absent a showing of this type, technical feasibility would be based on examination of the physical and chemical characteristics of the pollutant-bearing gas stream and comparison to the gas stream characteristics of the source types to which the technology had been applied previously. Deployment of the control technology on an existing source with similar gas stream characteristics is generally sufficient basis for concluding technical feasibility barring a demonstration to the contrary." As can be seen from Tables 4-4 and 4-5, there have been no CCS controls deployed or permitted in the U.S. on industrial boilers similar in size to the proposed steam generating boilers. Therefore, in accordance with U.S. EPA guidance, an "examination of the physical and chemical characteristics of the pollutant-bearing gas stream and a comparison to the gas stream characteristics of the source types to which" CCS technology has been applied is in order. In the *Report of the Interagency Task Force on Carbon Capture and Storage*, August 2010, the task force, when speaking of controlling CO_2 emissions from power plants, which are typically much larger than the steam generating boilers (a typical coal-fired power plant has a heat input capacity of 3,700–5,200 MMBtu/hr versus the 327 MMBtu/hr for the steam generating boilers), states that separating CO_2 from a flue gas is challenging because "a high volume of gas must be treated because the CO_2 is dilute (13–15% by volume in coal systems, 3–4% in natural gas systems); the flue gas is at low pressure (near atmospheric); trace impurities (PM, SO_2, NO_X, etc.) can degrade the CO_2 capture materials; and compressing captured CO_2 from near atmospheric pressure to pipeline pressure (about 2,000 psia) requires a large auxiliary power load."

Since the steam generating boilers are much smaller than the typical power plant, the GHG emissions from the steam generating boilers will be very dilute (3-4%), and the gas stream will be at, or near, atmospheric pressure, it can be concluded that CCS is not "applicable" to control of the GHG emissions from the steam generating boilers.

CHP is also not considered technically feasible for controlling GHG emissions from the steam generating boilers because it would result in a "fundamental change" to the purpose of the boilers. The purpose of the boilers is to produce steam for the production processes at HSAAP. The U.S. Supreme Court reaffirmed in their decision in Utility Air Regulatory Group v. Environmental Protection Agency, et al, June 23, 2014, that "BACT cannot be used to order a fundamental redesign of the facility."

Step 3: Rank Remaining Control Technologies by Effectiveness

The remaining control technologies are combustion of clean fuels and design and operational energy efficiency measures.

Step 4 Evaluate Most Effective Controls and Document Results

The steam generating boilers will be fired with natural gas for the overwhelming majority of their operating hours. A combination of firing natural gas most of the time and the implementation of fuel efficiency techniques is the most effective technically feasible option for reducing GHG emissions from the steam generatingboilers, therefore no further analysis is required.

Step 5 Select BACT

There are no applicable NSPS or NESHAP rules that would establish a baseline GHG emission rate for the boilers.

BACT is proposed as a combination of firing natural gas most of the time and the implementation of fuel efficiency techniques with a limit of 678,139 tons as CO_2e on a 12-month rolling total basis. This limit is based on the GWP values from Table A-1 of 40 CFR Part 98; a CO_2 emission rate of 53.06 kg/MMBtu (117.0 lb/MMBtu), a CH_4 emission rate of 0.001 kg/MMBtu (0.0022 lb/MMBtu), and a N_2O emission rate of 0.0001 (0.00022 lb/MMBtu), when burning natural gas; and a CO_2 emission rate of 73.96 kg/MMBtu (163.2) lb/MMBtu), a CH_4 emission rate of 0.003 kg/MMBtu (0.007 lb/MMBtu), and a N_2O emission rate of 0.0006 (0.001 lb/MMBtu), when burning fuel oil.

4.4.5 BACT Analysis for VOC Emissions from the Fuel Oil Storage Tanks

As mentioned above, because the VOC emissions from the tanks are each well below 5 tpy, the two tanks are considered insignificant emission units. The tanks are used to store fuel oil to operate the steam generating boilers in the event of a temporary natural gas outage.

Step 1: Identify All Control Technologies

Potential VOC control technologies for the two fuel oil storage tanks include:

- Flare
- Thermal oxidation
- Condenser
- Catalytic oxidation
- Carbon adsorption
- Scrubber
- Internal floating roof
- External floating roof
- Submerged fill
- White colored tank
- Good maintenance

Flare

Flares can be used to control almost any VOC stream, and can typically handle large fluctuations in VOC concentration, flow rate, heating value, and inert species content. The primary use of flares is that of a safety device used to control a large volume of a pollutant resulting from upset conditions. The majority of chemical plants and refineries have existing flare systems designed to relieve emergency process upsets that release large volumes of gas. Flares can reduce VOC emissions by 98% or more.

Thermal Oxidation

Thermal oxidation can be used to reduce emissions from almost all VOC sources, including reactor vents, distillation vents, solvent operations, and operations performed by ovens, dryers, and kilns. Fuel consumption is high, so thermal units are best suited for smaller process applications with moderate to high VOC loadings. Thermal oxidation can reduce VOC emissions by 98-99%

Condenser

A condenser is a control device that is used to cool an emission stream having organic vapors in it and to change the vapors to a liquid. Condensed organic vapors can be recovered, refined, and might be reused, preventing their release to the ambient air. Condensers can reduce VOC emissions by 99% or more.

Catalytic Oxidation

Catalytic oxidation, like thermal oxidation, can be used to reduce emissions from a variety of sources. Catalytic oxidation is widely used to control VOC emissions from solvent evaporation processes associated with surface coating and printing operations. Catalytic oxidation can reduce VOC emissions by 95% or more depending on the volume of catalyst used.

Carbon Adsorption

With carbon adsorption, VOC vapors condense on the surface of the adsorbent, usually activated carbon. When the surface has adsorbed nearly as much as it can, the VOC is either desorbed as part of regenerating the adsorbent or the carbon, with VOC, is disposed of. If the VOC is desorbed, the VOC vapors are usually at a higher concentration, after which the VOC is either recovered or has to be destroyed. Carbon adsorption can reduce VOC emissions by 95% or more.

Scrubber

The use of a scrubber to control VOC emissions is an absorption process (as opposed to carbon adsorption, which is an adsorption process). With a scrubber, an absorbent chemical is used to remove VOC's. The absorbent chemical is chosen based on its ability to absorb the chemical or chemicals which compose the VOC waste gas stream. In a scrubber the sorbent is intimately mixed with the VOC waste gas stream to give the sorbent the opportunity to absorb as much of the VOC as possible. Scrubbers can reduce VOC emissions by 95% or more.

Internal Floating Roof

An internal floating roof tank has both a permanent fixed roof and a floating roof inside. There are two basic types of internal floating roof tanks: tanks in which the fixed roof is supported by vertical columns within the tank, and tanks with a self-supporting fixed roof and no internal support columns. An internal floating roof minimizes evaporative losses of the stored liquid. Evaporative losses from floating roofs may come from deck fittings, nonwelded deck seams, and the annular space between the deck and tank wall. Internal floating roofs can reduce VOC emissions due to breathing losses by 75-80%.

External Floating Roof

A typical external floating roof tank consists of an open- topped cylindrical steel shell equipped with a roof that floats on the surface of the stored liquid. The floating roof consists of a deck, fittings, and rim seal system. Floating decks are of two general types: pontoon or double-deck. The purpose of the floating roof and rim seal system is to reduce evaporative loss of the stored liquid. Some annular space remains between the seal system and the tank wall. The external floating roof design is such that evaporative losses from the stored liquid are limited to losses from the rim seal system and deck fittings (breathing loss) and any exposed liquid on the tank walls (withdrawal loss). External floating roofs can reduce VOC emissions by 75-80%.

Submerged Fill
With submerged fill the fill pipe extends almost to the bottom of the tank. During most of submerged filling of the tank the fill pipe opening is below the liquid surface level. Liquid turbulence is controlled significantly, resulting in much lower vapor generation than encountered during filling without submerged fill. Submerged fill can reduce VOC emissions by 10-25%.

White Colored Tank
White or light-colored tanks do not absorb as much energy from the sun, thus they stay cooler. Since vapor pressures normally increase with increasing temperatures, cooler tanks result in lower breathing losses.

Good Tank Maintenance
Good maintenance of tanks and vents will reduce emissions from both working and breathing losses.

Twenty-five permits were found during a search of the RBLC for VOC controls for liquid storage tanks. In those 25 permits, the following was found:

Control	Number of Permits Where Control Was Required
White or Light-Colored Tank	8
Submerged Fill	7
External Floating Roof	5
Scrubber	5
Thermal Oxidation	3
Good Maintenance	3
Flare	2
Internal Floating Roof	1
Carbon Adsorption	1
Condenser	0
Catalytic Oxidation	0

Step 2: Eliminate Technically Infeasible Options
All of the control technologies listed above are considered technically feasible and most have been required in permits found during the RBLC search.

Step 3: Rank Remaining Control Technologies by Effectiveness
The control technology options are ranked in order of their approximate effectiveness in Step 1, above.

Step 4: Evaluate Most Effective Controls and Document Results
As mentioned above, the two tanks will have combined uncontrolled VOC emissions of less than 0.2 tpy. Consequently, it is not considered economically feasible to apply any add-on controls to the tanks or to require the use of either an internal or external floating roof. Based on emission calculations using EPA Tanks 4.0.9d, the maximum reduction in VOC emissions due to the use of a floating roof is about 150 pounds per year. (The EPA Tanks emission calculation reports for

the two tanks as fixed roof, external floating roof, and internal floating roof are provided in Appendix B.) Therefore, a flare, thermal oxidation, a condenser, catalytic oxidation, carbon adsorption, a scrubber, internal floating roof, and external floating roof are eliminated from further consideration.

Step 5: Select BACT

There are no applicable NSPS or NESHAP rules that would establish a baseline VOC emission rate for the fuel oil storage tanks.

BACT is proposed as white/light color, submerged fill, and good maintenance practices and a combined VOC emission rate of 0.2 tpy.

4.5 BACT for [redacted]

4.5.1. Process Description

HSAAP proposes to install process equipment in Building [redacted] for the [redacted] of crude explosives. The equipment in Building [redacted] will be used for three separate batch processes. Each of the three processes results in different emissions. The [redacted] of [redacted] will result in emissions of VOC. Those VOC emissions result from the use of [redacted] to dissolve the crude. After the crude is partially dissolved in the [redacted], the majority of the [redacted] is recovered by boiling and condensation. VOC emissions from this process are vented to the atmosphere. In addition to this batch process, four tanks containing [redacted] [redacted] tank), [redacted] and water [redacted] tanks) and [redacted] ([redacted] tank) will have small volumes of uncontrolled VOC emissions (less than 0.2 tpy for all four tanks combined). Because the VOC emissions from the tanks are each well below 5 tpy, the four tanks are considered insignificant emission units.

4.5.2 BACT Analysis for VOC Emissions from [redacted] Tanks

Step 1: Identify All Control Technologies

Potential VOC control technologies for the four [redacted] tanks include:

- Flare
- Thermal oxidation
- Condenser
- Catalytic oxidation
- Carbon adsorption
- Scrubber
- Internal floating roof
- External floating roof
- Submerged fill
- White colored tank
- Good maintenance

Flare

Flares can be used to control almost any VOC stream, and can typically handle large fluctuations in VOC concentration, flow rate, heating value, and inert species content. The primary use of flares is that of a safety device used to control a large volume of a pollutant resulting from upset conditions. The majority of chemical plants and refineries have existing flare systems designed to relieve emergency process upsets that release large volumes of gas. Flares can reduce VOC emissions by 98% or more.

Thermal Oxidation

Thermal oxidation can be used to reduce emissions from almost all VOC sources, including reactor vents, distillation vents, solvent operations, and operations performed by ovens, dryers, and kilns. Fuel consumption is high, so thermal units are best suited for smaller process applications with moderate to high VOC loadings. Thermal oxidation can reduce VOC emissions by 98-99%

Condenser

A condenser is a control device that is used to cool an emission stream having organic vapors in it and to change the vapors to a liquid. Condensed organic vapors can be recovered, refined, and might be reused, preventing their release to the ambient air. Condensers can reduce VOC emissions by 99% or more.

Catalytic Oxidation

Catalytic oxidation, like thermal oxidation, can be used to reduce emissions from a variety of sources. Catalytic oxidation is widely used to control VOC emissions from solvent evaporation processes associated with surface coating and printing operations. Catalytic oxidation can reduce VOC emissions by 95% or more depending on the volume of catalyst used.

Carbon Adsorption

With carbon adsorption, VOC vapors condense on the surface of the adsorbent, usually activated carbon. When the surface has adsorbed nearly as much as it can, the VOC is either desorbed as part of regenerating the adsorbent or the carbon, with VOC, is disposed of. If the VOC is desorbed, the VOC vapors are usually at a higher concentration, after which the VOC is either recovered or has to be destroyed. Carbon adsorption can reduce VOC emissions by 95% or more.

Scrubber

The use of a scrubber to control VOC emissions is an absorption process (as opposed to carbon adsorption, which is an adsorption process). With a scrubber, an absorbent chemical is used to remove VOC's. The absorbent chemical is chosen based on its ability to absorb the chemical or chemicals which compose the VOC waste gas stream. In a scrubber the sorbent is intimately mixed with the VOC waste gas stream to give the sorbent the opportunity to absorb as much of the VOC as possible. Scrubbers can reduce VOC emissions by 95% or more.

Internal Floating Roof

An internal floating roof tank has both a permanent fixed roof and a floating roof inside. There are two basic types of internal floating roof tanks: tanks in which the fixed roof is supported by vertical columns within the tank, and tanks with a self-supporting fixed roof and no internal support columns. An internal floating roof minimizes evaporative losses of the stored liquid. Evaporative losses from floating roofs may come from deck fittings, nonwelded deck seams, and the annular space between the deck and tank wall. Internal floating roofs can reduce VOC emissions due to breathing losses by 75-80%.

External Floating Roof

A typical external floating roof tank consists of an open- topped cylindrical steel shell equipped with a roof that floats on the surface of the stored liquid. The floating roof consists of a deck, fittings, and rim seal system. Floating decks are of two general types: pontoon or double-deck. The purpose of the floating roof and rim seal system is to reduce evaporative loss of the stored liquid. Some annular space remains between the seal system and the tank wall. The external floating roof design is such that evaporative losses from the stored liquid are limited to losses from the rim seal system and deck fittings (breathing loss) and any exposed liquid on the tank walls (withdrawal loss). External floating roofs can reduce VOC emissions by 75-80%.

Submerged Fill

With submerged fill the fill pipe extends almost to the bottom of the tank. During most of submerged filling of the tank the fill pipe opening is below the liquid surface level. Liquid turbulence is controlled significantly, resulting in much lower vapor generation than encountered during filling without submerged fill. Submerged fill can reduce VOC emissions by 10-25%.

White Colored Tank

White or light-colored tanks do not absorb as much energy from the sun, thus they stay cooler. Since vapor pressures normally increase with increasing temperatures, cooler tanks result in lower breathing losses.

Good Tank Maintenance

Good maintenance of tanks and vents will reduce emissions from both working and breathing losses.

Twenty-five permits were found during a search of the RBLC for VOC controls for liquid storage tanks. In those 25 permits, the following was found:

Control	Number of Permits Where Control Was Required
White or Light-Colored Tank	8
Submerged Fill	7
External Floating Roof	5
Scrubber	5
Thermal Oxidation	3
Good Maintenance	3
Flare	2
Internal Floating Roof	1
Carbon Adsorption	1
Condenser	0
Catalytic Oxidation	0

Step 2: Eliminate Technically Infeasible Options

All of the control technologies listed above are considered technically feasible and most have been required in permits found during the RBLC search.

Step 3: Rank Remaining Control Technologies by Effectiveness

The control technology options are ranked in order of their approximate effectiveness in Step 1, above.

Step 4: Evaluate Most Effective Controls and Document Results

As mentioned above, the four tanks will have combined uncontrolled VOC emissions of less than 0.2 tpy. Consequently, it is not considered economically feasible to apply any add-on controls to the tanks. Therefore, a flare, thermal oxidation, a condenser, catalytic oxidation, carbon adsorption, and a scrubber are eliminated from further consideration.

With regard to both internal and external floating roofs, because there is the chance that trace amounts of explosives can be present in the tanks, a floating roof tank cannot be used due to explosive design standard 11507. Therefore, floating roofs are eliminated from further consideration.

With regard to white or light-colored tanks, a white or light-colored tank would impede tank surface inspections for mechanical integrity. In addition, because the explosives are light-colored, a tank color similar to the color of the explosives would complicate leak detection. Also, there are potential issues with paint compatibility with explosives. For these reasons, white or light-colored tanks are eliminated from further consideration.

Step 5: Select BACT

There are no applicable NSPS or NESHAP rules that would establish a baseline VOC emission rate for the G-3, Recrystallization tanks.

BACT is proposed as submerged fill with good maintenance practices and a combined VOC emission rate of 0.18 tpy.

4.5.3 BACT Analysis for VOC Emissions from [redacted] Process Vent

Step 1: Identify All Control Technologies

Potential VOC control technologies for the [redacted] process vent include:

- Flare
- Thermal oxidation
- Condenser
- Catalytic oxidation
- Carbon adsorption
- Scrubber

Flare

Flares can be used to control almost any VOC stream, and can typically handle large fluctuations in VOC concentration, flow rate, heating value, and inert species content. The primary use of flares is that of a safety device used to control a large volume of a pollutant resulting from upset conditions. The majority of chemical plants and refineries have existing flare systems designed to relieve emergency process upsets that release large volumes of gas. Flares can reduce VOC emissions by 98% or more.

Thermal Oxidation

Thermal oxidation can be used to reduce emissions from almost all VOC sources, including reactor vents, distillation vents, solvent operations, and operations performed by ovens, dryers, and kilns. Fuel consumption is high, so thermal units are best suited for smaller process applications with moderate to high VOC loadings. Thermal oxidation can reduce VOC emissions by 98-99%

Condenser

A condenser is a control device that is used to cool an emission stream having organic vapors in it and to change the vapors to a liquid. Condensed organic vapors can be recovered, refined, and might be reused, preventing their release to the ambient air. Condensers can reduce VOC emissions by 99% or more.

Catalytic Oxidation

Catalytic oxidation, like thermal oxidation, can be used to reduce emissions from a variety of sources. Catalytic oxidation is widely used to control VOC emissions from solvent evaporation processes associated with surface coating and printing operations. Catalytic oxidation can reduce VOC emissions by 95% or more depending on the volume of catalyst used.

Carbon Adsorption

With carbon adsorption, VOC vapors condense on the surface of the adsorbent, usually activated carbon. When the surface has adsorbed nearly as much as it can, the VOC is either desorbed as part of regenerating the adsorbent or the carbon, with VOC, is disposed of. If the VOC is desorbed, the VOC vapors are usually at a higher concentration, after which the VOC is either recovered or has to be destroyed. Carbon adsorption can reduce VOC emissions by 95% or more.

Scrubber

The use of a scrubber to control VOC emissions is an absorption process (as opposed to carbon adsorption, which is an adsorption process). With a scrubber, an absorbent chemical is used to remove VOC's. The absorbent chemical is chosen based on its ability to absorb the chemical or chemicals which compose the VOC waste gas stream. In a scrubber the sorbent is intimately mixed with the VOC waste gas stream to give the sorbent the opportunity to absorb as much of the VOC as possible. Scrubbers can reduce VOC emissions by 95% or more.

HSAAP is the only facility in the US that produces the explosives RDX, HMX, and IMX. Consequently, there are no permits in the RBLC for the explosives recrystallization process. As described earlier, however, the VOC emissions produced during the batch process to recrystallize RDX result from the distillation and condensation of cyclohexanone. A search of the RBLC for VOC emissions from distillation processes resulted in the identification of nine (9) permitted VOC emission sources. Table 4-8 summarizes the control technologies and control efficiencies found during that RBLC search. Of the 9 permitted VOC emission sources, four are controlled by flares, three are controlled by routing the VOC's to the fuel gas system for energy recovery, one is controlled by thermal oxidation, and one is controlled by a scrubber. The control efficiency for all the sources, for which a control efficiency was specified, is 98%.

Table 4-8
Summary of RBLC Search for VOC Controls for the Distillation Process

Facility Name	State	Process	Control	VOC Control Efficiency (%)
Highlands Ethanol Facility	FL	Distillation	Scrubber	98
Grain Processing Corporation	IN	Distillation Heads Loadout	Enclosed Flare	98
Cardinal Ethanol	IN	Solids Distillation System	Enclosed Flare	98
Tradebe Treatment and Recycling, LLC	IN	Solids Distillation System	Flare	98
Central Indiana Ethanol	IN	Distillation Tower	Flare	98
Lake Charles Chemical	LA	Distillation Tower and Vacuum Distillation Tower	Flare or Route to Fuel Gas System	NA [1]
Lake Charles Chemical	LA	Distillation Units	Route to Fuel Gas System	NA [1]
Lake Charles Chemical	LA	Distillation and Drying	Route to Fuel Gas System	NA [1]
Lake Charles Chemical	LA	Distillation and Drying	Thermal Oxidation	NA [1]

Note:
1. Control efficiency not given.

Step 2: Eliminate Technically Infeasible Options

Because the processes in [redacted] involve the [redacted] of explosives, it is not technically feasible, from a safety standpoint, to employ any control technology that involves a flame. Consequently, flares, catalytic oxidation, and thermal oxidation are considered not technically feasible.

Step 3: Rank Remaining Control Technologies by Effectiveness

The control technology options are ranked in order of their approximate effectiveness in Step 1, above. After elimination of flares, catalytic oxidation, and thermal oxidation, the remaining control technologies in order of effectiveness are condenser, carbon adsorption, and scrubber.

Step 4: Evaluate Most Effective Controls and Document Results

The remaining control technologies provide the opportunity to recover the cyclohexanone for reuse. Cyclohexanone recovery by the emission control equipment is considered beneficial to the recrystallization process.

Recovery of the cyclohexanone by either carbon adsorption or scrubber would require extra steps to separate the cyclohexanone from either the carbon or the scrubbant. Recovery of the cyclohexanone by condensation would not require those extra steps. All three of the control technologies that provide for cyclohexanone recovery are capable of control efficiencies of 98%.

Step 5: Select BACT

There are no applicable NSPS or NESHAP rules that would establish a baseline VOC emission rate for the [redacted] tanks.

BACT is proposed as condensation.

During the first 25% of the batch process inert materials used to fill process equipment between batches for safety purposes will be purged from the system. During that time condenser control efficiencies will be slightly reduced. Consequently, BACT is proposed as the use of two condensers in series with a control efficiency during 25% of the batch process (approximately 4.25 hours) of 95% and a control efficiency during 75% of the batch process (approximately 12.75 hours) of 98%. These proposed efficiencies will result in an average hourly VOC emission rate for the batch of 0.42 lb/hr and an annual emission rate of 6.0 tpy.

4.6 BACT for Emergency Generators

In the event of the loss of electrical power, it is proposed that the facility be equipped with three emergency diesel generators. The engines will be certified by the manufacturer to the standards in 40 CFR 60, Subpart IIII. The emissions from the three proposed emergency generators will below 5 tpy, therefore they will qualify as insignificant emission units.

4.6.1 BACT Analysis for VOC, CO, and GHG Emissions from the Emergency Generators

Step 1: Identify All Control Technologies

Potential VOC, CO, and GHG control technologies for the emergency generators include:

- Good Engine Design
- GCP

Good Engine Design
The diesel-fired emergency engines will be certified to meet the required US EPA emission standards based on their model year and size. In order to achieve this certification, the engine is optimized to perform at its best design capacity.

Good Combustion Practices
Good combustion practices are used to reduce emissions of VOC, CO, and GHG by optimizing conditions in the combustion zone of a fuel burning source. Good combustion practices typically entail introducing the proper ratio of combustion air to the fuel, maintaining a minimum temperature in the firebox of the combustor, or a minimum residence time of fuel and air in the combustion zone.

Step 2: Eliminate Technically Infeasible Options
The control technologies are technically feasible.

Step 3: Rank Remaining Control Technologies by Effectiveness
1. Good engine design.
2. Good combustion practices.

Step 4: Evaluate Most Effective Controls and Document Results
The current BACT guidelines for diesel-fired emergency generators and generally accepted emissions limits meet the NSPS requirements for Stationary Compression Ignition Internal Combustion Engines (40 CFR 60 Subpart IIII). Therefore, the use of a certified engine with good combustion practices can be considered BACT for emissions from diesel-fired emergency generators and fire pumps.

Step 5: Select BACT
BACT for the emergency generators is proposed as good engine design (NSPS Subpart IIII) and GCP with no add-on controls. Emissions from the engines will be minimal because of limited operating hours. As a result, the addition of control devices cannot be cost effective. The engines will meet BACT through EPA emission standards for NO_X+NMHC and CO and compliance with NSPS Subpart IIII as follows:

NO_X+NMHC	6.4 g/kW-hr
CO	3.5 g/kW-hr

GHG emissions are based on calculated using emission factors from 40 CFR Part 98, Subpart C, Tables C-1 and C-2.

4.7 Summary of Proposed BACT
Table 4.9 summarizes the emission limits and control technologies proposed as BACT for VOC, CO, and GHG.

Table 4-9
Summary of Proposed BACT

Emission Unit	Pollutant	Proposed Emission Limit	Proposed Control Technology
Boilers	VOC	0.004 lb/MMBtu	Catalytic oxidation
	CO	0.035 lb/MMBtu on NG 0.040 lb/MMBtu on FO	Use of clean fuel and GCP
	GHG	675,343 TPY as CO_2e	Use of NG and fuel efficiency
Fuel Oil Storage Tanks	VOC	0.2 TPY [1]	White/Light color, submerged fill, and good maintenance
[redacted] Process Tanks	VOC	0.18 TPY [2]	Submerged fill
[redacted] Process Vent	VOC	0.42 lb/hr [3] 6.0 TPY	Condensation
Emergency Generators	VOC	NO_X+NMHC of 6.4 g/kW-hr [4]	Good engine design and GCP
	CO	3.5 g/kW-hr [4]	Good engine design and GCP
	GHG	644 TPY as CO_2e per generator	Good engine design and GCP

Notes:
1. Total of both tanks.
2. Total of all four tanks.
3. Average emission rate for the batch.
4. NSPS rate for emergency generators (Tier 2).

5.0 SOURCE IMPACT ANALYSIS

A source impact analysis was conducted to assess the ambient impacts from the proposed Expansion Project emissions. This analysis included all of the Expansion Project emission sources, including those that will not be permitted until Phase II and III.

The source impact analysis requires a demonstration that the project will not cause or contribute to a violation of a NAAQS or any applicable maximum allowable increase over the baseline concentration (increment). Source impact analysis requirements address the potential requirement for preconstruction ambient air quality monitoring. The source impact analysis quantifies only the impacts of the pollutants that are emitted in amounts in excess of PSD significant emission levels. The Expansion Project will result in increases in emissions of VOC and GHG's, and possibly CO that are in excess of PSD significant emission rates. There are no NAAQS or increments for GHGs, therefore GHG's do not require evaluation.

As mentioned above, there are six Class I areas located within 300 km of HSAAP. Class I areas are pristine areas (e.g., National Parks and Wilderness Areas) that have been designated by Congress and are afforded a greater degree of air quality protection. All other areas are designated as Class II areas.

The Federal Land Managers (FLMs) have been contacted (See Appendix D) and, based upon project emissions and the distance from HSAAP to the nearest Class I area, OSI has determined that a more detailed analysis is not required.

The Expansion Project's ozone precursor emissions were evaluated using the U. S. EPA's draft Modeled Emission Rates for Precursors ("MERPs") guidance and TDEC's April 10, 2018, MERPs Guidance. The Expansion Project's proposed VOC emissions increase of 115.5 tons per year is well below the lowest 8-hr ozone MERP value of 1339 tons per year (see Table 2 of the TDEC MERPs guidance). Since NO_X emissions will actually decrease, there is no need to consider NOx emissions in the evaluation. Based upon this assessment, ozone formation due to the Expansion Project are assumed to be negligible.

The results of the CO significant impact modeling analysis indicate that the Expansion Project will result in insignificant ambient air quality impacts. Therefore, a more refined NAAQS analysis is not required.

A more detailed description of the modeling procedures and results used in the source impact analysis is provided in Appendix C.

6.0 ADDITIONAL IMPACT ANALYSIS

PSD regulations require an additional impacts analysis of each pollutant emitted by a source, including the analysis of the effects on air quality, local soils, vegetation, and visibility. The depth of the analysis performed generally depends on existing air quality, the quantity of air emissions, and the sensitivity of local soils and vegetation.

6.1 Air Quality Impacts

Hawkins County is currently in attainment with all the National Ambient Air Quality Standards or is unclassified. As described in Section 2.0, emissions of SO_2, NO_X, and PM will be reduced as a result of the Expansion Project, while CO and VOC emissions will increase. Based on the results of modeling discussed in Section 5.0, Source Impact Analysis, this project will not result in ambient air quality impacts above PSD significance levels.

6.2 Growth Impacts

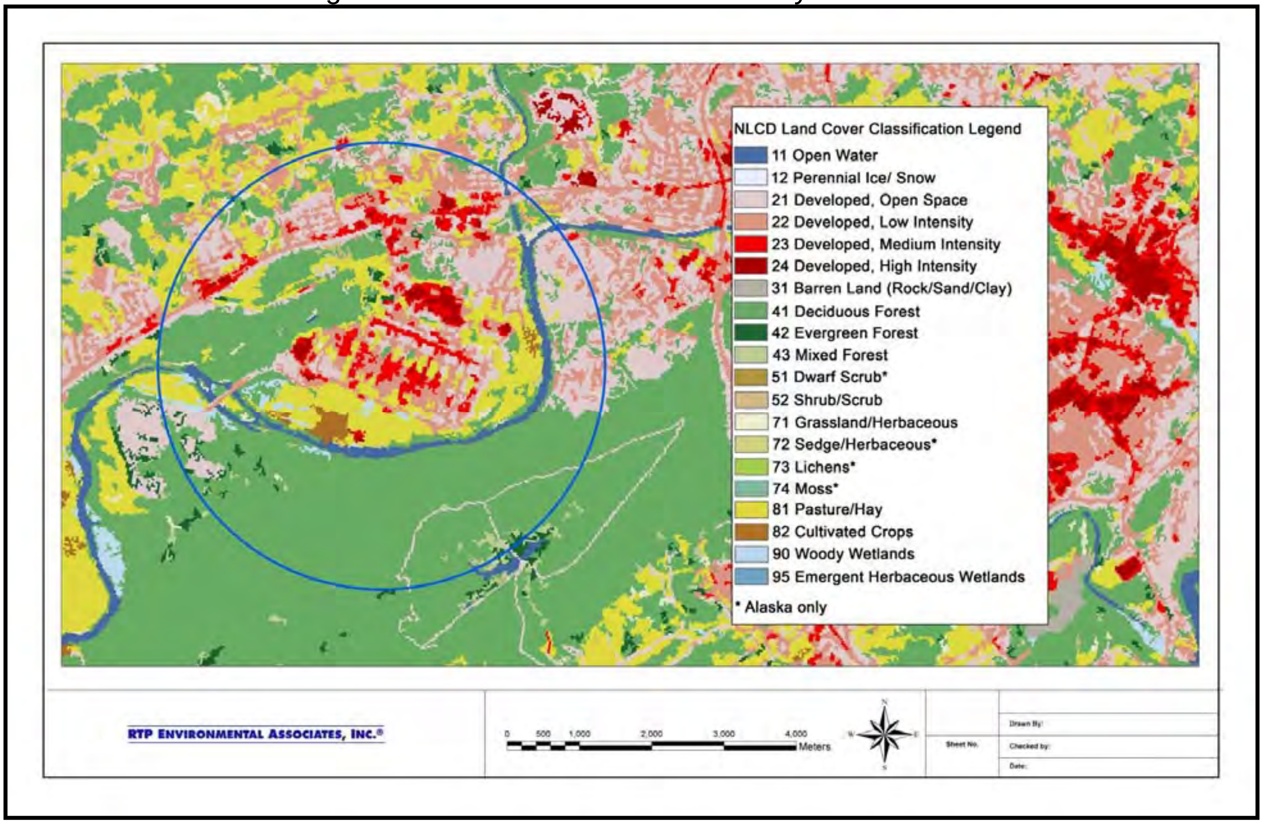
Air quality impacts projected for the area as a result of general commercial, residential, industrial, and other growth associated with this project are expected to be insignificant. HSAAP anticipates the addition of about 250 new permanent jobs as the result of the Expansion Project. Assuming an U.S. average household size of 2.64 persons per household, the estimated total increase in population would be about 660 persons. This would be a minor increase (less than 0.5 percent) compared to the 2016 population of Hawkins and Sullivan Counties (more than 213,000).

6.3 Soils Impacts

Because most air pollutants are ultimately deposited primarily on the land, the potential impact of these pollutants on terrestrial ecosystems is important. Pollutant emissions can impact the soil, ground and surface waters, and plant growth. In some cases, these pollutants can accumulate in the soil system or become concentrated in plants and animals. In other instances, these pollutants may cause leaching of soil nutrients (e.g., acid deposition) or contribute to nutritional imbalances in plant communities (e.g., excessive nitrogen deposition).

The HSAAP facility is located in extreme northeastern Hawkins County, Tennessee, near its borders with Sullivan and Hancock Counties, Tennessee. Land use in the immediate vicinity of the plant varies widely, being primarily commercial and residential to the north and west of the plant, residential to the east, and forested to the south. (See Figure 6.1) The main production area of the HSAAP facility slopes gently downward from the north toward the Holston River. The highest points on the production area are about 1,230 feet above mean sea level and the lowest points near the river are about 1,170 feet above mean sea level.

Figure 6.1 Land Use in the Vicinity of HSAAP



Soils in the immediate vicinity of the plant site are predominately well to excessively drained Holston and Dandridge loams composed of silts and shaly and cherty clays. Soils along the Holston River floodplain are predominately well drained Staser silty loams. There are some steep slopes to the south (up to 60%), but generally slopes in the area are 12-25%, except for the land along the Holston River, which is generally flat floodplain.

It is not anticipated that soils in the area would be adversely impacted by the additional VOC and CO emissions resulting from the Expansion Project and may actually benefit from the reduction in the emissions of NO_X and SO_2.

6.4 Vegetation Impacts

The potentially impacted vegetation is mostly residential and forest vegetation. There is very little agricultural vegetation in the vicinity of the HSAAP facility. The increases in CO and VOC emissions are not anticipated to cause adverse impacts to vegetation in the vicinity of the plant. CO does not adversely impact plants since it is rapidly oxidized in the atmosphere to form CO_2 which is used by plants in the photosynthesis process. Plants are a significant source of biogenic VOC's in the atmosphere, consequently, the increase in VOC emissions due to the Expansion Project will not significantly increase ambient VOC concentrations. Furthermore, chronic pollution effects, either direct effects or effects from secondary pollutants such as ozone, are not anticipated. Ozone levels in the vicinity of the HSAAP facility are likely NO_X-limited rather than VOC-limited due to the abundance of biogenic VOC's from vegetation, so the increase in VOC emissions should not result in an increase in ozone levels. Rather, the reduction in NO_X emissions should contribute to a decrease in ozone levels.

6.5 Visibility Impacts

Visibility is impacted by both suspended particles and aerosols. Most of the particles and aerosols that impact visibility have an aerodynamic diameter of 2.5 microns or less (i.e. $PM_{2.5}$). In addition to emissions of $PM_{2.5}$ (like those from coal-fired boilers), SO_2 and NO_X emissions contribute to the formation of particles and aerosols in the atmosphere. Therefore, the reduction in PM, SO_2, and NO_X emissions resulting from the Expansion project should contribute to an improvement in visibility in the region surrounding the HSAAP facility.

While the overall reduction in PM, SO_2, and NO_X emissions will contribute to an improvement in visibility in the region, an increase in open burning will have short-term impacts on visibility in the immediate vicinity of HSAAP.

Appendix A
Construction Permit Application Forms

REDACTED COPY

State of Tennessee
Department of Environment and Conservation
Division of Air Pollution Control
William R. Snodgrass Tennessee Tower
312 Rosa L. Parks Avenue, 15th Floor
Nashville, TN 37243
Telephone: (615) 532-0554

TITLE V PERMIT APPLICATION
INDEX OF AIR POLLUTION PERMIT APPLICATION FORMS

Section 1: Identification and Diagrams	
This application contains the following forms:	APC Form 1, Facility Identification
	APC Form 2, Operations and Flow Diagrams

Section 2: Emission Source Description Forms		
		Total number of this form
This application contains the following forms (one form for each incinerator, printing operation, fuel burning installation, etc.):	APC Form 3, Stack Identification	9
	APC Form 4, Fuel Burning Non-Process Equipment	4
	APC Form 5, Stationary Gas Turbines or Internal Combustion Engines	0
	APC Form 6, Storage Tanks	4
	APC Form 7, Incinerators	0
	APC Form 8, Printing Operations	0
	APC Form 9, Painting and Coating Operations	0
	APC Form 10, Miscellaneous Processes	2
	APC Form 33, Stage I and Stage II Vapor Recovery Equipment	0
	APC Form 34, Open Burning	0

Section 3: Air Pollution Control System Forms		
		Total number of this form
This application contains the following forms (one form for each control system in use at the facility):	APC Form 11, Control Equipment - Miscellaneous	4
	APC Form 13, Adsorbers	0
	APC Form 14, Catalytic or Thermal Oxidation Equipment	1
	APC Form 15, Cyclones/Settling Chambers	0
	APC Form 17, Wet Collection Systems	2
	APC Form 18, Baghouse/Fabric Filters	0

(OVER)

Section 4: Compliance Demonstration Forms		
		Total number of this form
This application contains the following forms (one form for each incinerator, printing operation, fuel burning installation, etc.):	APC Form 19, Compliance Certification - Monitoring and Reporting - Description of Methods for Determining Compliance	3
	APC Form 20, Continuous Emissions Monitoring	1
	APC Form 21, Portable Monitors	0
	APC Form 22, Control System Parameters or Operating Parameters of a Process	2
	APC Form 23, Monitoring Maintenance Procedures	2
	APC Form 24, Stack Testing	1
	APC Form 25, Fuel Sampling and Analysis	1
	APC Form 26, Record Keeping	3
	APC Form 27, Other Methods	3
	APC Form 28, Emissions from Process Emissions Sources / Fuel Burning Installations / Incinerators	3
	APC Form 29, Emissions Summary for the Facility or for the Source Contained in This Application	1
	APC Form 30, Current Emissions Requirements and Status	4
	APC Form 31, Compliance Plan and Compliance Certification	1
	APC Form 32, Air Monitoring Network	0

Section 5: Statement of Completeness and Certification of Compliance

I have reviewed this application in its entirety and to the best of my knowledge, and based on information and belief formed after reasonable inquiry, the statements and information contained in this application are true, accurate, and complete. I have provided all the information that is necessary for compliance purposes and this application consists of 74 pages and they are numbered from page A-1 to A-74. The status of this facility's compliance with all applicable air pollution control requirements, including the enhanced monitoring and compliance certification requirements of the Federal Clean Air Act, is reported in this application along with the methods to be used for compliance demonstration.

Name and Title of Responsible Official	Telephone Number with Area Code
Robert E. Winstead, Environmental Health Safety and Security BAE Systems Ordnance Systems Inc. Operating contractor for Holston Army Ammunition Plant (HSAAP)	(423) 578-6253
Signature of Responsible Official	Date of Application
	May 31, 2018

(For definition of responsible official, see instructions for APC Form 1)

State of Tennessee
Department of Environment and Conservation
Division of Air Pollution Control
William R. Snodgrass Tennessee Tower
312 Rosa L. Parks Avenue, 15th Floor
Nashville, TN 37243
Telephone: (615) 532-0554

TITLE V PERMIT APPLICATION
FACILITY IDENTIFICATION

SITE INFORMATION			
1. Organization's legal name BAE SYSTEMS Ordnance Systems Inc. Holston Army Ammunition Plant		For APC Use Only	APC company point no.
2. Site name (if different from legal name) Area B - Holston Army Ammunition Plant (HSAAP)			APC Log/Permit no.
3. Site address (St./Rd./Hwy.) 4509 West Stone Drive		NAICS or SIC Code 28	
City or distance to nearest town Kingsport, TN	Zip code 37660	County name Hawkins;	
4. Site location (in Lat./Long)	Latitude 17 S 353087.42 m E	Longitude 4044597.14 m N	

CONTACT INFORMATION (RESPONSIBLE OFFICIAL)			
5. Responsible official contact Robert E. Winstead, Director, Environmental Health Safety and Security (EHSS)			Phone number with area code (423) 578-6253
6. Mailing address (St./Rd./Hwy.) 4509 West Stone Drive			Fax number with area code
City Kingsport	State TN	Zip code 37660	Email address bob.winstead@baesystems.com

CONTACT INFORMATION (TECHNICAL)			
7. Principal technical contact James Ogle, Environmental Affairs Specialist			Phone number with area code 423-578-6231
8. Mailing address (St./Rd./Hwy.) 4509 West Stone Drive			Fax number with area code
City Kingsport	State TN	Zip code 37660	Email address james.ogle@baesystems.com

CONTACT INFORMATION (BILLING)			
11. Billing contact Jerry Andrieszyn, Financial Analyst			Phone number with area code 423-578-6101 or 423-578-6161
12. Mailing address (St./Rd./Hwy.) 4509 West Stone Drive			Fax number with area code
City Kingsport	State TN	Zip code 37660	Email address jerry.andrieszyn@baesystems.com

TYPE OF PERMIT REQUESTED			
13. Permit requested for:			
Initial application to operate :	☐	Minor permit modification :	☐
Permit renewal to operate :	☐	Significant modification :	☐
Administrative permit amendment :	☐	Construction permit :	✓

(OVER)

HAZARDOUS AIR POLLUTANTS, DESIGNATIONS, AND OTHER PERMITS ASSOCIATED WITH FACILITY

14. Is this facility subject to the provisions governing prevention of accidental releases of hazardous air contaminants contained in Chapter 1200-03-32 of the Tennessee Air Pollution Control regulations?

✓ Yes ☐ No

If the answer is Yes, are you in compliance with the provisions of Chapter 1200-03-32 of the Tennessee Air Pollution Control regulations?

✓ Yes ☐ No

15. If facility is located in an area designated as "Non-Attainment" or "Additional Control", indicate the pollutant(s) for the designation.

Particulate (PM 2.5 Attainment but Area A (Sullivan County) has an expired Kingsport Additional Control Area for TSP) Ozone (Attainment) and Sulfur Dioxide (Non-attainment for Sullivan County (82) and unclassified for Hawkins County (37))

16. List all valid Air Pollution permits issued to the sources contained in this application [identify all permits with most recent permit numbers and emission source reference numbers listed on the permit(s)].

Permit #	Reference #s	Facility
558406	37-0028	Area B - Title V Permits

17. Page number : Revision number: Date of revision:

State of Tennessee
Department of Environment and Conservation
Division of Air Pollution Control
William R. Snodgrass Tennessee Tower
312 Rosa L. Parks Avenue, 15th Floor
Nashville, TN 37243
Telephone: (615) 532-0554

TITLE V PERMIT APPLICATION
OPERATIONS AND FLOW DIAGRAMS

1. Please list, identify, and describe briefly process emission sources, fuel burning installations, and incinerators that are contained in this application. Please attach a flow diagram for this application.

New Steam Facility
New [redacted] Facility [redacted]
New [redacted] Mill [redacted]
Existing sources - Increased Utilization (37-0028-10,-17, -53, and -78)
New and existing Insignificant Emissions Units (IEUs)

The current existing Title V permit for the Area B facility is 558406.

Individual Process diagrams are included for each new facility.
The existing sources with increased utilization are included with the prevention of significant deterioration (PSD) applicability document emissions table. There are no modifications for these sources so applications are not appropriate.

2. List all insignificant activities which are exempted because of size or production rate and cite the applicable regulations.

IEUs for each new source are listed in the source specific APC 2 form. The IEU is in addition to the IEU list submitted as part of the December 2013 Title V renewal application.

3. Are there any storage piles?

YES __________ NO ____x_____

4. List the states that are within 50 miles of your facility.

Virginia, Kentucky, North Carolina

5. Page number: Revision Number: Date of Revision:

State of Tennessee
Department of Environment and Conservation
Division of Air Pollution Control
William R. Snodgrass Tennessee Tower
312 Rosa L. Parks Avenue, 15th Floor
Nashville, TN 37243
Telephone: (615) 532-0554

TITLE V PERMIT APPLICATION
COMPLIANCE PLAN AND COMPLIANCE CERTIFICATION

GENERAL IDENTIFICATION AND DESCRIPTION

1. Facility name:
BAE SYSTEMS Ordnance Systems Inc. Holston Army Ammunition Plant

2. List all the process emission source(s) or fuel burning installation(s) or incinerator(s) that are part of this application.

New Steam Facility
New [redacted] Facility [redacted]
New [redacted] Mill [redacted]

Existing sources - Increased Utilization (37-0028-10, -17, -53, and -78)
New and existing Insignificant Emissions Units (IEUs)

COMPLIANCE PLAN AND CERTIFICATION

3. Indicate that source(s) which are contained in this application are presently in compliance with all applicable requirements, by checking the following:

__x__ A. Attached is a statement of identification of the source(s) currently in compliance. We will continue to operate and maintain the source(s) to assure compliance with all the applicable requirements for the duration of the permit.

__x__ B APC 30 form(s) includes new requirements that apply or will apply to the source(s) during the term of the permit. We will meet such requirements on a timely basis.

4. Indicate that there are source(s) that are contained in this application which are not presently in full compliance, by checking both of the following:

______ A. Attached is a statement of identification of the source(s) not in compliance, non-complying requirement(s), brief description of the problem, and the proposed solution.

______ B. We will achieve compliance according to the following schedule:

Action	Deadline

Progress reports will be submitted:

Start date: ______________________ and every 180 days thereafter until compliance is achieved.

5. State the compliance status with any applicable compliance assurance monitoring and compliance certification requirements that have been promulgated under section 114(a)(3) of the Clean Air Act as of the date of submittal of this APC 31.

Except for any deviations recently reported in previously submitted or forthcoming semiannual reports, annual compliance certifications, and schedule of corrective actions, the sources covered in this application are currently in compliance with all applicable requirements, including parametric monitoring, required recordkeeping, semiannual reporting, and compliance certification requirements. HSAAP is currently under a Schedule of Corrective Action for Sources 37-0028-02 and -04. Additionally, any other applicable requirements that become effective during the permit term will be met in a timely manner.

6. Page number: Revision number: Date of revision:

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APC 35

TITLE V PERMIT APPLICATION
APPLICATION COMPLETENESS CHECK LIST

Note to Applicants: The Application Completeness Check List is required by Division Rule 1200-03-09-.02(11)(d)1(ii)(I) and is used by Division staff to determine whether or not an application is complete. This checklist will be used to resolve any dispute between the applicant and the Division regarding the completeness of an application.

Section 1: Identification and Diagrams (APC 1 and APC 2)		
Requirement	**Complete**	**Incomplete**
Site Information	☒	☐
Contact Information (Responsible Official)	☒	☐
Contact Information (Technical)	☒	☐
Contact Information (Billing)	☒	☐
Type of Permit Requested	☒	☐
Accidental Release Information	☒	☐
Nonattainment/Additional Control Area Designation	☒	☐
List of Valid Permits	☒	☐
List and description of process emission sources, fuel burning installations, and incinerators	☒	☐
Flow diagram attached?	☒	☐
List of Insignificant Activities	☒	☐
List of Storage Piles	☒	☐
List of States within 50 Miles	☒	☐

Section 2: Emission Source Description Forms		
Forms are complete as received:		☒
Forms are incomplete (one or more application forms not submitted)		☐
Forms are incomplete (missing information on the following application forms):	APC Form 3, Stack Identification	☒
	APC Form 4, Fuel Burning Non-Process Equipment	☒
	APC Form 5, Stationary Gas Turbines or Internal Combustion Engines	☐
	APC Form 6, Storage Tanks	☒
	APC Form 7, Incinerators	☐
	APC Form 8, Printing Operations	☐
	APC Form 9, Painting and Coating Operations	☐
	APC Form 10, Miscellaneous Processes	☐
	APC Form 33, Stage I and Stage II Vapor Recovery Equipment	☐
	APC Form 34, Open Burning	☐

Section 3: Air Pollution Control System Forms		
Forms are complete as received:		☒
Forms are incomplete (one or more application forms not submitted)		☐
Forms are incomplete (missing information on the following application forms):	APC Form 11, Control Equipment - Miscellaneous	☒
	APC Form 13, Adsorbers	☐
	APC Form 14, Catalytic or Thermal Oxidation Equipment	☒
	APC Form 15, Cyclones/Settling Chambers	☐
	APC Form 17, Wet Collection Systems	☒
	APC Form 18, Baghouse/Fabric Filters	☐
Section 4: Compliance Demonstration Forms		
Forms are complete as received:		☒
Forms are incomplete (one or more application forms not submitted)		☐
Forms are incomplete (missing information on the following application forms):	APC Form 19, Compliance Certification - Monitoring and Reporting - Description of Methods for Determining Compliance	☒
	APC Form 20, Continuous Emissions Monitoring	☒
	APC Form 21, Portable Monitors	☐
	APC Form 22, Control System Parameters or Operating Parameters of a Process	☒
	APC Form 23, Monitoring Maintenance Procedures	☒
	APC Form 24, Stack Testing	☒
	APC Form 25, Fuel Sampling and Analysis	☒
	APC Form 26, Recordkeeping	☒
	APC Form 27, Other Methods	☒
	APC Form 28, Emissions from Process Emissions Sources / Fuel Burning Installations / Incinerators	☒
	APC Form 29, Emissions Summary for the Facility or for the Source Contained in This Application	☒
	APC Form 30, Current Emissions Requirements and Status	☒
	APC Form 32, Air Monitoring Network	☐

Section 5: Statement of Completeness and Certification of Compliance			
Requirement	**Complete**	**Incomplete**	**Not Applicable**
Certification of Truth, Accuracy, and Completeness (Form APC 1, Section 5)	☒	☐	☐
General Identification and Description (Form APC 31, Items 1 and 2)	☒	☐	☐
Compliance Certification for Sources Currently in Compliance (Form APC 31, Item 3A)	☒	☐	☐
Compliance Certification for New Applicable Requirements (Form APC 31, Item 3B)	☒	☐	☐
Identification of Sources Currently Not in Compliance (Form APC 31, Item 4A)	☒	☐	☐
Compliance Schedule for Sources Currently Not in Compliance (Form APC 31, Item 4B)	☐	☐	☒
Compliance Certification for Enhanced Monitoring (Form APC 31, Item 5)	☒	☐	☐

Section 6: Miscellaneous Information		
Item	**Included**	**Not Included**
For Title V modifications, is a description of the modification included?	☒	☐
Request for Permit Shield	☐	☒
Calculations on which emissions-related information are based	☒	☐
Identification of alternative operating scenarios, as applicable	☐	☒
Explanation of any proposed exemptions from otherwise applicable requirements	☐	☒
Other information needed for completeness (explain in comments)	☒	☒

Section 7: Comments

Describe any missing information below or in a separate attachment:

Included with this application is the Prevention of Significant Deterioration (PSD) Applicability, the Best Available Control Technology (BACT) determination, the modeling results summary document, and all supporting information to ensure the permit application is complete. Proposed draft language can be provided to assist in the review and evaluation of applicable regulations for these projects.

The fees associated for these sources along with the entire facility should be based on actuals for the calendar year timeframe.

Section 8: Application Completeness	
Application is Complete	☒
Application is Incomplete	☐

State of Tennessee
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TITLE V PERMIT APPLICATION
EMISSION SUMMARY FOR THE FACILITY OR FOR THE SOURCES CONTAINED IN THIS APPLICATION

GENERAL IDENTIFICATION AND DESCRIPTION

1. Facility name: BAE SYSTEMS Ordnance Systems Inc. Holston Army Ammunition Plant

EMISSIONS SUMMARY TABLE – CRITERIA AND SELECTED POLLUTANTS

2. Complete the following emissions summary for regulated air pollutants at this facility or for the sources contained in this application.

Air Pollutant	Summary of Maximum Allowable Emissions		Summary of Actual Emissions	
	Tons per Year	Reserved for State use (Pounds per Hour- Item 4, APC 28)	Tons per Year	Reserved for State use (Pounds per Hour- Item 4, APC 28)
Particulate Matter (TSP)	22.21			
Sulfur Dioxide	6.42			
Volatile Organic Compounds	30			
Carbon Monoxide	106.4			
Lead				
Nitrogen Oxides	237.6			
Total Reduced Sulfur				
Mercury				
Asbestos				
Beryllium				
Vinyl Chlorides				
Fluorides				
Gaseous Fluorides				
Greenhouse Gases in CO_2 Equivalents	680,070.9			

(Continued on next page)

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EMISSIONS SUMMARY TABLE – HAZARDOUS AIR POLLUTANTS

3. Complete the following emissions summary for regulated air pollutants that are hazardous air pollutant(s) at this facility or for the sources contained in this application.

Air Pollutant & CAS	Summary of Maximum Allowable Emissions		Summary of Actual Emissions	
	Tons per Year	Reserved for State use (Pounds per Hour- Item 5, APC 28)	Tons per Year	Reserved for State use (Pounds per Hour- Item 5, APC 28)

4. Page number: Revision number: Date of revision:

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TITLE V PERMIT APPLICATION
OPERATIONS AND FLOW DIAGRAMS

1. Please list, identify, and describe briefly process emission sources, fuel burning installations, and incinerators that are contained in this application. Please attach a flow diagram for this application.

The HSAAP Area B facility is installing four (4) new boilers with dual fuel capability. Fuel oil will be maintained onsite in the event natural gas is not readily available. Each new boiler will be rated at 250,000 pounds per hour (PPH) of steam, with a total heat input capacity of 327 million British thermal units per hour (MMBtu/hr) when firing natural gas, and 310 MMBtu/hr when firing fuel oil. The boilers will be used to provide steam to the new processes, as well as to existing processes. Installation of the new boilers will take place in Phase I and will be executed to allow for decommissioning of the existing coal-fired boilers.

Emissions from the boilers will consist of the products of combustion. HSAAP proposes to install catalytic oxidation, selective catalytic reduction in addition to low NOx burners, and an electrostatic precipitator to control emissions from the boilers. See the BACT Analysis portion of the application (Section 4) for further information regarding emission controls.

Process Diagram is Attached.

The current existing Title V permit for the Area B facility is 558406

2. List all insignificant activities which are exempted because of size or production rate and cite the applicable regulations.

The insignificant emissions units specific for these sources are as follows:

Three diesel-fired stationary internal combustion engines with associated emergency generators. Each engine will have a rated capacity less than 1,000 kilowatts (1,490 horsepower).

Two new fuel oil storage tanks will be installed to provide fuel oil storage for the dual fuel steam generating boilers.

These IEUs are in addition to the IEU process list found in the Title V Renewal Application December 2013.

3. Are there any storage piles?

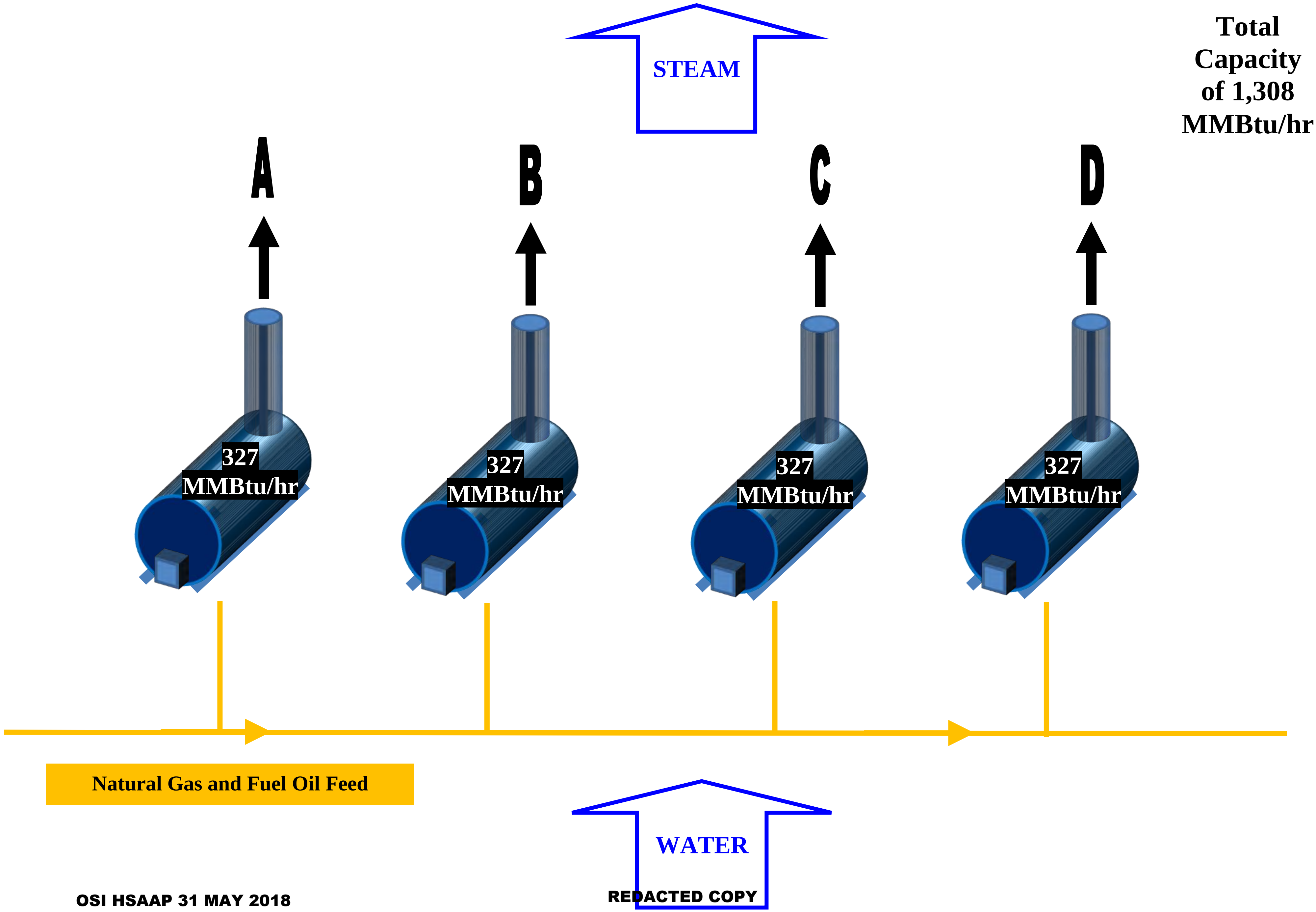
YES __________ NO ____X____

4. List the states that are within 50 miles of your facility.

Virginia, Kentucky, North Carolina

5. Page number: Revision Number: Date of Revision:

Expansion Project HSAAP Natural Gas Steam Generating Units



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TITLE V PERMIT APPLICATION
STACK IDENTIFICATION

GENERAL IDENTIFICATION AND DESCRIPTION

1. **Facility name:**
BAE Systems Ordnance Systems Inc. (OSI) Holston Army Ammunition Plant (HSAAP)

2. **Emission source (identify):**
Rentech 327 MMBtu/hr natural gas boiler 1.

STACK DESCRIPTION

3. Stack ID (or flow diagram point identification):
Flow Diagram Point A on the Expansion Project HSAAP Natural Gas Steam Generating Units Diagram

4. Stack height above grade in feet:
~75

5. Velocity (data at exit conditions):
~ 60 (Actual feet per second)

6. Inside dimensions at outlet in feet:
~5.0

7. Exhaust flow rate at exit conditions (ACFM):
~70,650

8. Flow rate at standard conditions (DSCFM):
~60,000

9. Exhaust temperature:
~300 Degrees Fahrenheit (°F)

10. Moisture content (data at exit conditions):
~9 Percent
__________ Grains per dry standard cubic foot (gr./dscf.)

11. Exhaust temperature that is equaled or exceeded during ninety (90) percent or more of the operating time (for stacks subject to diffusion equation only):
N/A (°F)

12. If this stack is equipped with continuous pollutant monitoring equipment required for compliance, what pollutant(s) does this equipment monitor (e.g., Opacity, SO_2, NO_x, etc.)?
NOx and CO optional

Complete the appropriate APC form(s) 4, 5, 7, 8, 9, or 10 for each source exhausting through this stack.

BYPASS STACK DESCRIPTION

13. Do you have a bypass stack?
________ Yes X No

If yes, describe the conditions which require its use & complete APC form 4 for the bypass stack. Please identify the stack number(s) of flow diagram point number(s) exhausting through this bypass stack.

14. Page number: Revision Number: Date of Revision:

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TITLE V PERMIT APPLICATION
STACK IDENTIFICATION

GENERAL IDENTIFICATION AND DESCRIPTION	
1. **Facility name:** BAE Systems Ordnance Systems Inc. (OSI) Holston Army Ammunition Plant (HSAAP)	
2. **Emission source (identify):** Rentech 327 MMBtu/hr natural gas boiler 2.	
STACK DESCRIPTION	
3. Stack ID (or flow diagram point identification): Flow Diagram Point B on the Expansion Project HSAAP Natural Gas Steam Generating Units Diagram	
4. Stack height above grade in feet: ~75	
5. Velocity (data at exit conditions): ~ 60 (Actual feet per second)	6. Inside dimensions at outlet in feet: ~5.0
7. Exhaust flow rate at exit conditions (ACFM): ~70,650	8. Flow rate at standard conditions (DSCFM): ~60,000
9. Exhaust temperature: ~300 Degrees Fahrenheit (°F)	10. Moisture content (data at exit conditions): ~9 Percent ______ Grains per dry standard cubic foot (gr./dscf.)
11. Exhaust temperature that is equaled or exceeded during ninety (90) percent or more of the operating time (for stacks subject to diffusion equation only): N/A (°F)	
12. If this stack is equipped with continuous pollutant monitoring equipment required for compliance, what pollutant(s) does this equipment monitor (e.g., Opacity, SO_2, NO_x, etc.)? NOx and CO optional	
Complete the appropriate APC form(s) 4, 5, 7, 8, 9, or 10 for each source exhausting through this stack.	
BYPASS STACK DESCRIPTION	
13. Do you have a bypass stack? ______ Yes X No If yes, describe the conditions which require its use & complete APC form 4 for the bypass stack. Please identify the stack number(s) of flow diagram point number(s) exhausting through this bypass stack.	
14. Page number: Revision Number:	Date of Revision:

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TITLE V PERMIT APPLICATION
STACK IDENTIFICATION

GENERAL IDENTIFICATION AND DESCRIPTION	
1. **Facility name:** BAE Systems Ordnance Systems Inc. (OSI) Holston Army Ammunition Plant (HSAAP)	
2. **Emission source (identify):** Rentech 327 MMBtu/hr natural gas boiler 3.	
STACK DESCRIPTION	
3. Stack ID (or flow diagram point identification): Flow Diagram Point C on the Expansion Project HSAAP Natural Gas Steam Generating Units Diagram	
4. Stack height above grade in feet: ~75	
5. Velocity (data at exit conditions): ~ 60 (Actual feet per second)	6. Inside dimensions at outlet in feet: ~5.0
7. Exhaust flow rate at exit conditions (ACFM): ~70,650	8. Flow rate at standard conditions (DSCFM): ~60,000
9. Exhaust temperature: ~300 Degrees Fahrenheit (°F)	10. Moisture content (data at exit conditions): ~9 Percent; ______ Grains per dry standard cubic foot (gr./dscf.)
11. Exhaust temperature that is equaled or exceeded during ninety (90) percent or more of the operating time (for stacks subject to diffusion equation only): N/A (°F)	
12. If this stack is equipped with continuous pollutant monitoring equipment required for compliance, what pollutant(s) does this equipment monitor (e.g., Opacity, SO_2, NO_x, etc.)? NOx and CO optional	
Complete the appropriate APC form(s) 4, 5, 7, 8, 9, or 10 for each source exhausting through this stack.	
BYPASS STACK DESCRIPTION	
13. Do you have a bypass stack? ______ Yes X No If yes, describe the conditions which require its use & complete APC form 4 for the bypass stack. Please identify the stack number(s) of flow diagram point number(s) exhausting through this bypass stack.	
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TITLE V PERMIT APPLICATION
STACK IDENTIFICATION

GENERAL IDENTIFICATION AND DESCRIPTION

1. **Facility name:**
BAE Systems Ordnance Systems Inc. (OSI) Holston Army Ammunition Plant (HSAAP)

2. **Emission source (identify):**
Rentech 327 MMBtu/hr natural gas boiler 4.

STACK DESCRIPTION

3. Stack ID (or flow diagram point identification):
Flow Diagram Point D on the Expansion Project HSAAP Natural Gas Steam Generating Units Diagram

4. Stack height above grade in feet:
~75

5. Velocity (data at exit conditions):
~ 60 (Actual feet per second)

6. Inside dimensions at outlet in feet:
~5.0

7. Exhaust flow rate at exit conditions (ACFM):
~70,650

8. Flow rate at standard conditions (DSCFM):
~60,000

9. Exhaust temperature:
~300 Degrees Fahrenheit (°F)

10. Moisture content (data at exit conditions):
~9 Percent
__________ Grains per dry standard cubic foot (gr./dscf.)

11. Exhaust temperature that is equaled or exceeded during ninety (90) percent or more of the operating time (<u>for stacks subject to diffusion equation only</u>):
N/A (°F)

12. If this stack is equipped with continuous pollutant monitoring equipment required for compliance, what pollutant(s) does this equipment monitor (e.g., Opacity, SO_2, NO_x, etc.)?
NOx and CO optional

Complete the appropriate APC form(s) 4, 5, 7, 8, 9, or 10 for each source exhausting through this stack.

BYPASS STACK DESCRIPTION

13. Do you have a bypass stack?
________ Yes X No

If yes, describe the conditions which require its use & complete APC form 4 for the bypass stack. Please identify the stack number(s) of flow diagram point number(s) exhausting through this bypass stack.

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TITLE V PERMIT APPLICATION
FUEL BURNING NON-PROCESS EQUIPMENT

GENERAL IDENTIFICATION AND DESCRIPTION

1. **Facility name:**
BAE Systems Ordnance Systems Inc. (OSI) Holston Army Ammunition Plant (HSAAP)

2. **Stack ID or flow diagram point identification (s):**
Flow Diagram Point A on the Expansion Project HSAAP Natural Gas Steam Generating Units Diagram

FUEL BURNING EQUIPMENT DESCRIPTION

3. List all fuel burning equipment that is at this fuel burning installation (please complete an APC 4 form for each piece of fuel burning equipment).
New Steam Generating Facility consisting of four Rentech Boilers each with a heat input capacity of 327 MMBtu/hr capable of producing 250,000 lbs/hr of steam. The units are natural gas fired with ULSD fuel oil as a backup fuel. The facility has a combined heat input capacity of 1,308 MMBtu/hr.

4. Fuel burning equipment identification number:
Rentech Boiler 1

5. Fuel burning equipment description:
Area B Rentech Boiler, dual fuel fired Low NOx natural gas and ULSD fuel oil fired boiler rated at 327 MMBtu/hr, Maximum operating pressure 300 psig at 525 degrees superheated steam. The boilers are "D-Type" with separate packaged economizers designed at 375 psig. The unit will be required to comply with 40 CFR Part 60 Subpart Db.

6. Year of installation or last modification of fuel burning equipment.
Installation planned complete in 2020.

7. Furnace type:
Rentech D type watertube design with separate packaged economizers with Zecco duel fuel fired low NOx (approximately 83.7% fuel-to-steam efficiency)

8. Manufacturer model number (if available):
TBD

9. Location of this fuel burning installation in UTM coordinates: UTM Vertical: [redacted]_ UTM Horizontal: [redacted]____

10. Normal operating schedule: __24__ Hrs./Day ___7___ Days/Wk. __365__ Days/Yr.

FUELS, CONTROLS, AND MONITORING DESCRIPTION

11. Maximum rated heat input capacity (in million BTU/Hour)
327 Natural Gas - 310 Fuel Oil

12. If wood is used as a fuel, specify the amount of wood used as a fraction of total heat input.
N/A

13. Fuels:	Primary fuel	Backup fuel #1	Backup fuel #2	Backup fuel #3
Fuel name	Natural Gas	ULSD		
Actual yearly consumption	2,701 MCF	0.74 Mgal		

14. If emissions from this fuel burning equipment are controlled for compliance, please specify the type of control:
Low NOx Burners, selective catalytic reduction (SCR), wet electrostatic precipitator (WESP), CO catalytic oxidation

15. If emissions from this fuel burning equipment are monitored for compliance, please specify the type of monitoring:
NOx CEMs meeting 40 CFR Part 75; optional CO CEMS

16. Describe any fugitive emissions associated with this process, such as outdoor storage piles, open conveyors, material handling operations, etc. (please attach a separate sheet if necessary).
N/A

17. Page number: Revision Number: Date of Revision:

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TITLE V PERMIT APPLICATION
FUEL BURNING NON-PROCESS EQUIPMENT

GENERAL IDENTIFICATION AND DESCRIPTION

1. **Facility name:**
BAE Systems Ordnance Systems Inc. (OSI) Holston Army Ammunition Plant (HSAAP)

2. **Stack ID or flow diagram point identification (s):**
Flow Diagram Point B on the Expansion Project HSAAP Natural Gas Steam Generating Units Diagram

FUEL BURNING EQUIPMENT DESCRIPTION

3. List all fuel burning equipment that is at this fuel burning installation (please complete an APC 4 form for each piece of fuel burning equipment).
New Steam Generating Facility consisting of four Rentech Boilers each with a heat input capacity of 327 MMBtu/hr capable of producing 250,000 lbs/hr of steam. The units are natural gas fired with ULSD fuel oil as a backup fuel. The facility has a combined heat input capacity of 1,308 MMBtu/hr.

4. Fuel burning equipment identification number:
Rentech Boiler 2

5. Fuel burning equipment description:
Area B Rentech Boiler, duel fuel fired Low NOx natural gas and ULSD fuel oil fired boiler rated at 327 MMBtu/hr, Maximum operating pressure 300 psig at 525 degrees superheated steam. The boilers are "D-Type" with separate packaged economizers designed at 375 psig. The unit will be required to comply with 40 CFR Part 60 Subpart Db.

6. Year of installation or last modification of fuel burning equipment.
Installation planned complete in 2020.

7. Furnace type:
Rentech D type watertube design with separate packaged economizers with Zecco duel fuel fired low NOx (approximately 83.7% fuel-to-steam efficiency)

8. Manufacturer model number (if available):
TBD

9. Location of this fuel burning installation in UTM coordinates: UTM Vertical: [redacted] UTM Horizontal: [redacted]__

10. Normal operating schedule:__24__ Hrs./Day ____7____ Days/Wk.__365__ Days/Yr.

FUELS, CONTROLS, AND MONITORING DESCRIPTION

11. Maximum rated heat input capacity (in million BTU/Hour)
327 Natural Gas - 310 Fuel Oil

12. If wood is used as a fuel, specify the amount of wood used as a fraction of total heat input.
N/A

13. Fuels:	Primary fuel	Backup fuel #1	Backup fuel #2	Backup fuel #3
Fuel name	Natural Gas	ULSD		
Actual yearly consumption	2,701 MCF	0.74 Mgal		

14. If emissions from this fuel burning equipment are controlled for compliance, please specify the type of control:
Low NOx Burners, selective catalytic reduction (SCR), wet electrostatic precipitator (WESP), CO catalytic oxidation

15. If emissions from this fuel burning equipment are monitored for compliance, please specify the type of monitoring:
NOx CEMs meeting 40 CFR Part 75; optional CO CEMS

16. Describe any fugitive emissions associated with this process, such as outdoor storage piles, open conveyors, material handling operations, etc. (please attach a separate sheet if necessary).
N/A

17. Page number: Revision Number: Date of Revision:

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TITLE V PERMIT APPLICATION
FUEL BURNING NON-PROCESS EQUIPMENT

GENERAL IDENTIFICATION AND DESCRIPTION

1. **Facility name:**
BAE Systems Ordnance Systems Inc. (OSI) Holston Army Ammunition Plant (HSAAP)

2. **Stack ID or flow diagram point identification (s):**
Flow Diagram Point C on the Expansion Project HSAAP Natural Gas Steam Generating Units Diagram

FUEL BURNING EQUIPMENT DESCRIPTION

3. List all fuel burning equipment that is at this fuel burning installation (please complete an APC 4 form for each piece of fuel burning equipment).

New Steam Generating Facility consisting of four Rentech Boilers each with a heat input capacity of 327 MMBtu/hr capable of producing 250,000 lbs/hr of steam. The units are natural gas fired with ULSD fuel oil as a backup fuel. The facility has a combined heat input capacity of 1,308 MMBtu/hr.

4. Fuel burning equipment identification number:
Rentech Boiler 3

5. Fuel burning equipment description:

Area B Rentech Boiler, dual fuel fired Low NOx natural gas and ULSD fuel oil fired boiler rated at 327 MMBtu/hr, Maximum operating pressure 300 psig at 525 degrees superheated steam. The boilers are "D-Type" with separate packaged economizers designed at 375 psig. The unit will be required to comply with 40 CFR Part 60 Subpart Db.

6. Year of installation or last modification of fuel burning equipment.
Installation planned complete in 2020.

7. Furnace type:	8. Manufacturer model number (if available):
Rentech D type watertube design with separate packaged economizers with Zecco duel fuel fired low NOx (approximately 83.7% fuel-to-steam efficiency)	TBD

9. Location of this fuel burning installation in UTM coordinates: UTM Vertical: [redacted]_ UTM Horizontal: [redacted]___

10. Normal operating schedule: __24__ Hrs./Day ___7___ Days/Wk.__365__ Days/Yr.

FUELS, CONTROLS, AND MONITORING DESCRIPTION

11. Maximum rated heat input capacity (in million BTU/Hour)	12. If wood is used as a fuel, specify the amount of wood used as a fraction of total heat input.
327 Natural Gas - 310 Fuel Oil	N/A

13. Fuels:	Primary fuel	Backup fuel #1	Backup fuel #2	Backup fuel #3
Fuel name	Natural Gas	ULSD		
Actual yearly consumption	2,701 MCF	0.74 Mgal		

14. If emissions from this fuel burning equipment are controlled for compliance, please specify the type of control:
Low NOx Burners, selective catalytic reduction (SCR), wet electrostatic precipitator (WESP), CO catalytic oxidation

15. If emissions from this fuel burning equipment are monitored for compliance, please specify the type of monitoring:
NOx CEMs meeting 40 CFR Part 75; optional CO CEMS

16. Describe any fugitive emissions associated with this process, such as outdoor storage piles, open conveyors, material handling operations, etc. (please attach a separate sheet if necessary).
N/A

17. Page number: Revision Number: Date of Revision:

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Department of Environment and Conservation
Division of Air Pollution Control
William R. Snodgrass Tennessee Tower
312 Rosa L. Parks Avenue, 15th Floor
Nashville, TN 37243
Telephone: (615) 532-0554

APC 4

TITLE V PERMIT APPLICATION
FUEL BURNING NON-PROCESS EQUIPMENT

GENERAL IDENTIFICATION AND DESCRIPTION

1. **Facility name:**
BAE Systems Ordnance Systems Inc. (OSI) Holston Army Ammunition Plant (HSAAP)

2. **Stack ID or flow diagram point identification (s):**
Flow Diagram Point D on the Expansion Project HSAAP Natural Gas Steam Generating Units Diagram

FUEL BURNING EQUIPMENT DESCRIPTION

3. List all fuel burning equipment that is at this fuel burning installation (please complete an APC 4 form for each piece of fuel burning equipment).

New Steam Generating Facility consisting of four Rentech Boilers each with a heat input capacity of 327 MMBtu/hr capable of producing 250,000 lbs/hr of steam. The units are natural gas fired with ULSD fuel oil as a backup fuel. The facility has a combined heat input capacity of 1,308 MMBtu/hr.

4. Fuel burning equipment identification number:
Rentech Boiler 4

5. Fuel burning equipment description:

Area B Rentech Boiler, dual fuel fired Low NOx natural gas and ULSD fuel oil fired boiler rated at 327 MMBtu/hr, Maximum operating pressure 300 psig at 525 degrees superheated steam. The boilers are "D-Type" with separate packaged economizers designed at 375 psig. The unit will be required to comply with 40 CFR Part 60 Subpart Db.

6. Year of installation or last modification of fuel burning equipment.
Installation planned complete in 2020.

7. Furnace type:
Rentech D type watertube design with separate packaged economizers with Zecco duel fuel fired low NOx (approximately 83.7% fuel-to-steam efficiency)

8. Manufacturer model number (if available):
TBD

9. Location of this fuel burning installation in UTM coordinates: UTM Vertical: [redacted] UTM Horizontal: [redacted]

10. Normal operating schedule: 24 Hrs./Day 7 Days/Wk. 365 Days/Yr.

FUELS, CONTROLS, AND MONITORING DESCRIPTION

11. Maximum rated heat input capacity (in million BTU/Hour)
327 Natural Gas - 310 Fuel Oil

12. If wood is used as a fuel, specify the amount of wood used as a fraction of total heat input.
N/A

13. Fuels:	Primary fuel	Backup fuel #1	Backup fuel #2	Backup fuel #3
Fuel name	Natural Gas	ULSD		
Actual yearly consumption	2,701 MCF	0.74 Mgal		

14. If emissions from this fuel burning equipment are controlled for compliance, please specify the type of control:
Low NOx Burners, selective catalytic reduction (SCR), wet electrostatic precipitator (WESP), CO catalytic oxidation

15. If emissions from this fuel burning equipment are monitored for compliance, please specify the type of monitoring:
NOx CEMs meeting 40 CFR Part 75; optional CO CEMS

16. Describe any fugitive emissions associated with this process, such as outdoor storage piles, open conveyors, material handling operations, etc. (please attach a separate sheet if necessary).
N/A

17. Page number: Revision Number: Date of Revision:

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TITLE V PERMIT APPLICATION
CONTROL EQUIPMENT - MISCELLANEOUS

GENERAL IDENTIFICATION AND DESCRIPTION

1. Facility name:
BAE Systems Ordnance Systems Inc. (OSI) Holston Army Ammunition Plant (HSAAP)

2. Emission source (identify):
Expansion Project New Steam Facility Boilers 1-4

3. Stack ID or flow diagram point identification (s):
Points A through D on the Expansion Project Natural Gas Steam Units Diagram

CONTROL EQUIPMENT DESCRIPTION

4. Describe the device in use. List the key operating parameters of this device and their normal operating range (e.g., pressure drop, gas flow rate, temperature):

NOx - The control for NOx for each of the four boilers includes Low NOx Burners in series with a Selective Catalytic Reduction (SCR) with ammonia control. The efficiency is discussed in the calculations section. The vendor will establish and provide key operating parameters which will likely consist of temperature and ammonia feed rate. However, parameters will not be utilized for compliance since these units will have a NOx SIP call compliant CEMs for NOx.

VOC - The control device for VOCs includes good combustion and use of a catalytic oxidation control device. The parameter associated with this unit will likely be temperature but will be established by the manufacturer or vendor. See form APC 14.

CO - As stated there is a catalytic oxidation control device for VOC. While operating this unit will also provide CO control even though the BACT rate for this pollutant is established based on good combustion. This is discussed in detail in the BACT and calculation section. The parameters will be established by the manufacturer or vendor and during any applicable testing. See form APC 14.

Particulate Matter - PM is controlled by a wet electrostatic precipitator (WESP). Parameter will likely be total power input however this will be established by the manufacturer or vendor and during any applicable testing.

The unit is subject to 40 CFR 60 Subpart Db and will meet the applicable requirements.

5. Manufacturer and model number (if available):
Boilers are Rentech boilers. The model number is TBD. Controls are TBD.

6. Year of installation:
Installation planned complete in 2020.

7. List of pollutant (s) to be controlled by this equipment and the expected control efficiency for each pollutant.

Pollutant	Efficiency (%)	Source of data
NOx	50	Vendor supplied. All units 40 CFR 60 Subpart Db
VOC	20	Vendor supplied.
CO	50	Vendor supplied.
Particulate Matter	50	Vendor supplied.

8. Discuss how collected material is handled for reuse or disposal.
Any wet ESP material collected will be properly disposed of following all solid waste management and resource conservation recovery act applicable regulations.

9. If this control equipment is in series with some other control equipment, state and specify the overall efficiency.
N/A

10. Page number: Revision Number: Date of Revision:

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Department of Environment and Conservation
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TITLE V PERMIT APPLICATION
CONTROL EQUIPMENT - CATALYTIC OR THERMAL OXIDATION

GENERAL IDENTIFICATION AND DESCRIPTION

1. Facility name:
BAE Systems Ordnance Systems Inc. (OSI) Holston Army Ammunition Plant (HSAAP)

2. Emission source (identify):
Expansion Project New Steam Facility Boilers 1-4

3. Stack ID or flow diagram point identification (s):
Points A through D on the Expansion Project Natural Gas Steam Units Diagram

OXIDIZER DESCRIPTION

4. Describe the oxidation system in use. List the key operating parameters of this device and their normal operating range.

VOC - The control device for VOCs includes good combustion and use of a catalytic oxidation control device. The parameter associated with this unit will likely be temperature but will be established by the manufacturer or vendor.

CO - As stated there is a catalytic oxidation control device for VOC. While operating this unit will also provide CO control even though the BACT rate for this pollutant is established based on good combustion. This is discussed in detail in the BACT and calculation section. The parameters will be established by the manufacturer or vendor and during any applicable testing.

5. Manufacturer and model number (if available):
TBD

6. Year of installation:
Installation planned complete in 2020.

7. Type (check one):
Catalytic oxidizer ✓
Thermal oxidizer ☐

8. List of pollutant (s) to be controlled and the expected control efficiency for each pollutant.

Pollutant	Efficiency (%)	Source of data
VOC	20	Estimate based on vendor information. TBD
CO	50	Estimate based on vendor information. TBD

9. If applicable, discuss how spent catalyst is handled for reuse or disposal.
All spent catalyst will be properly disposed of or recycled following all solid waste management and resource conservation recovery act applicable regulations.

10. Equipment specifications:

Catalytic oxidation	Thermal oxidation
10A. Minimum operating temperature (°F): TBD	10B. Minimum operating temperature (°F): NA
11A. Type of fuel used: TBD	11B. Type of fuel used: NA
12. Type of catalyst used and volume of catalyst used (Ft.^{3}): TBD	12. Not applicable. NA
13A. Maximum fuel use: TBD	13B. Maximum fuel use: NA
14A. Residence time (sec.): TBD	14B. Residence time (sec.): NA

15. If this control equipment is in series with some other control equipment, state and specify the overall efficiency.
NA

16. Page number: Revision Number: Date of Revision:

State of Tennessee
Department of Environment and Conservation
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TITLE V PERMIT APPLICATION
COMPLIANCE CERTIFICATION - MONITORING AND REPORTING
DESCRIPTION OF METHODS USED FOR DETERMINING COMPLIANCE

All sources that are subject to 1200-03-09-.02(11) of the Tennessee Air Pollution Control Regulations are required to certify compliance with all applicable requirements by including a statement within the permit application of the methods used for determining compliance. This statement must include a description of the monitoring, recordkeeping, and reporting requirements and test methods. In addition, the application must include a schedule for compliance certification submittals during the permit term. These submittals must be no less frequent than annually and may need to be more frequent if specified by the underlying applicable requirement or the Technical Secretary.

GENERAL IDENTIFICATION AND DESCRIPTION

1. Facility name: BAE SYSTEMS Ordnance Systems Inc. (OSI) Holston Army Ammunition Plant (HSAAP)
2. Process emission source, fuel burning installation, or incinerator (identify): Expansion Project New Natural Gas Steam Boilers 1-4
3. Stack ID or flow diagram point identification(s): Flow Diagram Points A through D on the Expansion Natural Gas Steam Units Diagram

METHODS OF DETERMINING COMPLIANCE

4. This source as described under Item #2 of this application will use the following method(s) for determining compliance with applicable requirements (and special operating conditions from an existing permit). Check all that apply and attach the appropriate form(s)

- [✓] Continuous Emission Monitoring (CEM) - APC 20
  Pollutant(s): NOx and CO optional
- [ ] Emission Monitoring Using Portable Monitors - APC 21
  Pollutant(s):
- [✓] Monitoring Control System Parameters or Operating Parameters of a Process - APC 22
  Pollutant(s): SCR for NOx, WESP for PM, and Catalytic Oxidation for VOC and CO - vendor recommended parameters
- [✓] Monitoring Maintenance Procedures - APC 23
  Pollutant(s): SCR for NOx, WESP for PM, and Catalytic Oxidation for VOC and CO - vendor recommended procedures
- [✓] Stack Testing - APC 24
  Pollutant(s): Optional
- [✓] Fuel Sampling & Analysis (FSA) - APC 25
  Pollutant(s): SO2 (for natural gas)
- [✓] Recordkeeping - APC 26
  Pollutant(s): PM, SO2, NOX, CO, VOC (natural gas usage)
- [✓] Other (please describe) - APC 27
  Pollutant(s): Opacity

5. Compliance certification reports will be submitted to the Division according to the following schedule:
   Start date: In accordance with the Title V permit certification requirements/frequency
   And every 365 days thereafter.
6. Compliance monitoring reports will be submitted to the Division according to the following schedule:
   Start date: In accordance with the Title V permit certification requirements/frequency
   And every 180 days thereafter.
7. Page number: Revision number: Date of revision:

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APC 20

TITLE V PERMIT APPLICATION
COMPLIANCE DEMONSTRATION BY CONTINUOUS EMISSIONS MONITORING

GENERAL IDENTIFICATION AND DESCRIPTION

1. Facility name:
BAE Systems Ordnance Systems Inc. (OSI) Holston Army Ammunition Plant (HSAAP)

2. Stack ID or flow diagram point identification(s):
Points A to D on the Expansion Project Natural Gas Steam Units

3. Process emission source or fuel burning installation or incinerator:
Expansion Project New Steam Facility Boilers 1-4

MONITOR DESCRIPTION

4. Description of equipment monitoring pollutant:
Part 75 compliant NOx CEMs

Pollutant being monitored: NOx

4A. Name of Manufacturer:
To be determined (TBD)

4B. Model number:
TBD

4C. Installation year
Project scheduled complete 2020

4D. Type:
☐ In situ ☑ Extractive ☐ Dilution ☑ Other (Specify): IF SME Recommends

4E. Describe how the monitor works:
40 CFR Part 75 compliant and based on vendor recommendations

5. Description of equipment monitoring diluent:
NA

Diluent being monitored: NA

5A. Name of manufacturer:
NA

5B. Model number:
NA

5C. Installation year
NA

5D. Type:
☐ In situ ☐ Extractive ☐ O_2 ☐ CO_2 ☐ Other (Specify): ______

5E. Describe how the monitor works:
NA

6. Description of equipment monitoring flow:
TBD

Amount of flow (DSCFM): TBD

6A. Name of manufacturer:
TBD

6B. Model number:
TBD

6C. Installation year
TBD

6D. Type:
☐ Differential pressure ☐ Thermal ☐ Other (Specify): ______

7. Opacity (or use of visible emission evaluations in lieu of opacity monitoring)

7A. Indicate which is used.
☐ Monitor ☐ Visible emission evaluations*

* For "Visible emission evaluation" choice, procedures will be specified as a condition in the source's operating permit.

7B. Opacity monitor (state the name of manufacturer, model number, and year of installation):
N/A

8. Page number: Revision Number: Date of Revision:

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TITLE V PERMIT APPLICATION - COMPLIANCE DEMONSTRATION BY MONITORING CONTROL SYSTEM PARAMETERS OR OPERATING PARAMETERS OF A PROCESS

The monitoring of a control system parameter or a process parameter shall be acceptable as a compliance demonstration method provided that a correlation between the parameter value and the emission rate of a particular pollutant is established.

GENERAL IDENTIFICATION AND DESCRIPTION

1. Facility name:
BAE Systems Ordnance Systems Inc. (OSI) Holston Army Ammunition Plant (HSAAP)

2. Stack ID or flow diagram point identification(s)
Points A-D - Expansion Project Natural Gas Steam Unit Diagram

3. Emission source:
Expansion Project New Steam Facility Boilers 1-4

MONITORING DESCRIPTION

4. Pollutant(s) being monitored:
Parameters for CO, VOCs, and Particulate Matter (PM)

5. Description of the method of monitoring and establishment of correlation between the parameter value and the emission rate of a particular pollutant:

Applicable parameters, in accordance with pollution control manufacturers recommendations and design requirements will be monitored at a frequency established by the manufacturer or site specific plan; the following parameters may be optionally monitored.

For CO and VOC a temperature range will be determined for the catalytic oxidation system to ensure the unit is operating at the appropriate range to verify compliance based on manufacturers information . As an alternative the vendor may recommend a more accurate parameter that better correlates to control efficiency. This information should be maintained in the vendor documents or onsite procedures. An annual tune-up of the boiler will also be required under the boiler MACT.

For PM the WESP will be monitored, similarly, in accordance with the manufacturers recommendations. Likely this will require monitoring of the total power input for the WESP. The vendor may recommend a more accurate parameter that better correlates to control efficiency and if so can be monitored as an alternative. The chosen parameter will be monitored at a frequency established by the manufacturer or site specific plan.

6. Compliance demonstration frequency (specify the frequency with which compliance will be demonstrated):
Frequency to be determined and reported Semi-annually, if applicable.

7. Page number: Revision number: Date of revision:

State of Tennessee
Department of Environment and Conservation
Division of Air Pollution Control
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TITLE V PERMIT APPLICATION
COMPLIANCE DEMONSTRATION BY MONITORING MAINTENANCE PROCEDURES

The monitoring of a maintenance procedure shall be acceptable as a compliance demonstration method provided that a correlation between the procedure and the emission rate of a particular pollutant is established.

GENERAL IDENTIFICATION AND DESCRIPTION

1. Facility name:

BAE Systems Ordnance Systems Inc. (OSI) Holston Army Ammunition Plant (HSAAP)

2. Stack ID or flow diagram point identification(s):

Points A through D on the Expansion Project Natural Gas Steam Units Diagram

3. Emission source (identify):

Expansion Project New Steam Facility Boilers 1-4

MONITORING DESCRIPTION

4. Pollutant(s) being monitored:

NOx, CO, VOC, and PM

5. Procedure being monitored:

For each of the three control devices (Selective Catalytic Reduction (SCR), CO and VOC catalytic oxidation, and wet electrostatic precipitator (WESP) the vendor recommended or approved optional maintenance procedures will be followed.

6. Description of the method of monitoring and establishment of correlation between the procedure and the emission rate of a particular pollutant:

The vendor recommended or approved optional maintenance procedures will be established for each system. The requirements will be tracked in OSI's electronic preventive maintenance tracking system.

The vendor maintenance procedures or a site specific maintenance plan will detail the required maintenance for these control devices.

7. Compliance demonstration frequency (specify the frequency with which compliance will be demonstrated):

Frequency to be determined and records maintained on site.

8. Page number: Revision number: Date of revision:

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Department of Environment and Conservation
Division of Air Pollution Control
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TITLE V PERMIT APPLICATION
COMPLIANCE DEMONSTRATION BY STACK TESTING

The performance of an appropriate EPA stack test method for demonstrating compliance with an emission limitation has always been acceptable. EPA test methods contain quality assurance procedures that shall be strictly adhered to by the source.

GENERAL IDENTIFICATION AND DESCRIPTION

1. Facility name:

BAE Systems Ordnance Systems Inc. (OSI)
Holston Army Ammunition Plant (HSAAP)

2. Stack ID or flow diagram point identification(s):

Points A through D on the Expansion Project Natural Gas Steam Units Diagram

3. Emission source (identify):

Expansion Project New Steam Facility Boilers 1-4

STACK TESTING DESCRIPTION

4. Pollutant(s) being monitored:

Stack Testing may be optional for CO, VOC, and PM. Currently there is no requirement for stack testing these units. OSI is providing this form as an optional compliance method in lieu of manufacturer's recommendations if the state determines these methods inadequate.

5. Test method:

To provide a one time correlation between parameters or maintenance procedures, stack testing can optionally be used for CO, VOC, and/or PM depending on the adequacy of the manufacturer's information.

The following stack test methods are recommended however approved alternatives can also be used.

PM - Method 5

CO - Method 10

VOC - TBD if required

6. Compliance demonstration frequency (specify the frequency with which compliance will be demonstrated):

One time testing with the report required within 60 days of testing. This option is only to be executed if the adequacy of the manufacturer's control device information is challenged and the state requests these tests be performed.

7. Page number: Revision number: Date of revision:

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APC 25

TITLE V PERMIT APPLICATION
COMPLIANCE DEMONSTRATION BY FUEL SAMPLING AND ANALYSIS

GENERAL IDENTIFICATION AND DESCRIPTION

1. Facility name:	2. Stack ID or flow diagram point identification(s):
BAE Systems Ordnance Systems Inc. (OSI) Holston Army Ammunition Plant (HSAAP)	Points A through D on the Expansion Project Natural Gas Steam Units Diagram

3. Emission source (identify):

Expansion Project New Steam Facility Boilers 1-4

MONITORING THROUGH FUEL SAMPLING AND ANALYSIS

4. Pollutant(s) being monitored:

SO2

5. Fuel being sampled:

Natural Gas and ultra low sulfur diesel (ULSD) fuel sample sufficient to meet the definitions of each of these fuels under 40 CFR Part 60 Subpart Db and in compliance with fuel record requirements of this NSPS requirement.

6. List the fuel sample collecting and analyzing method used (if an ASTM method is not applicable, propose a method acceptable to the Technical Secretary).

As defined in 40 CFR Part 60 Subpart Db

7. Compliance demonstration frequency (specify the frequency with which compliance will be demonstrated):

As required by 40 CFR Part 60 Subpart Db

8. Page number:	Revision number:	Date of revision:

State of Tennessee
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TITLE V PERMIT APPLICATION
COMPLIANCE DEMONSTRATION BY RECORDKEEPING

Recordkeeping shall be acceptable as a compliance demonstration method provided that a correlation between the parameter value recorded and the applicable requirement is established.

GENERAL IDENTIFICATION AND DESCRIPTION

1. Facility name:
BAE Systems Ordnance Systems Inc. (OSI)
Holston Army Ammunition Plant (HSAAP)

2. Stack ID or flow diagram point identification(s):
Points A through D on the Expansion Project Natural Gas Steam Units Diagram

3. Emission source (identify):
Expansion Project New Steam Facility Boilers 1-4

MONITORING AND RECORDKEEPING DESCRIPTION

4. Pollutant(s) or parameter being monitored:
Sulfur content monitored as required by 40 CFR Part 60 Subpart Db. Fuel usage records are also required by this NSPS subpart.

5. Material or parameter being monitored and recorded:
Natural gas and ultra low sulfur diesel (ULSD) fuel

6. Method of monitoring and recording:
In accordance with 40 CFR Part 60 Subpart Db

7. Compliance demonstration frequency (specify the frequency with which compliance will be demonstrated):
In accordance with 40 CFR Part 60 Subpart Db

8. Page number: Revision number: Date of revision:

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TITLE V PERMIT APPLICATION
COMPLIANCE DEMONSTRATION BY OTHER METHOD(S)

GENERAL IDENTIFICATION AND DESCRIPTION

1. Facility name:	2. Stack ID or flow diagram point identification(s):
BAE SYSTEMS Ordnance Systems Inc. (OSI) Holston Army Ammunition Plant (HSAAP)	Entire Source

3. Emission source (identify):

Expansion Project New Steam Facility Boilers 1-4

MONITORING DESCRIPTION

4. Pollutant(s) or parameter being monitored:

Opacity

5. Description of the method of monitoring:

Compliance with the standard shall be determined by the procedures of the Tennessee Division of Air Pollution Control's Opacity Matrix dated June 18, 1996 and amended September 12, 2005.

Note that in the latest version of the Division's Opacity Matrix natural gas or No. 2 Oil-fired combustion sources do not require Visible emission evaluations.

Standard:
Visible emissions from this source shall not exhibit greater than twenty percent (20%) opacity (6-minute average), except for one 6-minute period per hour of not more than 27 percent (27%) opacity. Visible emissions from this source shall be determined by EPA Method 9, as published in the current 40 CFR 60, Appendix A.

6. Compliance demonstration frequency (specify the frequency with which compliance will be demonstrated):

Frequency as required per the Tennessee Division of Air Pollution Control's Opacity Matrix

7. Page number:	Revision number:	Date of revision:

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Division of Air Pollution Control
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APC 28

TITLE V PERMIT APPLICATION
EMISSIONS FROM PROCESS EMISSION SOURCE / FUEL BURNING INSTALLATION / INCINERATOR

GENERAL IDENTIFICATION AND DESCRIPTION

1. Facility name:	2. Stack ID or flow diagram point identification(s):
BAE Systems Ordnance Systems Inc. (OSI) Holston Army Ammunition Plant (HSAAP)	Entire Source

3. Process emission source / Fuel burning installation / Incinerator (identify):

New Steam Generating Facility consisting of four Rentech Boilers each with a heat input capacity of 327 MMBtu/hr capable of producing 250,000 lbs/hr of steam. The units are natural gas fired with ULSD fuel oil as a backup fuel. The facility has a combined heat input capacity of 1,308 MMBtu/hr. The calculations below are explained in more detail in the calculations section of this application. Only maximum allowable emissions are listed because this is a new source. Calculations are included in Appendix B of this Application.

EMISSIONS SUMMARY TABLE – CRITERIA AND FUGITIVE EMISSIONS

4. Complete the following emissions summary for regulated air pollutants. Fugitive emissions shall be included. Attach calculations and emission factor references.

Air Pollutant	Maximum Allowable Emissions		Actual Emissions	
	Tons per Year	Reserved for State use (Pounds per Hour - Item 7, APC 30)	Tons per Year	Reserved for State use (Pounds per Hour- Item 8, APC 30)
Particulate Matter (TSP)	15.9			
(Fugitive Emissions)				
Sulfur Dioxide	6.4			
(Fugitive Emissions)				
Volatile Organic Compounds	22.9			
(Fugitive Emissions)				
Carbon Monoxide	100.6			
(Fugitive Emissions)				
Lead				
(Fugitive Emissions)				
Nitrogen Oxides	226.4			
(Fugitive Emissions)				
Total Reduced Sulfur				
(Fugitive Emissions)				
Mercury				
(Fugitive Emissions)				

(Continued on next page)

(Continued from last page)

AIR POLLUTANT	Maximum Allowable Emissions		Actual Emissions	
	Tons per Year	Reserved for State use (Pounds per Hour - Item 7, APC 30)	Tons per Year	Reserved for State use (Pounds per Hour- Item 8, APC 30)
Asbestos				
(Fugitive Emissions)				
Beryllium				
(Fugitive Emissions)				
Vinyl Chloride				
(Fugitive Emissions)				
Fluorides				
(Fugitive Emissions)				
Gaseous Fluorides				
(Fugitive Emissions)				
Greenhouse Gases in CO_2 Equivalents	678,139			

EMISSIONS SUMMARY TABLE – FUGITIVE HAZARDOUS AIR POLLUTANTS

5. Complete the following emissions summary for regulated air pollutants that are hazardous air pollutant(s). Fugitive emissions shall be included. Attach calculations and emission factor references.

Air Pollutant & CAS	Maximum Allowable Emissions		Actual Emissions	
	Tons per Year	Reserved for State use (Pounds per Hour - Item 7, APC 30)	Tons per Year	Reserved for State use (Pounds per Hour- Item 8, APC 30)

6. Page number: Revision number: Date of revision

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TITLE V PERMIT APPLICATION
CURRENT EMISSIONS REQUIREMENTS AND STATUS

GENERAL IDENTIFICATION AND DESCRIPTION

1. Facility name:
BAE SYSTEMS Ordnance Systems Inc. (OSI)
Holston Army Ammunition Plant (HSAAP)

2. Emission source number
Expansion Project New Steam Facility Boilers

3. Describe the process emission source / fuel burning installation / incinerator.
4 Rentech Boilers each with a heat input capacity of 327 MMBtu/hr capable of producing 250,000 lbs/hr of steam. The units are natural gas fired with ULSD fuel oil as a backup fuel.

EMISSIONS AND REQUIREMENTS

4. Identify if only a part of the source is subject to this requirement	5. Pollutant	6. Applicable requirement(s): TN Air Pollution Control Regulations, 40 CFR, permit restrictions, air quality based standards	7. Limitation	8. Maximum actual emissions	9. Compliance status (In/Out)
Entire Source	Heat Input capacity	Rule 1200-03-06-.01(7) and this application	Monthly log of fuel usage and hours of operation maintained to determine the maximum heat input of the source on and hourly average basis	Monthly log of fuel usage and hours of operation maintained to determine the maximum heat input of the source on and hourly average basis	IN
Entire Source	HAPs	40 CFR 63 Subpart DDDDD – Boiler NESHAP	Work Practice Standards and boiler tune-ups	NA	IN
Entire Source	NOx, SO2	40 CFR 60 Subpart Db	Fuel restrictions	NA	IN
Entire Source	NOx	40 CFR 96	NOx Budget permit and applicable NOx Budget trading program requirements	NA	IN
Entire Source	NOX	TAPCR 1200-3-6-.03(2)	226.4 tons per year	226.4 tons per year	IN
Entire Source	SO2	TAPCR 1200-03-14-.01(3) and application	13.7 pounds per hour and 6.4 tons per year	13.7 pounds per hour and 6.4 tons per year	IN
Entire Source	Particulates	TAPCR 1200-03-06-.01(7) and application	2.2 pounds per hour and 15.9 tons per year	2.2 pounds per hour and 15.9 tons per year	IN
Entire Source	CO	TAPCR 1200-3-6-.03(2)	100.6 tons per year	100.6 tons per year	IN
Entire Source	VOC	TAPCR 1200-3-6-.02(2)	22.9 tons per year	22.9 tons per year	IN

10. Other applicable requirements (new requirements that apply to this source during the term of this permit)

11. Page number: Revision number: Date of revision:

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TITLE V PERMIT APPLICATION
CURRENT EMISSIONS REQUIREMENTS AND STATUS

GENERAL IDENTIFICATION AND DESCRIPTION

1. Facility name:
BAE SYSTEMS Ordnance Systems Inc. (OSI)
Holston Army Ammunition Plant (HSAAP)

2. Emission source number
Source reference #: 37-1029-17

3. Describe the process emission source / fuel burning installation / incinerator.
Steam Generating Units

EMISSIONS AND REQUIREMENTS

4. Identify if only a part of the source is subject to this requirement	5. Pollutant	6. Applicable requirement(s): TN Air Pollution Control Regulations, 40 CFR, permit restrictions, air quality based standards	7. Limitation	8. Maximum actual emissions	9. Compliance status (In/Out)
Entire Source	VOC	TAPCR 1200-03-09-.01(4)(j)	0.004 lb/MMBtu	0.004 lb/MMBtu	IN
When Firing Natural Gas	CO	TAPCR 1200-03-09-.01(4)(j)	0.035 lb/MMBtu	0.035 lb/MMBtu	IN
When Firing Fuel Oil	CO	TAPCR 1200-03-09-.01(4)(j)	0.04 lb/MMBtu	0.04 lb/MMBtu	IN
Entire Source	NOX	TAPCR 1200-3-6-.03(2)	Low NOX burners (all)	Low NOX burners (all)	IN
Entire Source	Opacity	40 CFR 60.43b(f), 40 CFR 60.48b(l), and 1200-3-9-.02(11)(e)(iii) Divisions Opacity Matrix	20% opacity (maximum)	27% opacity (maximum)	IN

10. Other applicable requirements (new requirements that apply to this source during the term of this permit)

11. Page number: Revision number: Date of revision:

State of Tennessee
Department of Environment and Conservation
Division of Air Pollution Control
William R. Snodgrass Tennessee Tower
312 Rosa L. Parks Avenue, 15th Floor
Nashville, TN 37243
Telephone: (615) 532-0554

TITLE V PERMIT APPLICATION
OPERATIONS AND FLOW DIAGRAMS

1. Please list, identify, and describe briefly process emission sources, fuel burning installations, and incinerators that are contained in this application. Please attach a flow diagram for this application.

[redacted]

2. List all insignificant activities which are exempted because of size or production rate and cite the applicable regulations.

-Storage Tanks Identified by APC 6 forms (4 forms total)
-[redacted] process and acid storage - Included in Calculation section Appendix B

3. Are there any storage piles?

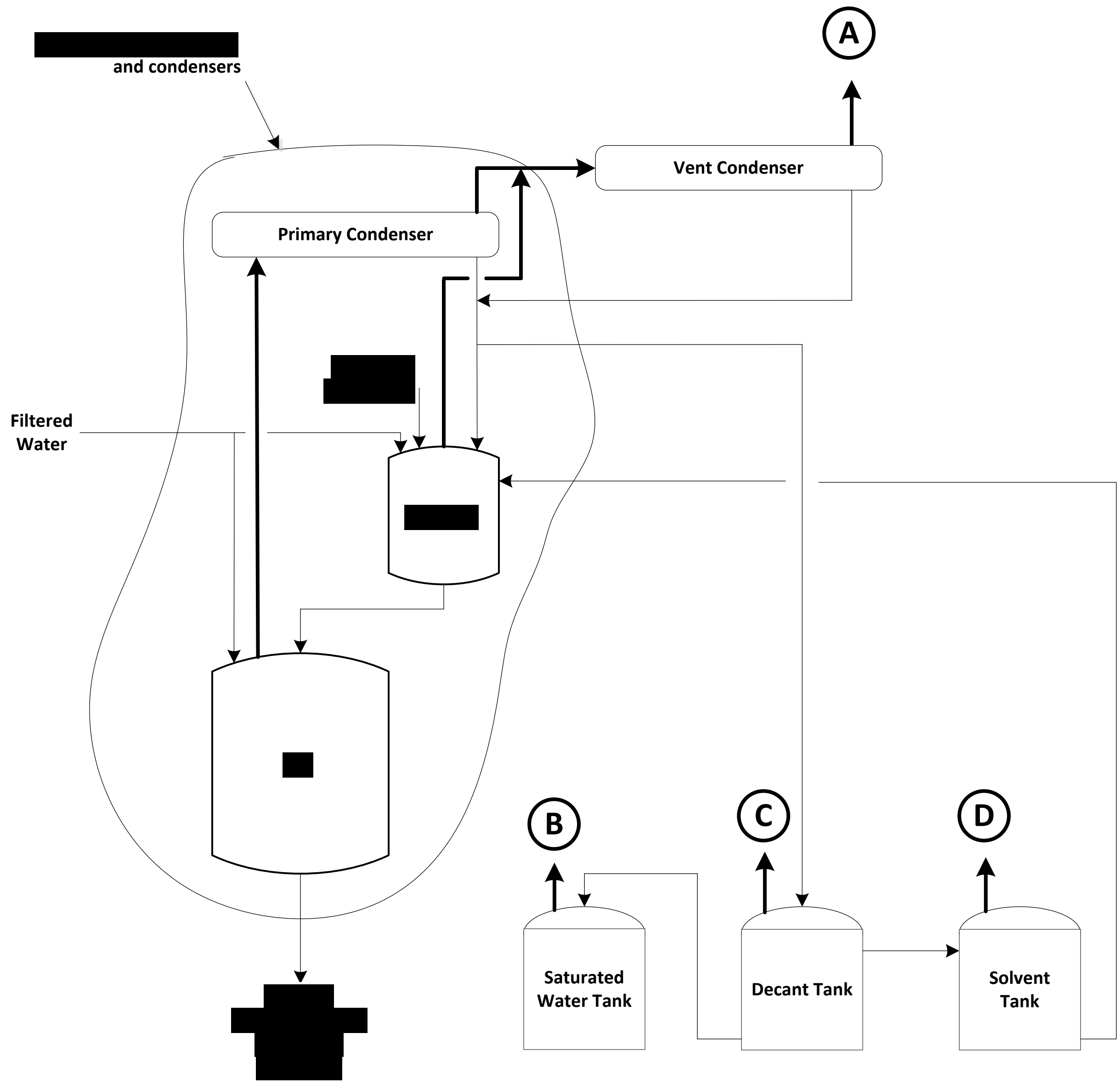
YES __________ NO ____X______

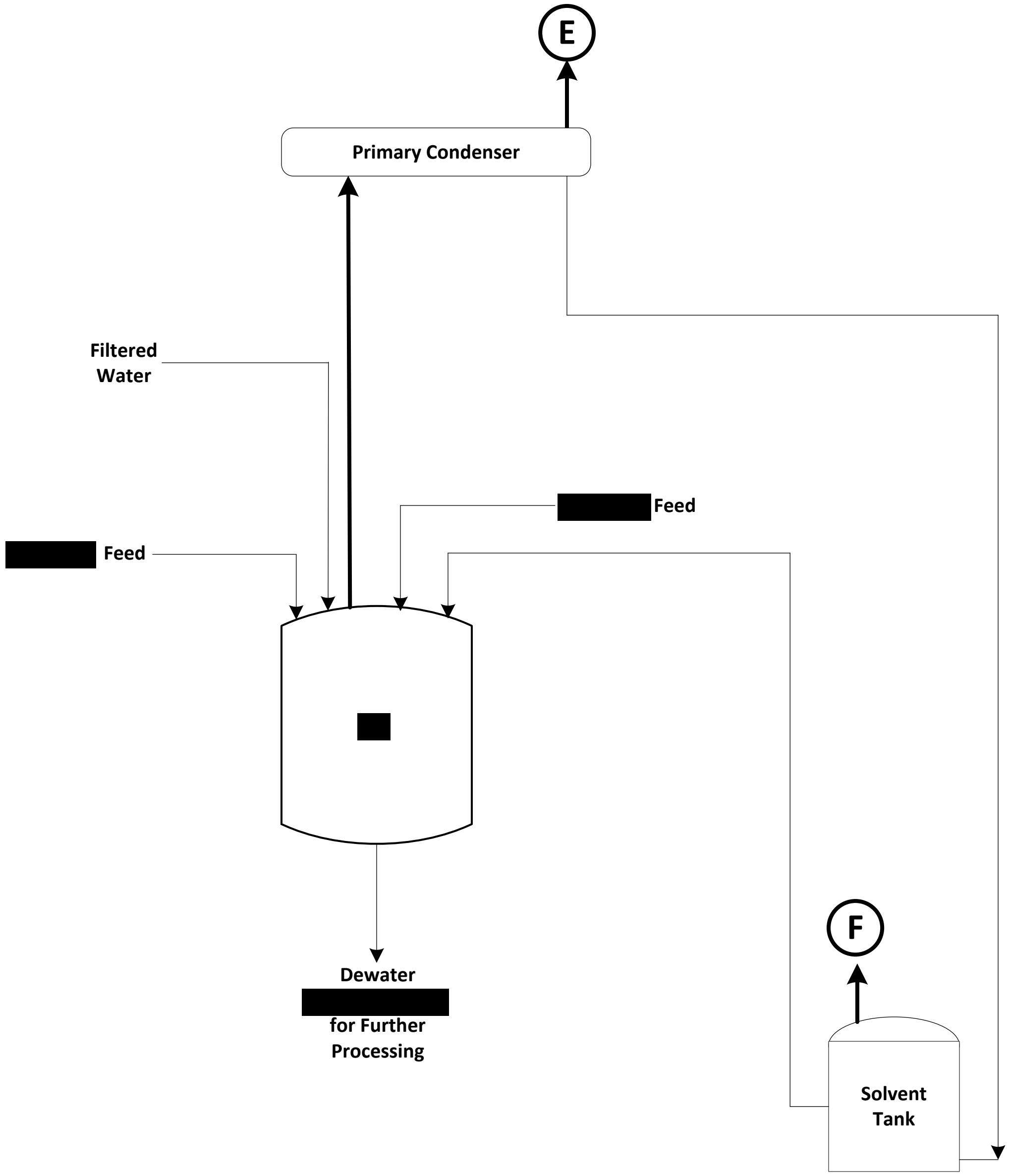
4. List the states that are within 50 miles of your facility.

Virginia, Kentucky, North Carolina

5. Page number: Revision Number: Date of Revision:

[redacted] Process




E
Primary Condenser
Filtered
Water
[redacted] Feed
[redacted] Feed
[redacted]
Dewater
[redacted]
for Further
Processing
F
Solvent
Tank

State of Tennessee
Department of Environment and Conservation
Division of Air Pollution Control
William R. Snodgrass Tennessee Tower
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Nashville, TN 37243
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TITLE V PERMIT APPLICATION
STACK IDENTIFICATION

GENERAL IDENTIFICATION AND DESCRIPTION

1. **Facility name:**
BAE Systems Ordnance Systems Inc., Holston Army Ammunition Plant

2. **Emission source (identify):**
Building [redacted]

STACK DESCRIPTION

3. Stack ID (or flow diagram point identification):
Vent A

4. Stack height above grade in feet:
52

5. Velocity (data at exit conditions): 2.16 (Actual feet per second)	6. Inside dimensions at outlet in feet: 0.172
7. Exhaust flow rate at exit conditions (ACFM): 3.02	8. Flow rate at standard conditions (DSCFM): 2.67
9. Exhaust temperature: 85 Degrees Fahrenheit (°F)	10. Moisture content (data at exit conditions): 2.8 Percent ______ Grains per dry standard cubic foot (gr./dscf.)

11. Exhaust temperature that is equaled or exceeded during ninety (90) percent or more of the operating time (for stacks subject to diffusion equation only):
N/A (°F)

12. If this stack is equipped with continuous pollutant monitoring equipment required for compliance, what pollutant(s) does this equipment monitor (e.g., Opacity, SO_2, NO_x, etc.)?
Not Applicable

Complete the appropriate APC form(s) 4, 5, 7, 8, 9, or 10 for each source exhausting through this stack.

BYPASS STACK DESCRIPTION

13. Do you have a bypass stack?
________ Yes X No

If yes, describe the conditions which require its use & complete APC form 4 for the bypass stack. Please identify the stack number(s) of flow diagram point number(s) exhausting through this bypass stack.

14. Page number: Revision Number: Date of Revision:

State of Tennessee
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Nashville, TN 37243
Telephone: (615) 532-0554

TITLE V PERMIT APPLICATION
STACK IDENTIFICATION

GENERAL IDENTIFICATION AND DESCRIPTION

1. **Facility name:**
BAE Systems Ordnance Systems Inc., Holston Army Ammunition Plant

2. **Emission source (identify):**
Building [redacted]

STACK DESCRIPTION

3. Stack ID (or flow diagram point identification):
Vent E

4. Stack height above grade in feet:
52

5. Velocity (data at exit conditions): 12.7 (Actual feet per second)	6. Inside dimensions at outlet in feet: 0.172
7. Exhaust flow rate at exit conditions (ACFM): 17.8	8. Flow rate at standard conditions (DSCFM): 15.1
9. Exhaust temperature: 122 Degrees Fahrenheit (°F)	10. Moisture content (data at exit conditions): 0.9% Percent; __________ Grains per dry standard cubic foot (gr./dscf.)

11. Exhaust temperature that is equaled or exceeded during ninety (90) percent or more of the operating time (for stacks subject to diffusion equation only):
N/A (°F)

12. If this stack is equipped with continuous pollutant monitoring equipment required for compliance, what pollutant(s) does this equipment monitor (e.g., Opacity, SO_2, NO_x, etc.)?
Not Applicable

Complete the appropriate APC form(s) 4, 5, 7, 8, 9, or 10 for each source exhausting through this stack.

BYPASS STACK DESCRIPTION

13. Do you have a bypass stack?
________ Yes X No

If yes, describe the conditions which require its use & complete APC form 4 for the bypass stack. Please identify the stack number(s) of flow diagram point number(s) exhausting through this bypass stack.

14. Page number: Revision Number: Date of Revision:

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TITLE V PERMIT APPLICATION
STORAGE TANKS

GENERAL IDENTIFICATION AND DESCRIPTION

1. **Facility name:** BAE Systems Ordnance Systems Inc., Holston Army Ammunition Plant

2. **Process emission source (identify):** Building [redacted] (Vent B on Process Flow Diagram)

STORAGE TANK DESCRIPTION

3. Storage tank identification: [redacted]-T-10

4. Location of the storage tank or tank farm in UTM coordinates: UTM Vertical: [redacted] UTM Horizontal: [redacted]___

5. Storage tank capacity: 7340 (Gallons)
6. Year of installation: 2019
7. Tank height 11.3 (Feet)
8. Tank diameter: 10.5 (Feet)

9. Color of tank: ________ White _X_______ Other Specify aluminum (specular)

10. Is this tank equipped with a submerged fill pipe? _X______ Yes ________ No

11. Type of storage tank:

________Open top tank _X_______Fixed roof ________Fixed roof w/internal floating roof ________Other (specify)
________Pressurized tank ________External floating roof ________Variable vapor space ______________________

12. For fixed roof tanks:
A. Tank configuration (check one):: _X______Vertical (upright cylinder) ________Horizontal
B. Tank roof type: ________Cone roof – indicate tank roof height ________(ft)
(check one) _X_______Dome roof – indicate tank roof height 1.83____(ft)
Indicate shell radius 10.5____(ft)

FLOATING ROOF TANK DESCRIPTION

13. For Floating Rook tanks (both internal and external) – shell condition (check one):
________ Light rust ________ Dense rust ________ Gunite lined

14. For External Floating Roof tanks:

A. Tank construction (check one): ________ Welded tank ________ Riveted tank

B. Rim Seal system description (check one):
_____Shoe Mounted Primary _____Vapor Mounted Primary _____Liquid Mounted Primary
_____Shoe Primary, Rim Secondary _____Vapor Primary, Rim Secondary _____Liquid Primary, Rim Secondary
_____Liquid Primary w/Weather Shield _____Shoe Primary and Secondary _____Vapor Primary w/Weather Shield

C. Roof type (check one): : ________ Pontoon roof ________ Double Deck roof

D. Roof fitting types (indicate the number of each type):

Access Hatch (24" Diameter well)
_____Bolted cover, gasketed
_____Unbolted cover, gasketed
_____Unbolted cover, ungasketed

Unslotted Guide-Pole Well
(8" Diameter Unslotted Pole, 21" Dia. Well)
_____Ungasketed sliding cover
_____Gasketed sliding cover

Gauge-Float Well (20" Diameter)
_____Unbolted cover, ungasketed
_____Unbolted cover, gasketed
_____Bolted cover, gasketed

Gauge-Hatch/Sample Well (8" Dia.)
_____Weighted Mechanical Actuation Gasketed
_____ Weighted Mechanical Actuation Ungasketed

Vacuum Breaker (10" Dia. Well)
_____Weighted Mechanical Actuation Gasketed
_____ Weighted Mechanical Actuation Ungasketed

Roof Drain
_____Open
_____ 90% Closed

Slotted Guide-Pole/Sample Well
(8" Slotted Pole, 21" Dia. Well)
_____Ungasketed Sliding Cover, without Float
_____Ungasketed Sliding Cover, with Float
_____Gasketed Sliding Cover, without Float
_____ Gasketed Sliding Cover, with Float

Roof Leg (3" Dia.)
_____Adjustable, Pontoon area
_____Adjustable, Center area
_____Adjustable, Double-Deck roofs
_____Fixed

Roof Leg (2 ½" Dia.)
_____Adjustable, Pontoon area
_____Adjustable, Center area
_____Adjustable, Double-Deck roofs
_____Fixed

15. For Internal Floating Roof tanks:

A. Rim Seal system description:

_____ Liquid Mounted Primary
_____ Vapor Mounted Primary
_____ Liquid Mounted Primary plus Secondary Seal
_____ Vapor Mounted Primary plus Secondary Seal

B. Number of Columns: _______

C. Effective Column diameter: _______ (Feet)

D. Deck Type (check one): _____ Welded _____ Bolted

E. Total Deck Seam length: __________ (Feet)

F. Deck Area: ________________ (Square Feet)

G. Deck Fitting types (indicate the number of each type):

Access Hatch (24" Dia.)
_____ Bolted cover, gasketed
_____ Unbolted cover, gasketed
_____ Unbolted cover, ungasketed

Automatic Gauge Float Well
_____ Bolted cover, gasketed
_____ Unbolted cover, gasketed
_____ Unbolted cover, ungasketed

Column Well
____ Built-up Column-Sliding cover, gasketed
____ Built-up Column-Sliding cover, ungasketed
____ Pipe Column-Flexible fabric sleeve seal
____ Pipe Column-Sliding cover, gasketed
____ Pipe Column-Sliding cover, ungasketed

Ladder well
_____ Sliding cover, gasketed
_____ Sliding cover, ungasketed

Sample Pipe and Well
_____ Slotted Pipe-Sliding cover, gasketed
_____ Slotted Pipe-Sliding cover, ungasketed
_____ Sample Well-Slit fabric seal, 10% open area
_____ Stub Drain, 1 inch diameter

Roof Leg or Hanger Well
_____ Adjustable
_____ Fixed

Vacuum Breaker

_____ Weighted Mechanical Actuation, gasketed
_____ Weighted Mechanical Actuation, ungasketed

16. For variable vapor space tanks:

Volume expansion capacity_____________________ (Gallons)

TANK CONTENTS AND OPERATION DESCRIPTION

17. Complete the flowing table for materials to be stored in this tank:

Material or component stored	Wt. %	Material Annual Throughput (Gal./Yr.)	Material stored Daily Average (Gallons)	Component Molecular weights (Lb./Lb. Mole)	Component Vapor Pressures (PSIA)	Material storage pressure(PSIA)	Material average storage temp. (Deg. F)
[redacted]	2.4	[redacted]	[redacted]	[redacted]	0.67	14.1	150
Water	97.6	9,167,231	25,116	18	0.93	14.1	150

Multipurpose tank with variable composition:

________ Yes X________ No

18. Describe the operation this tank will serve:

The tank stores water from the decant tank which is reused in the [redacted] process. This water contains some [redacted] due to the solvent's solubility in water.

19. Page number: Revision Number: Date of Revision:

State of Tennessee
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Division of Air Pollution Control
William R. Snodgrass Tennessee Tower
312 Rosa L. Parks Avenue, 15th Floor
Nashville, TN 37243
Telephone: (615) 532-0554

APC 6

TITLE V PERMIT APPLICATION
STORAGE TANKS

GENERAL IDENTIFICATION AND DESCRIPTION

1. **Facility name:** BAE Systems Ordnance Systems Inc., Holston Army Ammunition Plant

2. **Process emission source (identify):** Building [redacted] (Vent C on Process Flow Diagram)

STORAGE TANK DESCRIPTION

3. Storage tank identification: [redacted]-T-11

4. Location of the storage tank or tank farm in UTM coordinates: UTM Vertical: [redacted] UTM Horizontal: [redacted]___

5. Storage tank capacity: 7340 (Gallons)
6. Year of installation: 2019
7. Tank height 11.3 (Feet)
8. Tank diameter: 10.5 (Feet)

9. Color of tank: ________ White __X______ Other Specify aluminum (specular)

10. Is this tank equipped with a submerged fill pipe? __X______ Yes ________ No

11. Type of storage tank:

________Open top tank __X______Fixed roof ________Fixed roof w/internal floating roof ________Other (specify)
________Pressurized tank ________External floating roof ________Variable vapor space ______________________

12. For fixed roof tanks:
A. Tank configuration (check one):: __X______Vertical (upright cylinder) ________Horizontal
B. Tank roof type: ________Cone roof – indicate tank roof height ________(ft)
(check one) __X______Dome roof – indicate tank roof height __1.83____(ft)
Indicate shell radius 10.5____(ft)

FLOATING ROOF TANK DESCRIPTION

13. For Floating Rook tanks (both internal and external) – shell condition (check one):
________ Light rust ________ Dense rust ________ Gunite lined

14. For External Floating Roof tanks:

A. Tank construction (check one): ________ Welded tank ________ Riveted tank

B. Rim Seal system description (check one):
_____Shoe Mounted Primary _____Vapor Mounted Primary _____Liquid Mounted Primary
_____Shoe Primary, Rim Secondary _____Vapor Primary, Rim Secondary _____Liquid Primary, Rim Secondary
_____Liquid Primary w/Weather Shield _____Shoe Primary and Secondary _____Vapor Primary w/Weather Shield

C. Roof type (check one): : ________ Pontoon roof ________ Double Deck roof

D. Roof fitting types (indicate the number of each type):

Access Hatch (24" Diameter well)
_____Bolted cover, gasketed
_____Unbolted cover, gasketed
_____Unbolted cover, ungasketed

Unslotted Guide-Pole Well
(8" Diameter Unslotted Pole, 21" Dia. Well)
_____Ungasketed sliding cover
_____Gasketed sliding cover

Gauge-Float Well (20" Diameter)
_____Unbolted cover, ungasketed
_____Unbolted cover, gasketed
_____Bolted cover, gasketed

Gauge-Hatch/Sample Well (8" Dia.)
_____Weighted Mechanical Actuation Gasketed
_____ Weighted Mechanical Actuation Ungasketed

Vacuum Breaker (10" Dia. Well)
_____Weighted Mechanical Actuation Gasketed
_____ Weighted Mechanical Actuation Ungasketed

Roof Drain
_____Open
_____ 90% Closed

Slotted Guide-Pole/Sample Well
(8" Slotted Pole, 21" Dia. Well)
_____Ungasketed Sliding Cover, without Float
_____Ungasketed Sliding Cover, with Float
_____Gasketed Sliding Cover, without Float
_____ Gasketed Sliding Cover, with Float

Roof Leg (3" Dia.)
_____Adjustable, Pontoon area
_____Adjustable, Center area
_____Adjustable, Double-Deck roofs
_____Fixed

Roof Leg (2 ½" Dia.)
_____Adjustable, Pontoon area
_____Adjustable, Center area
_____Adjustable, Double-Deck roofs
_____Fixed

15. For Internal Floating Roof tanks:

A. Rim Seal system description:

_____ Liquid Mounted Primary
_____ Vapor Mounted Primary
_____ Liquid Mounted Primary plus Secondary Seal
_____ Vapor Mounted Primary plus Secondary Seal

B. Number of Columns: _______

C. Effective Column diameter: _______ (Feet)

D. Deck Type (check one): _____ Welded _____ Bolted

E. Total Deck Seam length: __________ (Feet)

F. Deck Area: ________________ (Square Feet)

G. Deck Fitting types (indicate the number of each type):

Access Hatch (24" Dia.)
_____ Bolted cover, gasketed
_____ Unbolted cover, gasketed
_____ Unbolted cover, ungasketed

Automatic Gauge Float Well
_____ Bolted cover, gasketed
_____ Unbolted cover, gasketed
_____ Unbolted cover, ungasketed

Column Well
____ Built-up Column-Sliding cover, gasketed
____ Built-up Column-Sliding cover, ungasketed
____ Pipe Column-Flexible fabric sleeve seal
____ Pipe Column-Sliding cover, gasketed
____ Pipe Column-Sliding cover, ungasketed

Ladder well
_____ Sliding cover, gasketed
_____ Sliding cover, ungasketed

Sample Pipe and Well
_____ Slotted Pipe-Sliding cover, gasketed
_____ Slotted Pipe-Sliding cover, ungasketed
_____ Sample Well-Slit fabric seal, 10% open area
_____ Stub Drain, 1 inch diameter

Roof Leg or Hanger Well
_____ Adjustable
_____ Fixed

Vacuum Breaker

_____ Weighted Mechanical Actuation, gasketed
_____ Weighted Mechanical Actuation, ungasketed

16. For variable vapor space tanks:

Volume expansion capacity_____________________ (Gallons)

TANK CONTENTS AND OPERATION DESCRIPTION

17. Complete the flowing table for materials to be stored in this tank:

Material or component stored	Wt. %	Material Annual Throughput (Gal./Yr.)	Material stored Daily Average (Gallons)	Component Molecular weights (Lb./Lb. Mole)	Component Vapor Pressures (PSIA)	Material storage pressure(PSIA)	Material average storage temp. (Deg. F)
[redacted]	50	[redacted]	[redacted]	[redacted]	0.055	14.1	60
Water	50	7,861,916	21,539	18	0.253	14.1	60

Multipurpose tank with variable composition:

________ Yes X________ No

18. Describe the operation this tank will serve:

Tank is used to decant water and [redacted] for use in [redacted].

19. Page number: Revision Number: Date of Revision:

State of Tennessee
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Division of Air Pollution Control
William R. Snodgrass Tennessee Tower
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Nashville, TN 37243
Telephone: (615) 532-0554

TITLE V PERMIT APPLICATION
STORAGE TANKS

GENERAL IDENTIFICATION AND DESCRIPTION

1. **Facility name:** BAE Systems Ordnance Systems Inc., Holston Army Ammunition Plant

2. **Process emission source (identify):** Building [redacted] (Vent D on Process Flow Diagram)

STORAGE TANK DESCRIPTION

3. Storage tank identification: [redacted]-T-12

4. Location of the storage tank or tank farm in UTM coordinates: UTM Vertical: [redacted] UTM Horizontal: [redacted]___

5. Storage tank capacity:	6. Year of installation:	7. Tank height	8. Tank diameter:
7340 (Gallons)	2019	11.3 (Feet)	10.5 (Feet)

9. Color of tank: ________ White __X______ Other Specify aluminum (specular)

10. Is this tank equipped with a submerged fill pipe? __X______ Yes ________ No

11. Type of storage tank:
________Open top tank ____X____Fixed roof ________Fixed roof w/internal floating roof ________Other (specify)
________Pressurized tank ________External floating roof ________Variable vapor space ______________________

12. For fixed roof tanks:
A. Tank configuration (check one):: ___X_____Vertical (upright cylinder) ________Horizontal
B. Tank roof type: ________Cone roof – indicate tank roof height ________(ft)
(check one) ___X_____Dome roof – indicate tank roof height 1.83____(ft)
Indicate shell radius 10.5____(ft)

FLOATING ROOF TANK DESCRIPTION

13. For Floating Rook tanks (both internal and external) – shell condition (check one):
________ Light rust ________ Dense rust ________ Gunite lined

14. For External Floating Roof tanks:

A. Tank construction (check one): ________ Welded tank ________ Riveted tank

B. Rim Seal system description (check one):
_____Shoe Mounted Primary _____Vapor Mounted Primary _____Liquid Mounted Primary
_____Shoe Primary, Rim Secondary _____Vapor Primary, Rim Secondary _____Liquid Primary, Rim Secondary
_____Liquid Primary w/Weather Shield _____Shoe Primary and Secondary _____Vapor Primary w/Weather Shield

C. Roof type (check one): : ________ Pontoon roof ________ Double Deck roof

D. Roof fitting types (indicate the number of each type):

Access Hatch (24" Diameter well)
_____Bolted cover, gasketed
_____Unbolted cover, gasketed
_____Unbolted cover, ungasketed

Unslotted Guide-Pole Well
(8" Diameter Unslotted Pole, 21" Dia. Well)
_____Ungasketed sliding cover
_____Gasketed sliding cover

Gauge-Float Well (20" Diameter)
_____Unbolted cover, ungasketed
_____Unbolted cover, gasketed
_____Bolted cover, gasketed

Gauge-Hatch/Sample Well (8" Dia.)
_____Weighted Mechanical Actuation Gasketed
_____ Weighted Mechanical Actuation Ungasketed

Vacuum Breaker (10" Dia. Well)
_____Weighted Mechanical Actuation Gasketed
_____ Weighted Mechanical Actuation Ungasketed

Roof Drain
_____Open
_____ 90% Closed

Slotted Guide-Pole/Sample Well
(8" Slotted Pole, 21" Dia. Well)
_____Ungasketed Sliding Cover, without Float
_____Ungasketed Sliding Cover, with Float
_____Gasketed Sliding Cover, without Float
_____ Gasketed Sliding Cover, with Float

Roof Leg (3" Dia.)
_____Adjustable, Pontoon area
_____Adjustable, Center area
_____Adjustable, Double-Deck roofs
_____Fixed

Roof Leg (2 ½" Dia.)
_____Adjustable, Pontoon area
_____Adjustable, Center area
_____Adjustable, Double-Deck roofs
_____Fixed

15. For Internal Floating Roof tanks:

A. Rim Seal system description:

_____ Liquid Mounted Primary
_____ Vapor Mounted Primary
_____ Liquid Mounted Primary plus Secondary Seal
_____ Vapor Mounted Primary plus Secondary Seal

B. Number of Columns: _______

C. Effective Column diameter: _______ (Feet)

D. Deck Type (check one): _____ Welded _____ Bolted

E. Total Deck Seam length: __________ (Feet)

F. Deck Area: ________________ (Square Feet)

G. Deck Fitting types (indicate the number of each type):

Access Hatch (24" Dia.)
_____ Bolted cover, gasketed
_____ Unbolted cover, gasketed
_____ Unbolted cover, ungasketed

Automatic Gauge Float Well
_____ Bolted cover, gasketed
_____ Unbolted cover, gasketed
_____ Unbolted cover, ungasketed

Column Well
____ Built-up Column-Sliding cover, gasketed
____ Built-up Column-Sliding cover, ungasketed
____ Pipe Column-Flexible fabric sleeve seal
____ Pipe Column-Sliding cover, gasketed
____ Pipe Column-Sliding cover, ungasketed

Ladder well
_____ Sliding cover, gasketed
_____ Sliding cover, ungasketed

Sample Pipe and Well
_____ Slotted Pipe-Sliding cover, gasketed
_____ Slotted Pipe-Sliding cover, ungasketed
_____ Sample Well-Slit fabric seal, 10% open area
_____ Stub Drain, 1 inch diameter

Roof Leg or Hanger Well
_____ Adjustable
_____ Fixed

Vacuum Breaker

_____ Weighted Mechanical Actuation, gasketed
_____ Weighted Mechanical Actuation, ungasketed

16. For variable vapor space tanks:

Volume expansion capacity______________________ (Gallons)

TANK CONTENTS AND OPERATION DESCRIPTION

17. Complete the flowing table for materials to be stored in this tank:

Material or component stored	Wt. %	Material Annual Throughput (Gal./Yr.)	Material stored Daily Average (Gallons)	Component Molecular weights (Lb./Lb. Mole)	Component Vapor Pressures (PSIA)	Material storage pressure(PSIA)	Material average storage temp. (Deg. F)
[redacted]	100	[redacted]	[redacted]	[redacted]	0.055	14.1	60

Multipurpose tank with variable composition:

________ Yes X________ No

18. Describe the operation this tank will serve:

Storage of [redacted] for [redacted].

19. Page number: Revision Number: Date of Revision:

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Division of Air Pollution Control
William R. Snodgrass Tennessee Tower
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Nashville, TN 37243
Telephone: (615) 532-0554

TITLE V PERMIT APPLICATION
STORAGE TANKS

GENERAL IDENTIFICATION AND DESCRIPTION

1. **Facility name:** BAE Systems Ordnance Systems Inc., Holston Army Ammunition Plant

2. **Process emission source (identify):** Building [redacted] (Vent F on Process Flow Diagram)

STORAGE TANK DESCRIPTION

3. Storage tank identification: [redacted]-T-14

4. Location of the storage tank or tank farm in UTM coordinates: UTM Vertical: [redacted]_ UTM Horizontal: [redacted]___

5. Storage tank capacity: 3008 (Gallons)	6. Year of installation: 2019	7. Tank height 8 (Feet)	8. Tank diameter: 8 (Feet)

9. Color of tank: ________ White _X_______ Other Specify aluminum (specular)

10. Is this tank equipped with a submerged fill pipe? _X______ Yes ________ No

11. Type of storage tank:

________Open top tank _X_______Fixed roof ________Fixed roof w/internal floating roof ________Other (specify)
________Pressurized tank ________External floating roof ________Variable vapor space ______________________

12. For fixed roof tanks:
A. Tank configuration (check one):: _X______Vertical (upright cylinder) ________Horizontal
B. Tank roof type: ________Cone roof – indicate tank roof height ________(ft)
(check one) _X_______Dome roof – indicate tank roof height _1.4_____(ft)
Indicate shell radius_8_______(ft)

FLOATING ROOF TANK DESCRIPTION

13. For Floating Rook tanks (both internal and external) – shell condition (check one):
________ Light rust ________ Dense rust ________ Gunite lined

14. For External Floating Roof tanks:

A. Tank construction (check one): ________ Welded tank ________ Riveted tank

B. Rim Seal system description (check one):
_____Shoe Mounted Primary _____Vapor Mounted Primary _____Liquid Mounted Primary
_____Shoe Primary, Rim Secondary _____Vapor Primary, Rim Secondary _____Liquid Primary, Rim Secondary
_____Liquid Primary w/Weather Shield _____Shoe Primary and Secondary _____Vapor Primary w/Weather Shield

C. Roof type (check one): : ________ Pontoon roof ________ Double Deck roof

D. Roof fitting types (indicate the number of each type):

Access Hatch (24" Diameter well)
_____Bolted cover, gasketed
_____Unbolted cover, gasketed
_____Unbolted cover, ungasketed

Unslotted Guide-Pole Well
(8" Diameter Unslotted Pole, 21" Dia. Well)
_____Ungasketed sliding cover
_____Gasketed sliding cover

Gauge-Float Well (20" Diameter)
_____Unbolted cover, ungasketed
_____Unbolted cover, gasketed
_____Bolted cover, gasketed

Gauge-Hatch/Sample Well (8" Dia.)
_____Weighted Mechanical Actuation Gasketed
_____ Weighted Mechanical Actuation Ungasketed

Vacuum Breaker (10" Dia. Well)
_____Weighted Mechanical Actuation Gasketed
_____ Weighted Mechanical Actuation Ungasketed

Roof Drain
_____Open
_____ 90% Closed

Slotted Guide-Pole/Sample Well
(8" Slotted Pole, 21" Dia. Well)
_____Ungasketed Sliding Cover, without Float
_____Ungasketed Sliding Cover, with Float
_____Gasketed Sliding Cover, without Float
_____ Gasketed Sliding Cover, with Float

Roof Leg (3" Dia.)
_____Adjustable, Pontoon area
_____Adjustable, Center area
_____Adjustable, Double-Deck roofs
_____Fixed

Roof Leg (2 ½" Dia.)
_____Adjustable, Pontoon area
_____Adjustable, Center area
_____Adjustable, Double-Deck roofs
_____Fixed

15. For Internal Floating Roof tanks:

A. Rim Seal system description:

_____ Liquid Mounted Primary
_____ Vapor Mounted Primary
_____ Liquid Mounted Primary plus Secondary Seal
_____ Vapor Mounted Primary plus Secondary Seal

B. Number of Columns: _______

C. Effective Column diameter: _______ (Feet)

D. Deck Type (check one): _____ Welded _____ Bolted

E. Total Deck Seam length: __________ (Feet)

F. Deck Area: ________________ (Square Feet)

G. Deck Fitting types (indicate the number of each type):

Access Hatch (24" Dia.)
_____ Bolted cover, gasketed
_____ Unbolted cover, gasketed
_____ Unbolted cover, ungasketed

Automatic Gauge Float Well
_____ Bolted cover, gasketed
_____ Unbolted cover, gasketed
_____ Unbolted cover, ungasketed

Column Well
____ Built-up Column-Sliding cover, gasketed
____ Built-up Column-Sliding cover, ungasketed
____ Pipe Column-Flexible fabric sleeve seal
____ Pipe Column-Sliding cover, gasketed
____ Pipe Column-Sliding cover, ungasketed

Ladder well
_____ Sliding cover, gasketed
_____ Sliding cover, ungasketed

Sample Pipe and Well
_____ Slotted Pipe-Sliding cover, gasketed
_____ Slotted Pipe-Sliding cover, ungasketed
_____ Sample Well-Slit fabric seal, 10% open area
_____ Stub Drain, 1 inch diameter

Roof Leg or Hanger Well
_____ Adjustable
_____ Fixed

Vacuum Breaker

_____ Weighted Mechanical Actuation, gasketed
_____ Weighted Mechanical Actuation, ungasketed

16. For variable vapor space tanks:

Volume expansion capacity______________________ (Gallons)

TANK CONTENTS AND OPERATION DESCRIPTION

17. Complete the flowing table for materials to be stored in this tank:

Material or component stored	Wt. %	Material Annual Throughput (Gal./Yr.)	Material stored Daily Average (Gallons)	Component Molecular weights (Lb./Lb. Mole)	Component Vapor Pressures (PSIA)	Material storage pressure(PSIA)	Material average storage temp. (Deg. F)
[redacted]	100	[redacted]	[redacted]	[redacted]	0.147	14.1	60

Multipurpose tank with variable composition:

________ Yes X________ No

18. Describe the operation this tank will serve:

Storage of [redacted] for use in the [redacted].

19. Page number: Revision Number: Date of Revision:

State of Tennessee
Department of Environment and Conservation
Division of Air Pollution Control
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APC 10

TITLE V PERMIT APPLICATION
MISCELLANEOUS PROCESSES

GENERAL IDENTIFICATION AND DESCRIPTION

1. **Facility name:**
BAE Systems Ordnance Systems Inc., Holston Army Ammunition Plant

2. **Process emission source (identify):**
Building [redacted] and [redacted] Processes

3. Stack ID or flow diagram point identification(s): See process flow diagrams

4. Year of construction or last modification: 2019

If the emissions are controlled for compliance, attach an appropriate Air Pollution Control system form.

5. Normal operating schedule: 24 Hrs./Day 7 Days/Wk. 365 Days/Yr.

6. Location of this process emission source in UTM coordinates: UTM Vertical : [redacted] UTM Horizontal: [redacted]

7. Describe this process (Please attach a flow diagram of this process) and check one of the following:

☑ Batch ☐ Continuous

PROCESS MATERIAL INPUT AND OUTPUT

8. List the types and amounts of raw materials input to this process:

Material	Storage/Material handling process	Average usage (units)	Maximum usage (units)
Water	Closed Pipe	~20,000 lbs/batch	~30,000 lbs/batch
Organic Solvent	Closed Pipe	[redacted]	
[redacted]	Closed Pipe or Hopper		
[redacted]	[redacted] or Hopper		

9. List the types and amounts of primary products produced by this process:

Material	Storage/Material handling process	Average usage (units)	Maximum usage (units)
[redacted]	Closed Pipe	[redacted]	
Organic Solvent	Closed Pipe		

10. Process fuel usage:

Type of fuel	Max heat input (10^6 BTU/Hr.)	Average usage (units)	Maximum usage (units)
Not applicable			

11. List any solvents, cleaners, etc., associated with this process:

Typically [redacted]

If the emissions and/or operations of this process are monitored for compliance, please attach the appropriate Compliance Demonstration form.

12. Describe any fugitive emissions associated with this process, such as outdoor storage piles, open conveyors, open air sand blasting, material handling operations, etc. (please attach a separate sheet if necessary).

Equipment leaks

13. Page number: Revision Number: Date of Revision:

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TITLE V PERMIT APPLICATION
CONTROL EQUIPMENT - MISCELLANEOUS

GENERAL IDENTIFICATION AND DESCRIPTION

1. Facility name:
BAE Systems Ordnance Systems Inc.,
Holston Army Ammunition Plant

2. Emission source (identify):
Building [redacted]

3. Stack ID or flow diagram point identification (s):
Vent A

CONTROL EQUIPMENT DESCRIPTION

4. Describe the device in use. List the key operating parameters of this device and their normal operating range (e.g., pressure drop, gas flow rate, temperature):

8.5 inch x 8 foot stainless steel shell and tube condenser
Operating temperature range 85-212°F

Vent condenser is used for solvent recovery. The solvent is reused in the process.
Key operating parameter is cooling water ON/OFF.
Process interlocks require the cooling water to be ON.

5. Manufacturer and model number (if available):
TBD

6. Year of installation:
2019

7. List of pollutant (s) to be controlled by this equipment and the expected control efficiency for each pollutant.

Pollutant	Efficiency (%)	Source of data
VOC	95-98%	BACT analysis

8. Discuss how collected material is handled for reuse or disposal.
The material is piped to a storage tank for reuse in the process.

9. If this control equipment is in series with some other control equipment, state and specify the overall efficiency.
Not applicable.

10. Page number: Revision Number: Date of Revision:

State of Tennessee
Department of Environment and Conservation
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TITLE V PERMIT APPLICATION
CONTROL EQUIPMENT - MISCELLANEOUS

GENERAL IDENTIFICATION AND DESCRIPTION

1. Facility name:

BAE Systems Ordnance Systems Inc.,
Holston Army Ammunition Plant

2. Emission source (identify):

Building [redacted]

3. Stack ID or flow diagram point identification (s):

Vent E

CONTROL EQUIPMENT DESCRIPTION

4. Describe the device in use. List the key operating parameters of this device and their normal operating range (e.g., pressure drop, gas flow rate, temperature):

12 inch x 12 foot stainless steel shell and tube condenser
Operating temperature range 80-122°F

Condenser is used for solvent recovery. The solvent is reused in the process.
Key operating parameter is cooling water ON/OFF.
Process interlocks require the cooling water to be ON.

5. Manufacturer and model number (if available):

TBD

6. Year of installation:

2019

7. List of pollutant (s) to be controlled by this equipment and the expected control efficiency for each pollutant.

Pollutant	Efficiency (%)	Source of data
VOC	95-98%	BACT analysis

8. Discuss how collected material is handled for reuse or disposal.

The material is piped to a storage tank for reuse in the process.

9. If this control equipment is in series with some other control equipment, state and specify the overall efficiency.

Not applicable.

10. Page number: Revision Number: Date of Revision:

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Division of Air Pollution Control
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Telephone: (615) 532-0554

TITLE V PERMIT APPLICATION
COMPLIANCE CERTIFICATION - MONITORING AND REPORTING
DESCRIPTION OF METHODS USED FOR DETERMINING COMPLIANCE

All sources that are subject to 1200-03-09-.02(11) of the Tennessee Air Pollution Control Regulations are required to certify compliance with all applicable requirements by including a statement within the permit application of the methods used for determining compliance. This statement must include a description of the monitoring, recordkeeping, and reporting requirements and test methods. In addition, the application must include a schedule for compliance certification submittals during the permit term. These submittals must be no less frequent than annually and may need to be more frequent if specified by the underlying applicable requirement or the Technical Secretary.

GENERAL IDENTIFICATION AND DESCRIPTION

1. Facility name: BAE Systems Ordnance Systems Inc., Holston Army Ammunition Plant
2. Process emission source, fuel burning installation, or incinerator (identify): Building [redacted] and [redacted] Processes
3. Stack ID or flow diagram point identification(s): See process flow diagrams

METHODS OF DETERMINING COMPLIANCE

4. This source as described under Item #2 of this application will use the following method(s) for determining compliance with applicable requirements (and special operating conditions from an existing permit). Check all that apply and attach the appropriate form(s)

[ ] Continuous Emission Monitoring (CEM) - APC 20
Pollutant(s): ______

[ ] Emission Monitoring Using Portable Monitors - APC 21
Pollutant(s): ______

[ ] Monitoring Control System Parameters or Operating Parameters of a Process - APC 22
Pollutant(s): ______

[ ] Monitoring Maintenance Procedures - APC 23
Pollutant(s): ______

[ ] Stack Testing - APC 24
Pollutant(s): ______

[ ] Fuel Sampling & Analysis (FSA) - APC 25
Pollutant(s): ______

[✓] Recordkeeping - APC 26
Pollutant(s): VOC (vent points with potential to emit > 5 tons per year)

[✓] Other (please describe) - APC 27
Pollutant(s): Opacity

5. Compliance certification reports will be submitted to the Division according to the following schedule:
Start date: In accordance with Title V permit certification requirements/frequency
And every 365 days thereafter.
6. Compliance monitoring reports will be submitted to the Division according to the following schedule:
Start date: In accordance with Title V permit certification requirements/frequency
And every 180 days thereafter.
7. Page number: Revision number: Date of revision:

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Department of Environment and Conservation
Division of Air Pollution Control
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Telephone: (615) 532-0554

TITLE V PERMIT APPLICATION
COMPLIANCE DEMONSTRATION BY RECORDKEEPING

Recordkeeping shall be acceptable as a compliance demonstration method provided that a correlation between the parameter value recorded and the applicable requirement is established.

GENERAL IDENTIFICATION AND DESCRIPTION

1. Facility name:
BAE Systems Ordnance Systems Inc.
Holston Army Ammunition Plant

2. Stack ID or flow diagram point identification(s):
Vents A and E

3. Emission source (identify):
Building [redacted] and [redacted]

MONITORING AND RECORDKEEPING DESCRIPTION

4. Pollutant(s) or parameter being monitored:
VOC

5. Material or parameter being monitored and recorded:
VOC using batch records

6. Method of monitoring and recording:
Batch emission factors determined by engineering calculations in combination with batch production records are used to demonstrate the source has not exceeded its permitted limit.

7. Compliance demonstration frequency (specify the frequency with which compliance will be demonstrated):
Monthly

8. Page number: Revision number: Date of revision:

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Department of Environment and Conservation
Division of Air Pollution Control
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Telephone: (615) 532-0554

TITLE V PERMIT APPLICATION
COMPLIANCE DEMONSTRATION BY OTHER METHOD(S)

GENERAL IDENTIFICATION AND DESCRIPTION

1. Facility name:	2. Stack ID or flow diagram point identification(s):
BAE Systems Ordnance Systems Inc., Holston Army Ammunition Plant	Vent Points A, B, C, D, E, and F on the process flow diagrams

3. Emission source (identify):

Building [redacted] and [redacted] Processes

MONITORING DESCRIPTION

4. Pollutant(s) or parameter being monitored:

Opacity

5. Description of the method of monitoring:

Compliance with the standard shall be determined by the procedures of the Tennessee Division of Air Pollution Control's Opacity Matrix dated June 18, 1996 and amended September 12, 2005.

Note that in the latest version of the Division's Opacity Matrix colorless pollutants such as VOCs do not require Visible emission evaluations.

Standard:
Visible emissions from this source shall not exhibit greater than twenty percent (20%) opacity, except for an aggregate of no more than five (5) minutes in any one (1) hour period, and no more than twenty (20) minutes in any twenty-four (24) hour period. Visible emissions from these sources shall be determined by Tennessee Visible Emission Evaluation Method 2, as adopted by the Tennessee Air Pollution Control Board on August 24 1984 (aggregate count). TAPCR 1200-3-5-.01(1)

6. Compliance demonstration frequency (specify the frequency with which compliance will be demonstrated):

Frequency as required per the Tennessee Division of Air Pollution Control's Opacity Matrix

7. Page number:	Revision number:	Date of revision:

State of Tennessee
Department of Environment and Conservation
Division of Air Pollution Control
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APC 28

TITLE V PERMIT APPLICATION
EMISSIONS FROM PROCESS EMISSION SOURCE / FUEL BURNING INSTALLATION / INCINERATOR

GENERAL IDENTIFICATION AND DESCRIPTION

1. Facility name:	2. Stack ID or flow diagram point identification(s):
BAE Systems Ordnance Systems Inc., Holston Army Ammunition Plant	See process flow diagram

3. Process emission source / Fuel burning installation / Incinerator (identify):

Building [redacted] and [redacted] Processes. See Appendix B for emissions calculations.

EMISSIONS SUMMARY TABLE – CRITERIA AND FUGITIVE EMISSIONS

4. Complete the following emissions summary for regulated air pollutants. Fugitive emissions shall be included. Attach calculations and emission factor references.

Air Pollutant	Maximum Allowable Emissions		Actual Emissions	
	Tons per Year	Reserved for State use (Pounds per Hour - Item 7, APC 30)	Tons per Year	Reserved for State use (Pounds per Hour- Item 8, APC 30)
Particulate Matter (TSP)	0.01			
(Fugitive Emissions)				
Sulfur Dioxide				
(Fugitive Emissions)				
Volatile Organic Compounds	6.2			
(Fugitive Emissions)				
Carbon Monoxide				
(Fugitive Emissions)				
Lead				
(Fugitive Emissions)				
Nitrogen Oxides	0.6			
(Fugitive Emissions)				
Total Reduced Sulfur				
(Fugitive Emissions)				
Mercury				
(Fugitive Emissions)				

(Continued on next page)

(Continued from last page)

AIR POLLUTANT	Maximum Allowable Emissions		Actual Emissions	
	Tons per Year	Reserved for State use (Pounds per Hour - Item 7, APC 30)	Tons per Year	Reserved for State use (Pounds per Hour- Item 8, APC 30)
Asbestos				
(Fugitive Emissions)				
Beryllium				
(Fugitive Emissions)				
Vinyl Chloride				
(Fugitive Emissions)				
Fluorides				
(Fugitive Emissions)				
Gaseous Fluorides				
(Fugitive Emissions)				
Greenhouse Gases in CO_2 Equivalents				

EMISSIONS SUMMARY TABLE – FUGITIVE HAZARDOUS AIR POLLUTANTS

5. Complete the following emissions summary for regulated air pollutants that are hazardous air pollutant(s). Fugitive emissions shall be included. Attach calculations and emission factor references.

Air Pollutant & CAS	Maximum Allowable Emissions		Actual Emissions	
	Tons per Year	Reserved for State use (Pounds per Hour - Item 7, APC 30)	Tons per Year	Reserved for State use (Pounds per Hour- Item 8, APC 30)

6. Page number: Revision number: Date of revision

State of Tennessee
Department of Environment and Conservation
Division of Air Pollution Control
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Telephone: (615) 532-0554

APC 30

TITLE V PERMIT APPLICATION
CURRENT EMISSIONS REQUIREMENTS AND STATUS

GENERAL IDENTIFICATION AND DESCRIPTION	
1. Facility name: BAE Systems OSI, Holston Army Ammunition Plant	2. Emission source number See process flow diagram
3. Describe the process emission source / fuel burning installation / incinerator. Building [redacted] and [redacted] Processes	

EMISSIONS AND REQUIREMENTS					
4. Identify if only a part of the source is subject to this requirement	5. Pollutant	6. Applicable requirement(s): TN Air Pollution Control Regulations, 40 CFR, permit restrictions, air quality based standards	7. Limitation	8. Maximum actual emissions	9. Compliance status (In/Out)
All	VOC	TVEE Method 2	20% Opacity	N/A	IN
[redacted]	VOC	TAPCR 1200-03-09-.01(4)(j)	0.42 lb/hr	N/A	IN
[redacted]	VOC	TAPCR 1200-03-09-.01(4)(j)	6.0 TPY	N/A	IN
10. Other applicable requirements (new requirements that apply to this source during the term of this permit)					
11. Page number:		Revision number:		Date of revision:	

State of Tennessee
Department of Environment and Conservation
Division of Air Pollution Control
William R. Snodgrass Tennessee Tower
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Nashville, TN 37243
Telephone: (615) 532-0554

TITLE V PERMIT APPLICATION
OPERATIONS AND FLOW DIAGRAMS

1. Please list, identify, and describe briefly process emission sources, fuel burning installations, and incinerators that are contained in this application. Please attach a flow diagram for this application.

[redacted]

[redacted]

2. List all insignificant activities which are exempted because of size or production rate and cite the applicable regulations.

As discussed later in this section, the control equipment associated with the process equipment is interlocked to ensure the controls are operating when the processes are operating. This is for safety purposes and the controls are integral to each process. The forms include all emissions associated with each source. OSI requests this information be evaluated to determine if these processes should be considered insignificant activities as defined in 1200-03-09-.04 and requests an official determination be made.

3. Are there any storage piles?

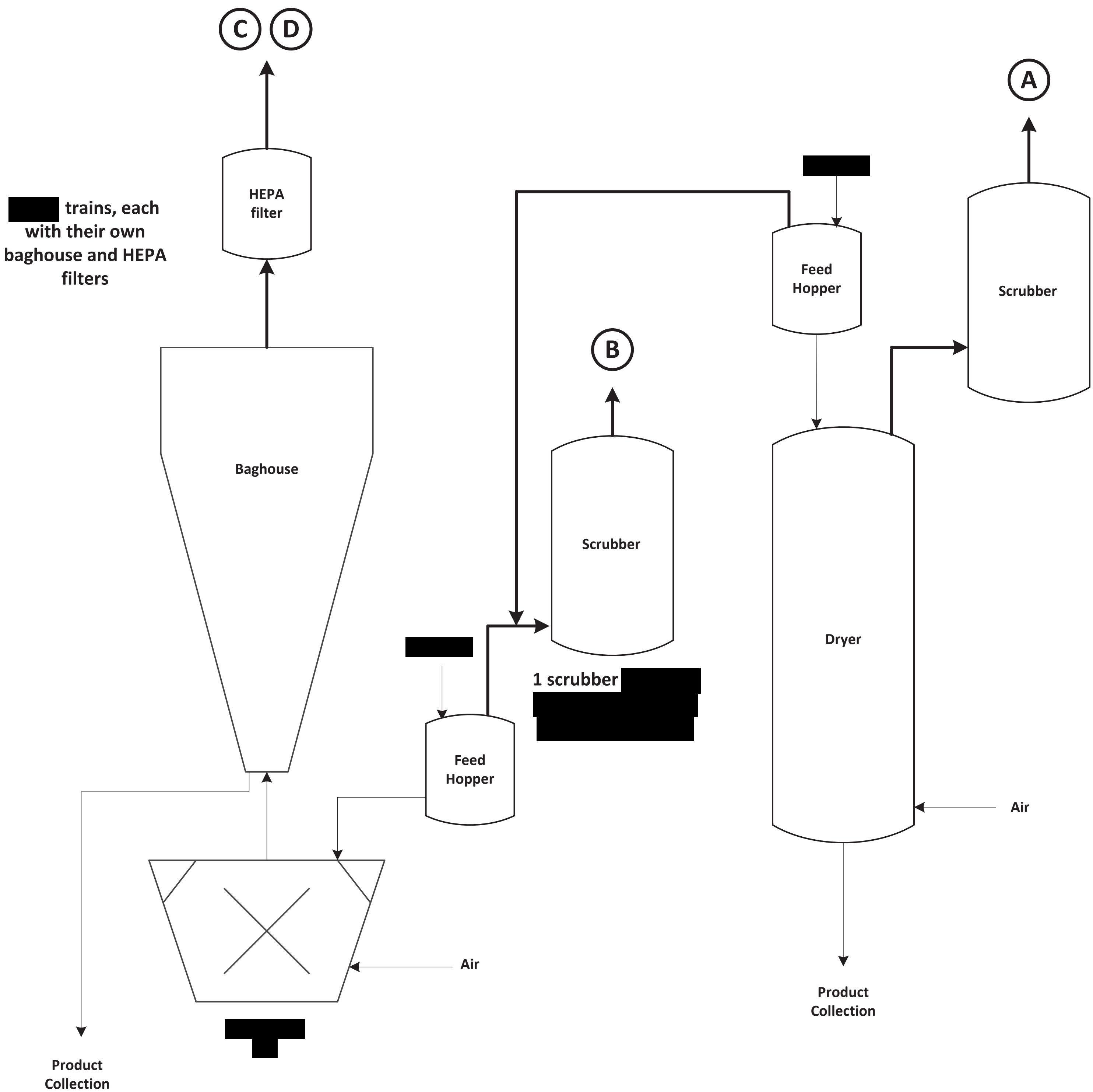
YES ________ NO X ________

4. List the states that are within 50 miles of your facility.

Kentucky, North Carolina, Virginia

5. Page number: Revision Number: Date of Revision:

Building [redacted]



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Telephone: (615) 532-0554

TITLE V PERMIT APPLICATION
STACK IDENTIFICATION

GENERAL IDENTIFICATION AND DESCRIPTION	
1. **Facility name:** BAE SYSTEMS Ordnance Systems Inc., Holston Army Ammunition Plant	
2. **Emission source (identify):** Building [redacted]	
STACK DESCRIPTION	
3. Stack ID (or flow diagram point identification): Vent Point A - Dryer Scrubber	
4. Stack height above grade in feet: 11 ft	
5. Velocity (data at exit conditions): 33.4 (Actual feet per second)	6. Inside dimensions at outlet in feet: 2.0 ft
7. Exhaust flow rate at exit conditions (ACFM): ~6,300	8. Flow rate at standard conditions (DSCFM): ~6,000
9. Exhaust temperature: 175.0 Degrees Fahrenheit (°F)	10. Moisture content (data at exit conditions): ~15 Percent ______ Grains per dry standard cubic foot (gr./dscf.)
11. Exhaust temperature that is equaled or exceeded during ninety (90) percent or more of the operating time (for stacks subject to diffusion equation only): Ambient (°F)	
12. If this stack is equipped with continuous pollutant monitoring equipment required for compliance, what pollutant(s) does this equipment monitor (e.g., Opacity, SO_2, NO_x, etc.)? NA	
Complete the appropriate APC form(s) 4, 5, 7, 8, 9, or 10 for each source exhausting through this stack.	
BYPASS STACK DESCRIPTION	
13. Do you have a bypass stack? ______ Yes X No If yes, describe the conditions which require its use & complete APC form 4 for the bypass stack. Please identify the stack number(s) of flow diagram point number(s) exhausting through this bypass stack.	
14. Page number: Revision Number: Date of Revision:	

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Department of Environment and Conservation
Division of Air Pollution Control
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TITLE V PERMIT APPLICATION
STACK IDENTIFICATION

GENERAL IDENTIFICATION AND DESCRIPTION

1. **Facility name:**
BAE SYSTEMS Ordnance Systems Inc., Holston Army Ammunition Plant

2. **Emission source (identify):**
Building [redacted]

STACK DESCRIPTION

3. Stack ID (or flow diagram point identification):
Vent Point B - Feed Hopper Scrubber

4. Stack height above grade in feet:
11 ft

5. Velocity (data at exit conditions): 34.0 (Actual feet per second)	6. Inside dimensions at outlet in feet: 2.5 ft
7. Exhaust flow rate at exit conditions (ACFM): ~10,000	8. Flow rate at standard conditions (DSCFM): ~9,300
9. Exhaust temperature: 70.0 Degrees Fahrenheit (°F)	10. Moisture content (data at exit conditions): ~15 Percent; ______ Grains per dry standard cubic foot (gr./dscf.)

11. Exhaust temperature that is equaled or exceeded during ninety (90) percent or more of the operating time (for stacks subject to diffusion equation only):
Ambient (°F)

12. If this stack is equipped with continuous pollutant monitoring equipment required for compliance, what pollutant(s) does this equipment monitor (e.g., Opacity, SO_2, NO_x, etc.)?
NA

Complete the appropriate APC form(s) 4, 5, 7, 8, 9, or 10 for each source exhausting through this stack.

BYPASS STACK DESCRIPTION

13. Do you have a bypass stack?
______ Yes X No

If yes, describe the conditions which require its use & complete APC form 4 for the bypass stack. Please identify the stack number(s) of flow diagram point number(s) exhausting through this bypass stack.

14. Page number: Revision Number: Date of Revision:

State of Tennessee
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Division of Air Pollution Control
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APC 3

TITLE V PERMIT APPLICATION
STACK IDENTIFICATION

GENERAL IDENTIFICATION AND DESCRIPTION	
1. **Facility name:** BAE SYSTEMS Ordnance Systems Inc., Holston Army Ammunition Plant	
2. **Emission source (identify):** Building [redacted]	
STACK DESCRIPTION	
3. Stack ID (or flow diagram point identification): Vent Points C and D - HEPA Filters on [redacted]	
4. Stack height above grade in feet: 65 ft	
5. Velocity (data at exit conditions): 18.0 (Actual feet per second)	6. Inside dimensions at outlet in feet: 0.33 ft
7. Exhaust flow rate at exit conditions (ACFM): ~100	8. Flow rate at standard conditions (DSCFM): ~90
9. Exhaust temperature: 80.0 Degrees Fahrenheit (°F)	10. Moisture content (data at exit conditions): ~6 Percent ______ Grains per dry standard cubic foot (gr./dscf.)
11. Exhaust temperature that is equaled or exceeded during ninety (90) percent or more of the operating time (for stacks subject to diffusion equation only): Ambient (°F)	
12. If this stack is equipped with continuous pollutant monitoring equipment required for compliance, what pollutant(s) does this equipment monitor (e.g., Opacity, SO_2, NO_x, etc.)? NA	
Complete the appropriate APC form(s) 4, 5, 7, 8, 9, or 10 for each source exhausting through this stack.	
BYPASS STACK DESCRIPTION	
13. Do you have a bypass stack? ______ Yes X No If yes, describe the conditions which require its use & complete APC form 4 for the bypass stack. Please identify the stack number(s) of flow diagram point number(s) exhausting through this bypass stack.	
14. Page number: Revision Number: Date of Revision:	

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Division of Air Pollution Control
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APC 10

TITLE V PERMIT APPLICATION
MISCELLANEOUS PROCESSES

GENERAL IDENTIFICATION AND DESCRIPTION

1. **Facility name:**
BAE SYSTEMS Ordnance Systems Inc., Holston Army Ammunition Plant

2. **Process emission source (identify):**
Building [redacted]

3. Stack ID or flow diagram point identification (s):
See flow diagram

4. Year of construction or last modification:
2018

If the emissions are controlled for compliance, attach an appropriate Air Pollution Control system form.

5. Normal operating schedule: 24 Hrs./Day 7 Days/Wk. 365 Days/Yr.

6. Location of this process emission source in UTM coordinates: UTM Vertical : [redacted] UTM Horizontal: [redacted]

7. Describe this process (Please attach a flow diagram of this process) and check one of the following:

[✓] Batch [ ] Continuous

PROCESS MATERIAL INPUT AND OUTPUT

8. List the types and amounts of raw materials input to this process:

Material	Storage/Material handling process	Average usage (units)	Maximum usage (units)
[redacted]	[redacted] (metal boxes)	[redacted]	[redacted]

9. List the types and amounts of primary products produced by this process:

Material	Storage/Material handling process	Average usage (units)	Maximum usage (units)
[redacted]	Totes	[redacted]	[redacted]

10. Process fuel usage:

Type of fuel	Max heat input (10^6 BTU/Hr.)	Average usage (units)	Maximum usage (units)
NA			

11. List any solvents, cleaners, etc., associated with this process:
Not applicable

If the emissions and/or operations of this process are monitored for compliance, please attach the appropriate Compliance Demonstration form.

12. Describe any fugitive emissions associated with this process, such as outdoor storage piles, open conveyors, open air sand blasting, material handling operations, etc. (please attach a separate sheet if necessary).

[redacted]

13. Page number: Revision Number: Date of Revision:

State of Tennessee
Department of Environment and Conservation
Division of Air Pollution Control
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TITLE V PERMIT APPLICATION
CONTROL EQUIPMENT - MISCELLANEOUS

GENERAL IDENTIFICATION AND DESCRIPTION

1. Facility name:
BAE Systems Ordnance Systems Inc.,
Holston Army Ammunition Plant

2. Emission source (identify):
Building [redacted]

3. Stack ID or flow diagram point identification (s):
Vent Points C and D - HEPA Filters on [redacted]

CONTROL EQUIPMENT DESCRIPTION

4. Describe the device in use. List the key operating parameters of this device and their normal operating range (e.g., pressure drop, gas flow rate, temperature):

High efficiency filter for removal of fine particles.
Key operating parameter is pressure drop.
Normal operating range will be established by the vendor.

The HEPA Filters are located at the exhaust for the baghouses associated with product capture [redacted]. Each HEPA filter system and baghouse is equipped with a pressure drop indicator. Control interlocks are connected to these indicators and any change from a valid range will trigger [redacted] associated with this equipment to cease operations. This is designed for safety purposes and to ensure explosives are contained to areas specifically designed for collection of this material. Therefore, the HEPA filters are integral to the [redacted].

5. Manufacturer and model number (if available):
To be determined

6. Year of installation:
2019

7. List of pollutant (s) to be controlled by this equipment and the expected control efficiency for each pollutant.

Pollutant	Efficiency (%)	Source of data
PM10	99.9	Vendor data
PM2.5	99.9	Vendor data

8. Discuss how collected material is handled for reuse or disposal.
[redacted]

9. If this control equipment is in series with some other control equipment, state and specify the overall efficiency.
Not applicable

10. Page number: Revision Number: Date of Revision:

State of Tennessee
Department of Environment and Conservation
Division of Air Pollution Control
William R. Snodgrass Tennessee Tower
312 Rosa L. Parks Avenue, 15th Floor
Nashville, TN 37243
Telephone: (615) 532-0554

APC 17

TITLE V PERMIT APPLICATION
CONTROL EQUIPMENT - WET COLLECTION SYSTEMS

GENERAL IDENTIFICATION AND DESCRIPTION

1. Facility name:
BAE SYSTEMS Ordnance Systems Inc.
Holston Army Ammunition Plant

2. Emission source (identify):
Building [redacted]

3. Stack ID or flow diagram point identification(s):
Vent Point A - Dryer Scrubber

WET COLLECTION SYSTEM DESCRIPTION

4. Describe the device in use. List the key operation parameters of this device and their normal operating range.

The [redacted] dryer scrubber will be a wet scrubber that uses water to remove PM from the dryer exhaust stream. The scrubber will be designed to have a minimum recirculation rate which will be provided by the manufacturer.

The scrubber is integral to the process and the dryer can not operate without the scrubber in operation for safety purposes. Additionally, 29 CFR 1910.109 requires areas processing explosive to minimize dust and Army safety rules specify wet collection systems be operated as control for manned operations in specific site distance circumstances. Therefore, the scrubber operation is interlocked in the control system and the dryer will not operate unless the scrubber is operational.

5. Manufacturer and model number (if available):
TBD

6. Year of installation:
2018

7. List of pollutant(s) to be controlled and the expected control efficiency for each pollutant.

Pollutant	Efficiency (%)	Source of data
PM10	99.9%	Vendor supplied
PM2.5	99.9%	Vendor supplied

8. Discuss how collected material and effluent is handled for reuse or disposal..
The scrubber water is filtered then recirculated in the scrubber.

9. Scrubbing medium (water, sodium hydroxide slurry, etc.):
Water

10. If this control equipment is in series with some other control equipment, state and specify the overall efficiency.
NA

11. Page number: Revision Number: Date of Revision:

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Nashville, TN 37243
Telephone: (615) 532-0554

APC 17

TITLE V PERMIT APPLICATION
CONTROL EQUIPMENT - WET COLLECTION SYSTEMS

GENERAL IDENTIFICATION AND DESCRIPTION

1. Facility name:
BAE SYSTEMS Ordnance Systems Inc.
Holston Army Ammunition Plant

2. Emission source (identify):
Building [redacted]

3. Stack ID or flow diagram point identification(s):
Vent B, Feed Hopper Scrubber

WET COLLECTION SYSTEM DESCRIPTION

4. Describe the device in use. List the key operation parameters of this device and their normal operating range.

The scrubber for the ventilation hoods over the [redacted] feed hoppers will be a wet scrubber. The scrubber will be designed to have a minimum recirculation rate which will be provided by the manufacturer.

The scrubber is integral to the process and the feeders can not operate without the scrubber in operation for safety purposes. Additionally, 29 CFR 1910.109 requires areas processing explosive to minimize dust and Army safety rules specify wet collection systems be operated as control for manned operations in specific site distance circumstances. Therefore, the scrubber operation is interlocked in the control system and the feeders will not operate unless the scrubber is operational.

5. Manufacturer and model number (if available):
TBD

6. Year of installation:
2018

7. List of pollutant(s) to be controlled and the expected control efficiency for each pollutant.

Pollutant	Efficiency (%)	Source of data
PM10	99.9	Vendor Supplied
PM2.5	99.9	Vendor Supplied

8. Discuss how collected material and effluent is handled for reuse or disposal..
The scrubber water is filtered then recirculated in the scrubber.

9. Scrubbing medium (water, sodium hydroxide slurry, etc.):
Water

10. If this control equipment is in series with some other control equipment, state and specify the overall efficiency.
NA

11. Page number: Revision Number: Date of Revision:

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Department of Environment and Conservation
Division of Air Pollution Control
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TITLE V PERMIT APPLICATION
COMPLIANCE CERTIFICATION - MONITORING AND REPORTING
DESCRIPTION OF METHODS USED FOR DETERMINING COMPLIANCE

All sources that are subject to 1200-03-09-.02(11) of the Tennessee Air Pollution Control Regulations are required to certify compliance with all applicable requirements by including a statement within the permit application of the methods used for determining compliance. This statement must include a description of the monitoring, recordkeeping, and reporting requirements and test methods. In addition, the application must include a schedule for compliance certification submittals during the permit term. These submittals must be no less frequent than annually and may need to be more frequent if specified by the underlying applicable requirement or the Technical Secretary.

GENERAL IDENTIFICATION AND DESCRIPTION

1. Facility name: BAE SYSTEMS Ordnance Systems Holston Army Ammunition Plant

2. Process emission source, fuel burning installation, or incinerator (identify): Building [redacted]

3. Stack ID or flow diagram point identification(s): See flow diagram

METHODS OF DETERMINING COMPLIANCE

4. This source as described under Item #2 of this application will use the following method(s) for determining compliance with applicable requirements (and special operating conditions from an existing permit). Check all that apply and attach the appropriate form(s)

[ ] Continuous Emission Monitoring (CEM) - APC 20
Pollutant(s): ____________

[ ] Emission Monitoring Using Portable Monitors - APC 21
Pollutant(s): ____________

[✓] Monitoring Control System Parameters or Operating Parameters of a Process - APC 22
Pollutant(s): PM, PM10, PM2.5

[✓] Monitoring Maintenance Procedures - APC 23
Pollutant(s): PM, PM10, PM2.5

[ ] Stack Testing - APC 24
Pollutant(s): ____________

[ ] Fuel Sampling & Analysis (FSA) - APC 25
Pollutant(s): ____________

[✓] Recordkeeping - APC 26
Pollutant(s): PM, PM10. PM2.5

[✓] Other (please describe) - APC 27
Pollutant(s): PM, PM10, PM2.5

5. Compliance certification reports will be submitted to the Division according to the following schedule:

Start date: In accordance with Title V permit certification requirements/frequency

And every 365 days thereafter.

6. Compliance monitoring reports will be submitted to the Division according to the following schedule:

Start date: In accordance with Title V permit certification requirements/frequency

And every 180 days thereafter.

7. Page number: Revision number: Date of revision:

State of Tennessee
Department of Environment and Conservation
Division of Air Pollution Control
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TITLE V PERMIT APPLICATION - COMPLIANCE DEMONSTRATION BY MONITORING CONTROL SYSTEM PARAMETERS OR OPERATING PARAMETERS OF A PROCESS

The monitoring of a control system parameter or a process parameter shall be acceptable as a compliance demonstration method provided that a correlation between the parameter value and the emission rate of a particular pollutant is established.

GENERAL IDENTIFICATION AND DESCRIPTION

1. Facility name: BAE SYSTEMS Ordnance Systems Inc., Holston Army Ammunition Plant	2. Stack ID or flow diagram point identification(s) Vent Points A and B

3. Emission source:

Building [redacted]

MONITORING DESCRIPTION

4. Pollutant(s) being monitored:

PM, PM10, PM2.5

5. Description of the method of monitoring and establishment of correlation between the parameter value and the emission rate of a particular pollutant:

The dryer scrubber will be monitored in accordance with the manufacturer's recommendation and suggested frequency. Likely the water recirculation flow rate and the feed hopper scrubber recirculation flow rate will be monitored once per shift when the process emission unit is in operation. The minimum flow rate or alternative metric will be recommended along with frequency by the manufacturer.

6. Compliance demonstration frequency (specify the frequency with which compliance will be demonstrated):

Either once per shift or as recommended by the scrubber manufacturer - when the emission unit is in operation

7. Page number:	Revision number:	Date of revision:

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Division of Air Pollution Control
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TITLE V PERMIT APPLICATION
COMPLIANCE DEMONSTRATION BY MONITORING MAINTENANCE PROCEDURES

The monitoring of a maintenance procedure shall be acceptable as a compliance demonstration method provided that a correlation between the procedure and the emission rate of a particular pollutant is established.

GENERAL IDENTIFICATION AND DESCRIPTION

1. Facility name:

BAE SYSTEMS Ordnance Systems Inc., Holston Army Ammunition Plant

2. Stack ID or flow diagram point identification(s):

Vent Points A, B, C, and D

3. Emission source (identify):

Building [redacted]

MONITORING DESCRIPTION

4. Pollutant(s) being monitored:

PM, PM10, PM2.5

5. Procedure being monitored:

For each of the control devices (dryer scrubber, feed hopper scrubber, HEPA filters), the manufacturer's recommended or approved optional maintenance procedures will be followed.

6. Description of the method of monitoring and establishment of correlation between the procedure and the emission rate of a particular pollutant:

The manufacturer's recommended or approved optional maintenance procedures established and correlated preventive maintenance procedures will be tracked in OSI's electronic preventive maintenance tracking system.

7. Compliance demonstration frequency (specify the frequency with which compliance will be demonstrated):

Frequency to be determined per vendor recommendations and records to be maintained on-site.

8. Page number: Revision number: Date of revision:

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Division of Air Pollution Control
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TITLE V PERMIT APPLICATION
COMPLIANCE DEMONSTRATION BY RECORDKEEPING

Recordkeeping shall be acceptable as a compliance demonstration method provided that a correlation between the parameter value recorded and the applicable requirement is established.

GENERAL IDENTIFICATION AND DESCRIPTION

1. Facility name:
   BAE SYSTEMS Ordnance Systems
   Holston Army Ammunition Plant

2. Stack ID or flow diagram point identification(s):
   Vent Points A and B

3. Emission source (identify):
   Building [redacted]

MONITORING AND RECORDKEEPING DESCRIPTION

4. Pollutant(s) or parameter being monitored:
   PM, PM10, PM2.5

5. Material or parameter being monitored and recorded:
   Scrubber Flow Rate

6. Method of monitoring and recording:

The [redacted] dryer scrubber recirculation flow rate and feed hopper scrubber recirculation flow rate shall be monitored and recorded once per shift when the process emission source is in operation. As an alternative the manufacturer's recommended parameter or metric at the manufacturer's recommended frequency will be monitored in lieu of the flow rate.

7. Compliance demonstration frequency (specify the frequency with which compliance will be demonstrated):

Once per shift when the process emission source is in operation or as recommended by the manufacturer. The records will be maintained on-site.

8. Page number: Revision number: Date of revision:

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TITLE V PERMIT APPLICATION
COMPLIANCE DEMONSTRATION BY OTHER METHOD(S)

GENERAL IDENTIFICATION AND DESCRIPTION

1. Facility name:
BAE SYSTEMS Ordnance Systems Inc.,
Holston Army Ammunition Plant

2. Stack ID or flow diagram point identification(s):
Vent Points A, B, C, and D

3. Emission source (identify):
Building [redacted]

MONITORING DESCRIPTION

4. Pollutant(s) or parameter being monitored:
Opacity

5. Description of the method of monitoring:
Compliance with the standard shall be determined by the procedures of the Tennessee Division of Air Pollution Control's Opacity Matrix dated June 18, 1996 and amended September 12, 2005.

Standard:
Visible emissions from this source shall not exhibit greater than twenty percent (20%) opacity, except for an aggregate of no more than five (5) minutes in any one (1) hour period, and no more than twenty (20) minutes in any twenty-four (24) hour period. Visible emissions from these sources shall be determined by Tennessee Visible Emission Evaluation Method 2, as adopted by the Tennessee Air Pollution Control Board on August 24 1984 (aggregate count). TAPCR 1200-3-5-.01(1)

6. Compliance demonstration frequency (specify the frequency with which compliance will be demonstrated):
Frequency as required per the Tennessee Division of Air Pollution Control's Opacity Matrix

7. Page number: Revision number: Date of revision:

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Division of Air Pollution Control
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TITLE V PERMIT APPLICATION
EMISSIONS FROM PROCESS EMISSION SOURCE / FUEL BURNING INSTALLATION / INCINERATOR

GENERAL IDENTIFICATION AND DESCRIPTION

1. Facility name: BAE SYSTEMS Ordnance Systems Inc. Holston Army Ammunition Plant	2. Stack ID or flow diagram point identification(s): See flow diagram
3. Process emission source / Fuel burning installation / Incinerator (identify): Building [redacted] See Appendix B for emissions calculations.	

EMISSIONS SUMMARY TABLE – CRITERIA AND FUGITIVE EMISSIONS

4. Complete the following emissions summary for regulated air pollutants. Fugitive emissions shall be included. Attach calculations and emission factor references.

Air Pollutant	Maximum Allowable Emissions		Actual Emissions	
	Tons per Year	Reserved for State use (Pounds per Hour - Item 7, APC 30)	Tons per Year	Reserved for State use (Pounds per Hour- Item 8, APC 30)
Particulate Matter (TSP)	6			
(Fugitive Emissions)				
Sulfur Dioxide				
(Fugitive Emissions)				
Volatile Organic Compounds				
(Fugitive Emissions)				
Carbon Monoxide				
(Fugitive Emissions)				
Lead				
(Fugitive Emissions)				
Nitrogen Oxides				
(Fugitive Emissions)				
Total Reduced Sulfur				
(Fugitive Emissions)				
Mercury				
(Fugitive Emissions)				

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(Continued from last page)

AIR POLLUTANT	Maximum Allowable Emissions		Actual Emissions	
	Tons per Year	Reserved for State use (Pounds per Hour - Item 7, APC 30)	Tons per Year	Reserved for State use (Pounds per Hour- Item 8, APC 30)
Asbestos				
(Fugitive Emissions)				
Beryllium				
(Fugitive Emissions)				
Vinyl Chloride				
(Fugitive Emissions)				
Fluorides				
(Fugitive Emissions)				
Gaseous Fluorides				
(Fugitive Emissions)				
Greenhouse Gases in CO_2 Equivalents				

EMISSIONS SUMMARY TABLE – FUGITIVE HAZARDOUS AIR POLLUTANTS

5. Complete the following emissions summary for regulated air pollutants that are hazardous air pollutant(s). Fugitive emissions shall be included. Attach calculations and emission factor references.

Air Pollutant & CAS	Maximum Allowable Emissions		Actual Emissions	
	Tons per Year	Reserved for State use (Pounds per Hour - Item 7, APC 30)	Tons per Year	Reserved for State use (Pounds per Hour- Item 8, APC 30)

6. Page number: Revision number: Date of revision

State of Tennessee
Department of Environment and Conservation
Division of Air Pollution Control
William R. Snodgrass Tennessee Tower
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TITLE V PERMIT APPLICATION
CURRENT EMISSIONS REQUIREMENTS AND STATUS

GENERAL IDENTIFICATION AND DESCRIPTION

1. Facility name: BAE SYSTEMS Ordnance Systems Holston Army Ammunition Plant
2. Emission source number: See Flow Diagram
3. Describe the process emission source / fuel burning installation / incinerator.
Building [redacted]

EMISSIONS AND REQUIREMENTS

4. Identify if only a part of the source is subject to this requirement	5. Pollutant	6. Applicable requirement(s): TN Air Pollution Control Regulations, 40 CFR, permit restrictions, air quality based standards	7. Limitation	8. Maximum actual emissions	9. Compliance status (In/Out)
All	PM, PM10, PM2.5	TAPCR 1200-03-06-.01(7) and application if not IEU under 1200-03-09-.04	6 tpy	6 tpy	IN
All	Opacity	TVEE Method 2	20% Opacity	NA	IN

10. Other applicable requirements (new requirements that apply to this source during the term of this permit)

11. Page number: Revision number: Date of revision:

Appendix B
Emission Calculations

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Appendix C
Air Dispersion Modeling Report

APPENDIX C

AIR DISPERSION MODELING FOR THE EXPANSION PROJECT AT THE HOLSTON ARMY AMMUNITION PLANT IN KINGSPORT, TENNESSEE

Prepared for:
BAE Systems, Ordinance Systems Inc.
4509 W Stone Drive
Kingsport, TN 37660

Prepared by:
RTP Environmental Associates
304A West Millbrook Road
Raleigh, North Carolina 27609

June 2018

Table of Contents

List of Tables

List of Figures

1.0 INTRODUCTION

This document presents the results of the air quality dispersion modeling analysis conducted for the Expansion Project at the Holston Army Ammunitions Plant (HSAAP) in Kingsport, Tennessee.

The analysis evaluated emissions of the criteria pollutants regulated under the applicable provisions of the Prevention of Significant Deterioration ("PSD") regulations of the Tennessee Air Pollution Control Regulations Chapter 1200-03-09-.01(4). The criteria pollutant analysis was conducted to ensure that the emissions from the Expansion processes will not cause or contribute to air pollution in violation of a National Ambient Air Quality Standard (NAAQS) or increment for all criteria pollutants proposed to be emitted in excess of the PSD significant emission rates ("SERs").

The modeling conforms with the modeling procedures outlined in the Environmental Protection Agency's Guideline on Air Quality Models[1] (Guideline or Appendix W), associated EPA modeling policy and guidance, as well as the modeling protocol document submitted to, and approved with minor revisions, by the Tennessee Department of Environment and Conservation (TDEC)[2]..

2.0 PROJECT DESCRIPTION

HSAAP is the major supplier of explosive materials, primarily RDX- and HMX-based products, to the U.S. Department of Defense. The combined processes to produce RDX and HMX at HSAAP are currently at capacity to meet product demand for the U.S. Military and an increase in capacity is needed to meet the projected orders for the currently forecasted years. Consequently, HSAAP is undertaking a large portfolio of expansion projects known as the Expansion Program ("the Project").

The Project will result in the need for new process buildings. Two other unrelated process buildings are also scheduled to be added during the same construction period. Emissions from these new process buildings and support equipment will include nitrogen oxides ("NO_X"), carbon monoxide ("CO"), particulate matter ("PM"), volatile organic compounds ("VOC"), hazardous air pollutants ("HAP's"), and greenhouse gases ("GHG's"). The combined emissions from these process buildings are expected to be above some SER's. Process types include combustion for steam, chemical manufacturing, milling, distillation, coating operations, chemical storage, etc.

Project will result in increases in emissions of VOC and GHG's, and possibly CO that are in excess of PSD SERs. Overall, NOx emissions will decrease because HSSAP will also retire several existing coal fired boilers as part of the project.

3.0 SITE DESCRIPTION

HSAAP spans over 6,000 acres and two counties (Hawkins and Sullivan). There are over [redacted] buildings and storage magazines on site. The facility is owned by the Department of Defense and is operated by BAE Systems, Ordinance Systems Inc. (OSI). The approximate Universal Transverse Mercator (UTM) coordinates of HSAAP are 354,150 meters east and 4,044,500 meters north (UTM Zone 17, NAD 83). Figure 1 shows the general location of HSAAP. Figure 2 shows the specific HSAAP location on a 7.5-minute U.S. Geological Survey (USGS) topographic map.

HSAAP is classified under the regulations governing PSD and Title V as a major source. Hawkins and Sullivan Counties are classified as attainment or unclassifiable for all regulated pollutants except SO_2. There is an SO_2 non-attainment area in Sullivan County.

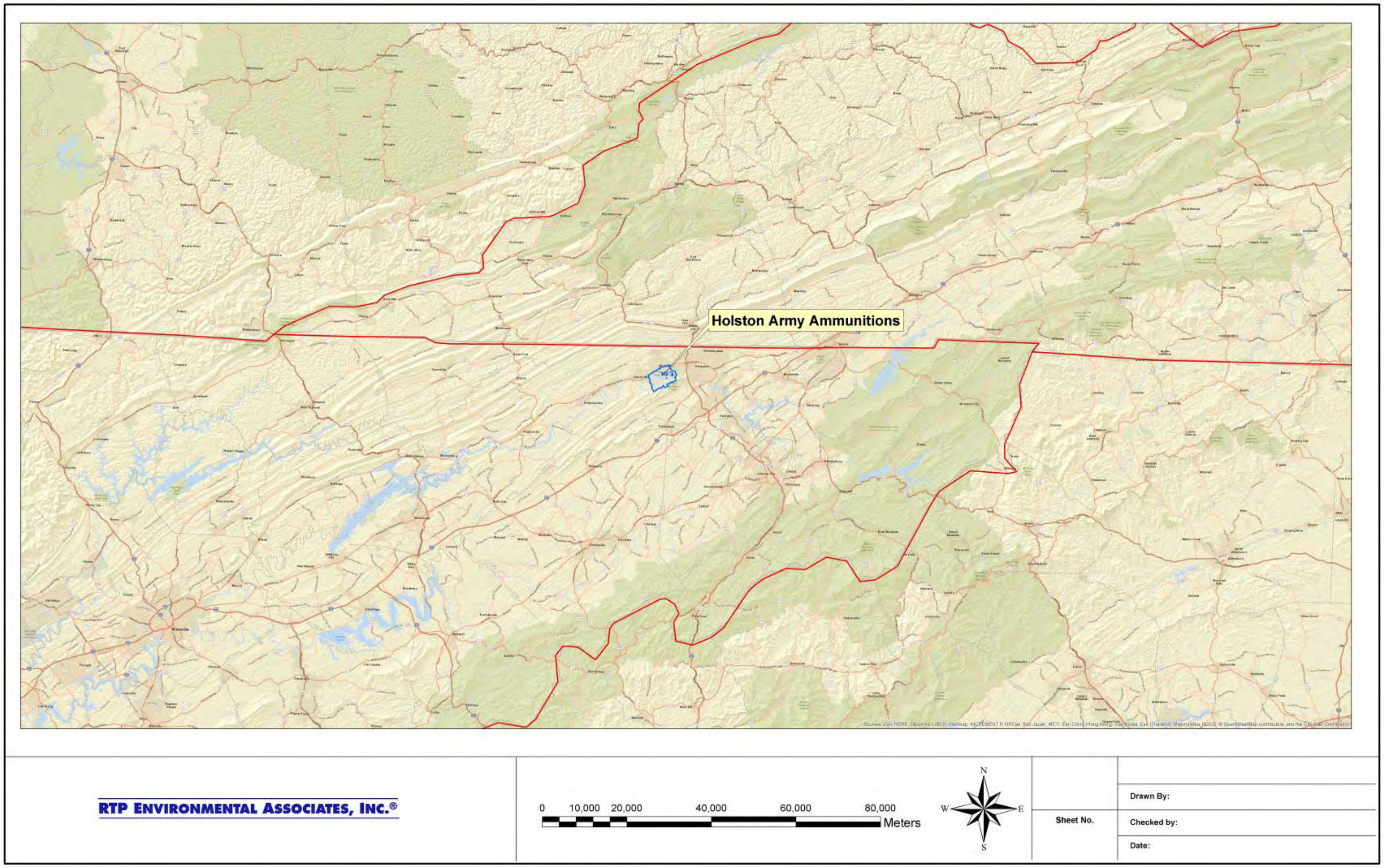

Figure 1. General Location of the Holston Army Ammunitions Plant

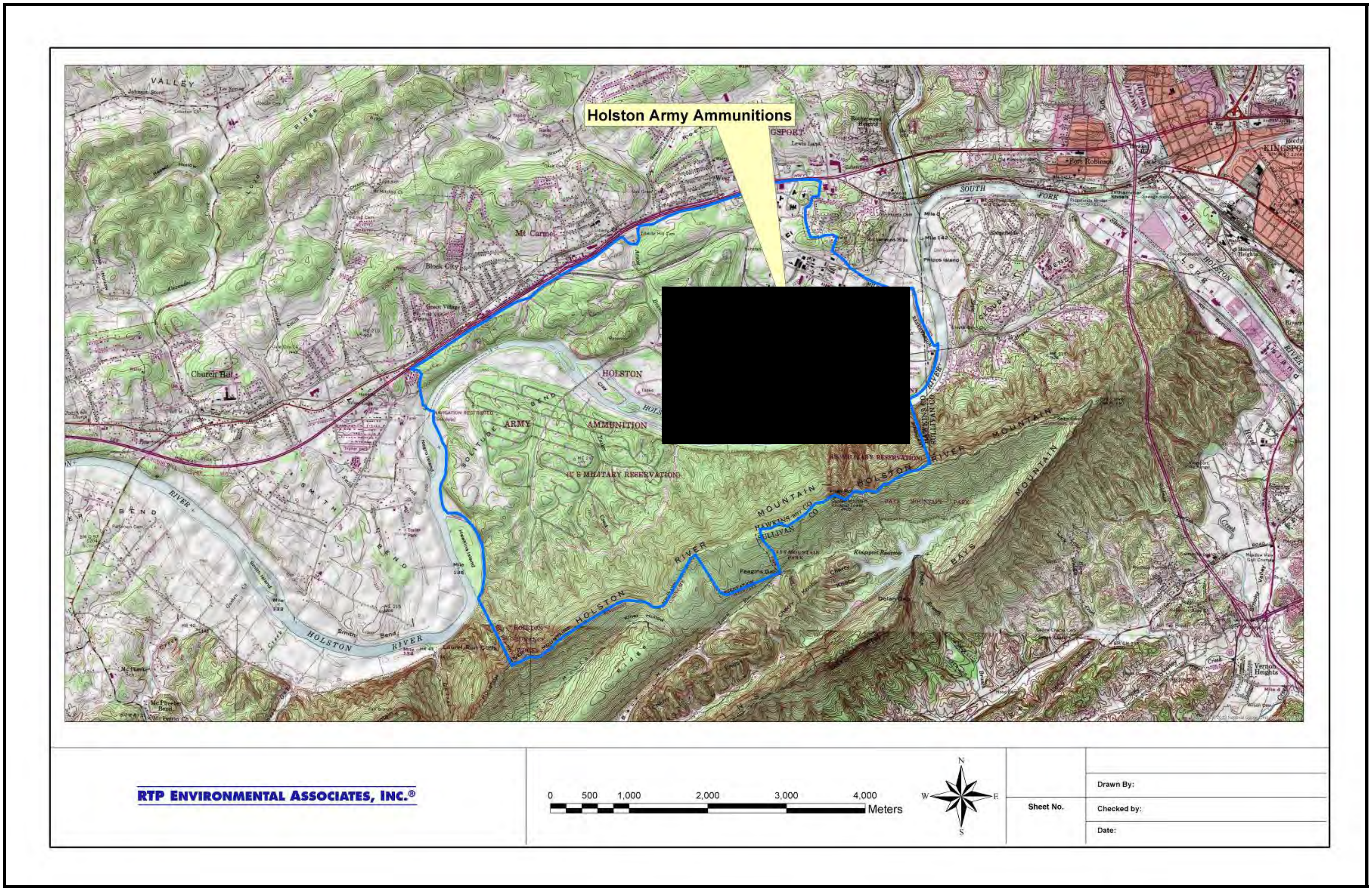

Figure 2. Specific Location of HSSAP

4.0 MODEL SELECTION AND MODEL INPUT

4.1 Model Selection

The latest version of the AMS/EPA Regulatory Model (AERMOD, Version 18081) was used to conduct the dispersion modeling analysis. AERMOD is a Gaussian plume dispersion model that is based on planetary boundary layer principals for characterizing atmospheric stability. The model evaluates the non-Gaussian vertical behavior of plumes during convective conditions with the probability density function and the superposition of several Gaussian plumes. AERMOD is a modeling system with three components: AERMAP is the terrain preprocessor program, AERMET is the meteorological data preprocessor and AERMOD includes the dispersion modeling algorithms.

AERMOD is the required default model for calculating ambient concentrations near the HSAAP based on the model's ability to incorporate multiple sources and source types. The model can also account for convective updrafts and downdrafts and meteorological data throughout the plume depth. The model also provides parameters required for use with up to date planetary boundary layer parameterization. The model also has the ability to incorporate building wake effects and to calculate concentrations within the cavity recirculation zone. All model options will be selected as recommended in the EPA Guideline on Air Quality Models.

Oris Solution's BEEST Graphical User Interface (GUI) was used to run AERMOD. The GUI uses an altered version of the AERMOD code to allow for flexibility in the file naming convention. The dispersion algorithms of AERMOD are not altered. Therefore, a model equivalency evaluation pursuant to Section 3.2 of 40 CFR 51, Appendix W is not warranted.

4.2 Model Control Options and Land Use

AERMOD was run in the regulatory default mode. The default rural dispersion coefficients in the model were used. This is supported by the Land Use Procedure consistent with subsection 7.2.3(c) of the Guideline and Section 5.1 of the AERMOD Implementation Guide. The USGS 2006 National Land Cover Data (NLCD) within 3km of the site were converted to Auer 1978 land use types, using recommendations from the Pennsylvania Department of Environmental Protection, and evaluated.3 It was determined that the land use in the vicinity of the Project is mixed but predominantly rural as defined by Auer (less than 50% of the area is classified as urban - Figure 3). Only the red and dark red regions in the figure (NLCD categories 23 and 24) are classified as urban using this approach.

4.3 Source Data

Point Sources

All Project emission sources will vent to stacks with a well defined opening. These sources were modeled as point sources in AERMOD. The modeled source input data are provided in Attachment A of this report.

Good Engineering Practice Stack Height Analysis

A Good Engineering Practice (GEP) stack height evaluation was conducted to determine appropriate building dimensions to include in the model and to calculate the GEP formula stack height used to justify stack height credit for stacks to be constructed in excess of 65m. Procedures to be used will be in accordance with those described in the EPA Guidelines for Determination of Good Engineering Practice Stack Height (Technical Support Document for the Stack Height Regulations-Revised)[4]. GEP formula stack height, as defined in 40 CFR 51, is expressed as GEP = H_b + 1.5L, where H_b is the building height and L is the lesser of the building height or maximum projected width. Building/structure locations will be determined from a facility plot plan. The structure locations and heights were input to the EPA's Building Profile Input Program (BPIP-PRIME) computer program to calculate the direction-specific building dimensions needed for AERMOD. The HSAAP plot plan is shown in Figure 4. The fenceline is shown as the outer blue line. All stacks and structures that are located near a stack were included in the BPIP runs.

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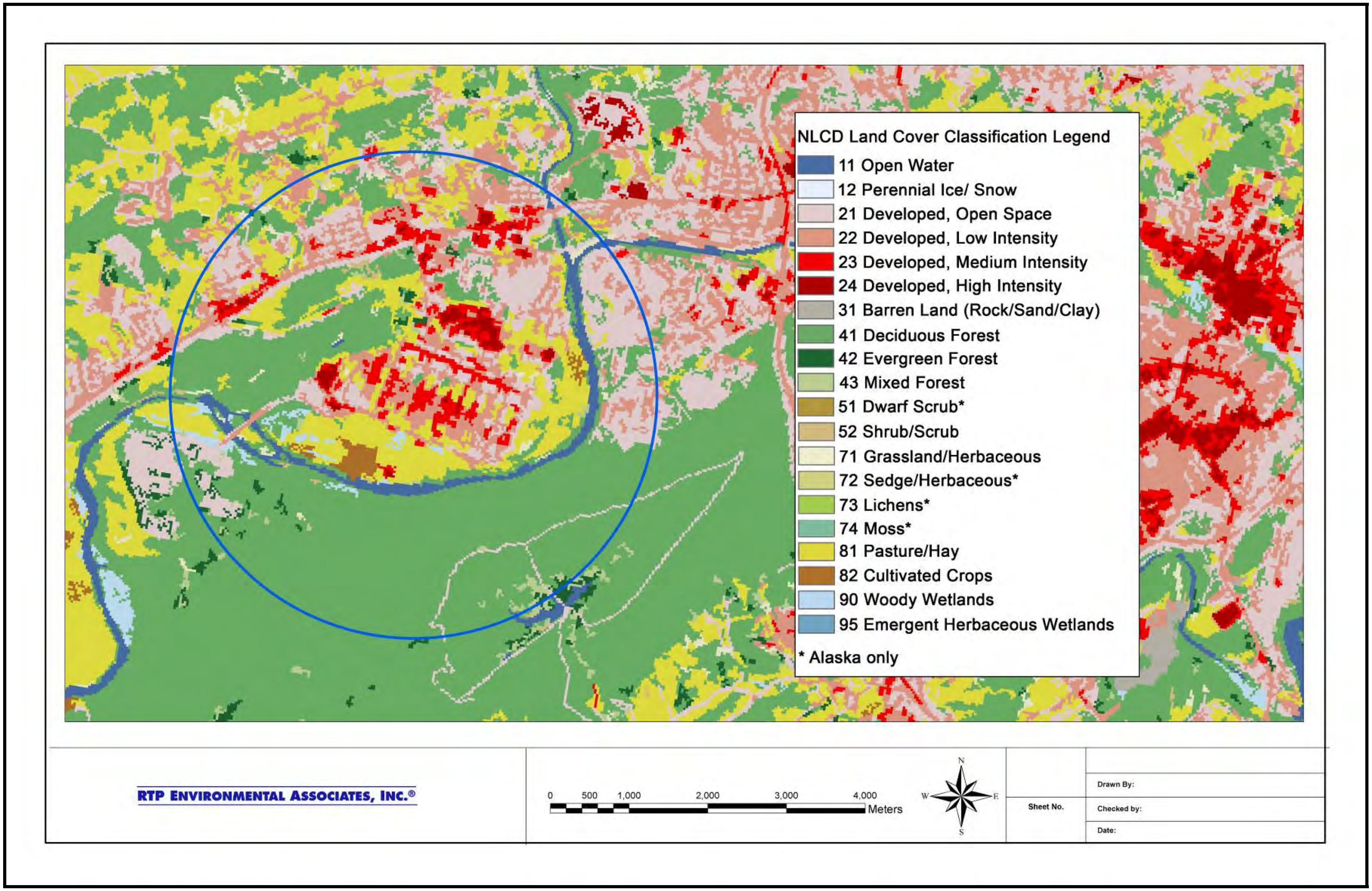

Figure 3. Land Use within Three Kilometers (Three Kilometer Radius Shown As Blue Circle)

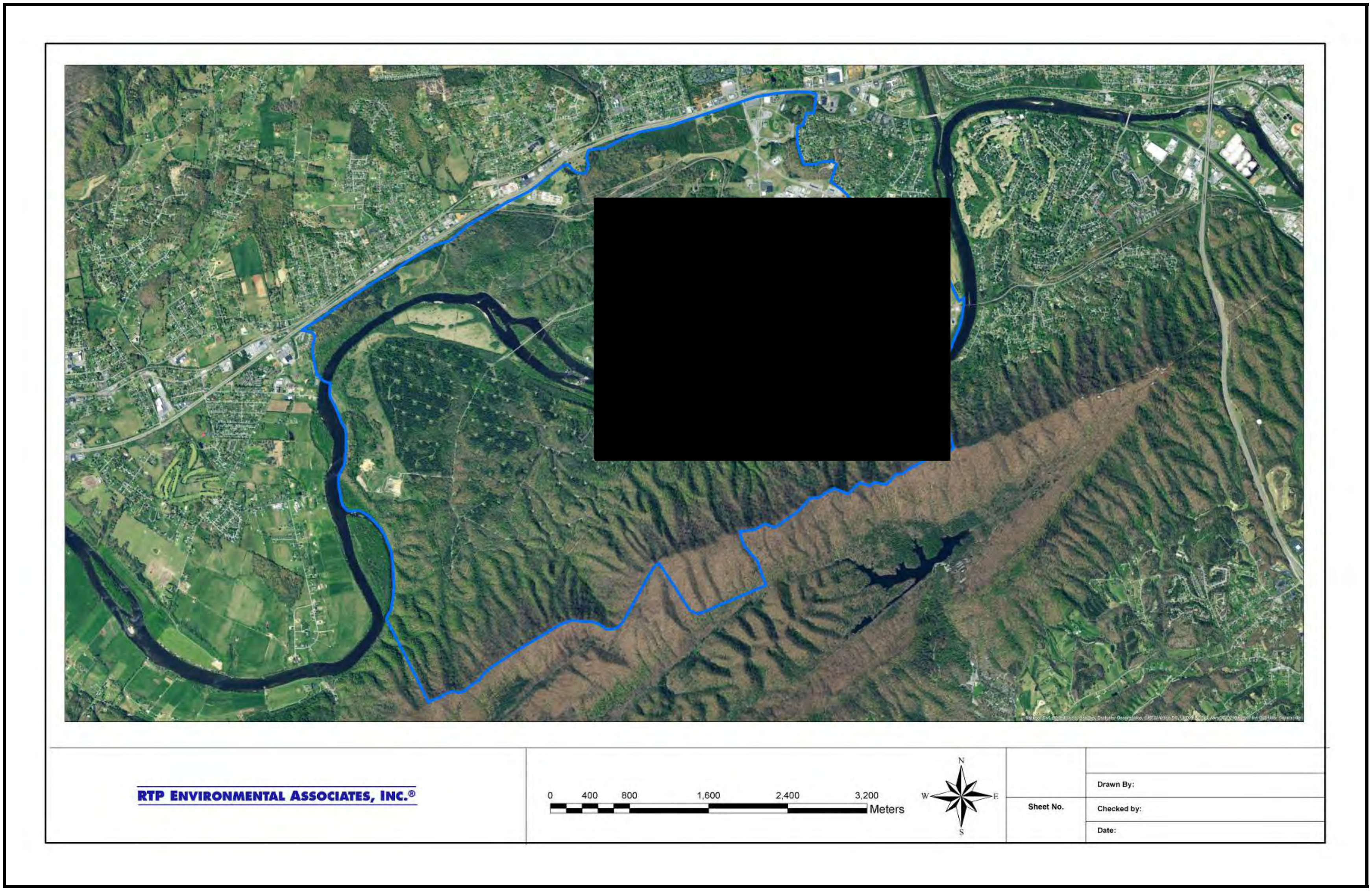

Figure 4. HSAAP Plot Plan

4.4 Monitored Background Data

Ambient, background pollutant concentrations are needed to establish a representative background concentration to complete the NAAQS portion of the *Source Impact Analysis* required by 40 CFR 52.21(k). The background concentrations are added to the modeled concentrations to assess NAAQS compliance. Ambient pollutant concentrations are also needed to fulfill the *Air Quality Analysis* requirement of 40 CFR 52.21(m).

Pursuant to 40 CFR 52.21(i)(5), requirements for ambient monitoring data may be waived by the permitting authority if projected increases in ambient concentrations due to the project are less than the Significant Monitoring Concentrations. However, in light of the decision of the D.C. Circuit Court of Appeals *Sierra Club v. EPA*,[5] OSI has elected not to request such a waiver.

The EPA Monitoring Guidelines[6], other EPA interpretive guidance, and EPA administrative decisions clarify that representative, existing air quality monitoring data may be used to fulfill the PSD pre-construction monitoring requirements and establish background concentrations needed for assessing NAAQS compliance, in lieu of monitoring data. EPA's Monitoring Guidelines suggest specific criteria to determine representativeness of off-site data: *quality of the data, currentness of the data, and monitor location*.

There are existing CO and ozone ambient monitors that can be used in lieu of site specific preconstruction monitoring data. Existing monitoring data have been evaluated in relation to the criteria provided in EPA's Ambient Monitoring Guidelines as being representative of the HSAAP site.

The most recent available, quality assured data (2015-2017) are presented in Table 1. The data are from the monitors in Memphis (AQS Site # 47-157-0075 for CO and AQS Site #47-163-2003 for ozone).

These monitors best represent background concentrations as they are the closest monitors with data for the pollutants of concern.

Table 1. Background Concentrations 2015-2017

Pollutant	Averaging Time	Design Value (ppb)	Basis	AQS Site No.
CO	1-hour	1500	High 2nd High	47-157-0075
	8-hour	900	High 2nd High	
Ozone	8-hour	66	Maximum	47-163-2003

The existing monitoring data satisfy the criteria provided in EPA's Ambient Monitoring Guidelines[7] as being representative of the site and should therefore be allowed for use.

Monitor Location

Of the monitors available, these monitors represent background concentrations as they are the closest monitors with data for the pollutants of concern that are not also significantly influenced by the localized source impacts.

Data Quality

The monitor data were collected and quality assured by the Tennessee Department of Environment & Conservation (TDEC).

Currentness of Data

The data were collected during 2015-2017, which represents the most recent quality assured data available for use in assessing compliance.

4.5 Receptor Data

Modeled receptors were placed in all areas considered as "ambient air" pursuant to 40 CFR 50.1(e). Ambient air is defined as that portion of the atmosphere, external to buildings, to which the general public has access. The HSSAP is a tightly controlled facility due to the nature of operations. A contiguous fence which precludes public access surrounds the facility. Approximately 15,400 receptors were used in the

AERMOD significant impacts analysis. The receptor grid consists of two cartesian grids and receptors spaced at 50m intervals along the facility fenceline. The first cartesian grid extends to approximately 2km from the fence in all directions. Receptors in this region were spaced at 100m intervals. The second grid extends to 7.5km. Receptor spacing in this region was 250m. The receptor grid is designed such that maximum facility impacts fall within the 100m spacing of receptors. No refinements to the grid was needed because maximum impacts were identified in the 1000m grid. The receptor grid spacing is presented in Table 2.

Table 2. Receptor Grid Spacing

Receptor Spacing (m)	Distance from Facility Fence (m)
100	2,000
250	7,500

HSAAP is located in northeastern Tennessee. Terrain within 10km of the site is generally hilly. Receptor elevations and hill height scale factors were calculated with AERMAP (18081). The elevation data were obtained from the USGS one arc second National Elevation Data (NED). Locations were based upon a NAD83, UTM Zone 17 projection. The near-field receptor grid is presented in Figure 6.

4.6 Meteorological Data

The 2012-2016, 5-year sequential hourly surface meteorological data from the National Weather Service (NWS) Station in Bristol, TN (WBAN No. 13877) and upper air data from the NWS staion in Roanoke, VA (WBAN No. 53829) were used in the analysis.

These data have been processed into a “model-ready” format using the latest version of AERMET (version 18081).

The AERMET meteorological processor requires estimates of the following surface characteristics: surface roughness length, albedo, and Bowen ratio. The surface roughness length is related to the height of obstacles to the wind flow. It is the height

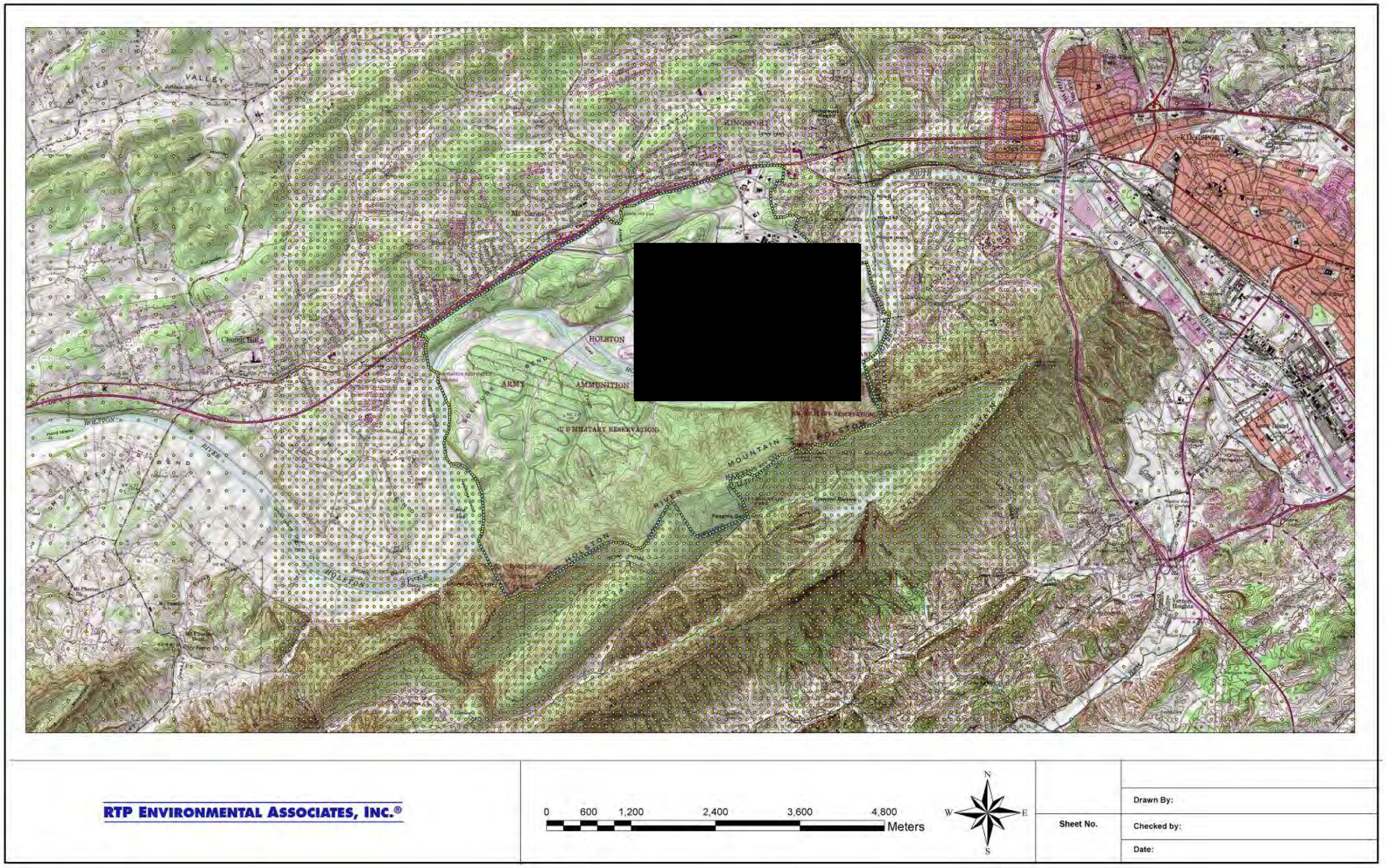

Figure 5. HSAAP Near-field Receptor Grid

above the surface where the average wind speed is zero. The smoother the surface, the lower the roughness length. The surface roughness length influences the surface shear stress and is an important factor in calculating mechanical turbulence and stability. The albedo is the fraction of the total incident solar radiation reflected by the surface back to space without absorption. The Bowen ratio is an indicator of surface moisture and is the ratio of the sensible heat flux to the latent heat flux. The albedo and Bowen ratio are used for determining the planetary boundary layer parameters for convective conditions due to the surface sensible heat flux.

Estimates of the surface characteristics were made using EPA's AERSURFACE program (Version 13016). Surface characteristics were compiled for both the Bristol tower location and the HSSAP site location. Two sets of surface characteristics were compiled due to the fact that the surface characteristics of the tower location and the site location are not similar. A 1km search radius was employed at each location. Twelve sectors of 30 degrees each and seasonal resolution were used in the AERSURFACE analysis. The "ADJ_U*" option to allow for adjustments to the friction velocity under low wind speeds was employed.

The use of NWS meteorological data for dispersion modeling can often lead to a high incidence of calms and variable wind conditions if the data are collected by Automated Surface Observing Stations (ASOS), as are in use at most NWS stations since the mid-1990's. A calm wind is defined as a wind speed less than 3 knots and is assigned a value of 0 knots. In addition, variable wind observations may include wind speeds up to 6 knots, but the wind direction is reported as missing, if the wind direction varies more than 60 degrees during the 2-minute averaging period for the observation. The AERMOD model currently cannot simulate dispersion under calm or missing wind conditions. To reduce the number of calms and missing winds in the surface data, archived 1-minute winds for the ASOS stations were used to calculate hourly average wind speeds and directions, which were used to supplement the standard archive of hourly observed winds processed in AERMET. The EPA AERMINUTE program (Version 14327) was used for these calculations. A wind rose of the 5-year meteorological dataset is provided in Figure 7.

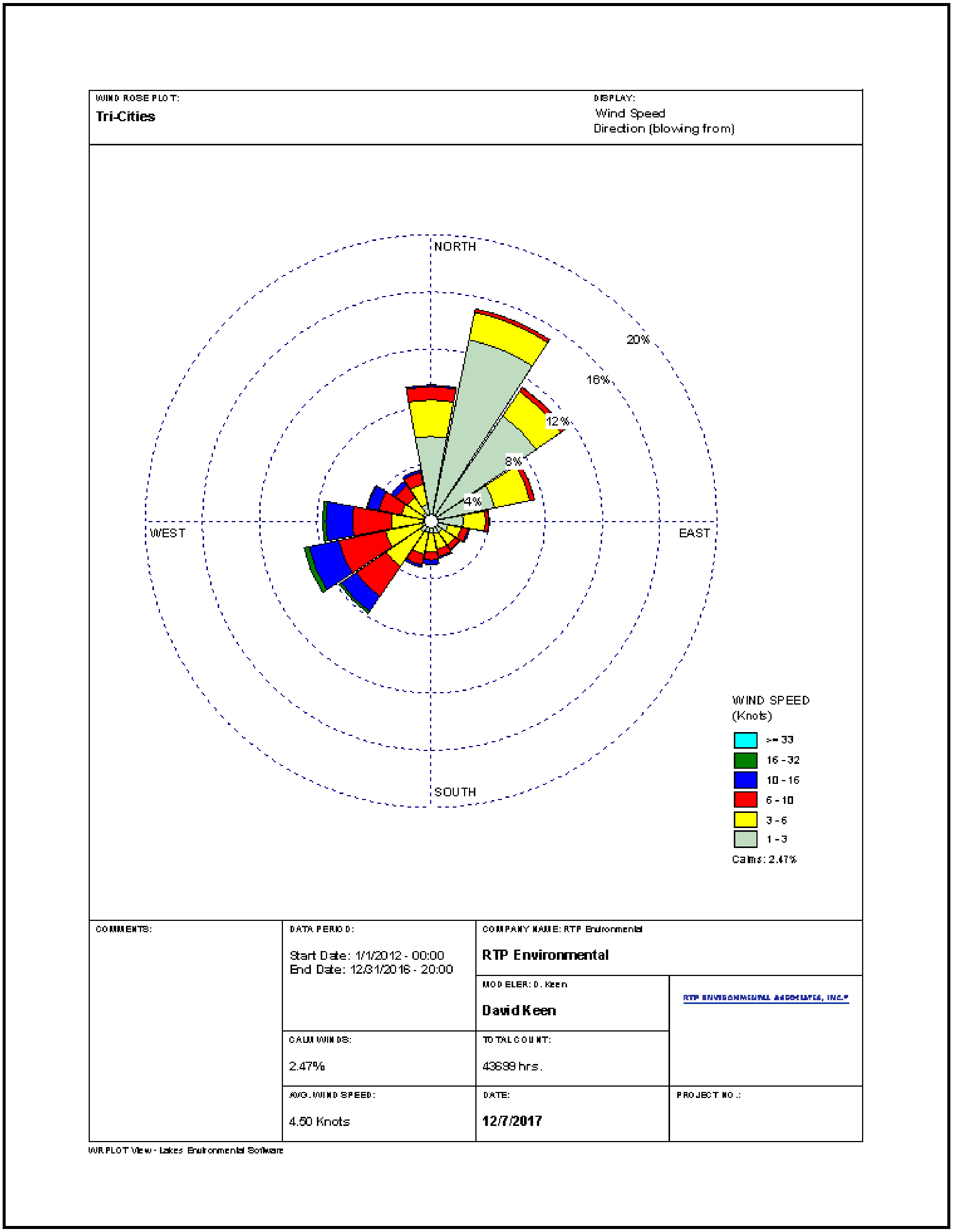

Figure 6. Tri-Cities Windrose 2012-2016.

5.0 MODELING METHODOLOGY

5.1 Pollutants Subject to Review

Only the criteria pollutants whose emissions increases exceed the PSD significance thresholds and are therefore subject to PSD review were evaluated in the modeling analysis. There are no ambient air quality standards for GHGs. These pollutants therefore do not require evaluation.

5.2 Ozone Analysis

There are currently no regulatory photochemical models available to evaluate smaller spatial scales or single-source impacts on ozone concentrations. Since ozone is formed from precursor pollutants, assessment of ambient ozone impacts is typically conducted on a regional basis using resource-intensive models such as the EPA Community Multiscale Air Quality (CMAQ) model. However, sources subject to PSD review are required to conduct a source impact analysis and demonstrate that a proposed source will not cause or contribute to a violation of any NAAQS or applicable increment. Qualitative ozone analyses have typically been performed in recent PSD applications to evaluate whether ozone precursor emissions (NOx and VOC) will significantly impact regional ozone formation.

Potential emissions of NO_2 will decrease due to the Project; however, VOC emissions will be above 40 tons per year. The EPA and permitting authorities have historically used the 100 ton per year threshold to assess whether a detailed air quality analysis should be conducted for ozone.[8] According to EPA, although this threshold has not been revisited since promulgation of the 8-hour ozone NAAQS, it is unlikely that a source emitting below this level would contribute to a violation of the 8-hour ozone NAAQS.

We have evaluated the project's ozone precursor emissions under the EPA's draft Modeled Emission Rates for Precursors ("MERPs") guidance[9], as also described by the TDEC in its April 10, 2018, MERPs Guidance[10], to further demonstrate that the project will not result in quantifiable ozone formation. Under TDEC's MERPs guidance, the Project proposed VOC emissions increase of 116 tons per year is below the lowest 8-hr ozone MERP value of 1339 tons per year (see Table 2 of the TDEC MERPs guidance). Since NOx emissions will decrease, there is no need to consider NOx emissions in the evaluation. Based upon this assessment, ozone formation due to the Project will be assumed negligible.

5.3 Significant Impact Analysis

Since maximum CO impacts were determined to be less than the Significant Impact Levels (SIL), there was no need to conduct a more detailed NAAQS analysis (there is no increment for CO). In the significant impacts analysis, the calculated maximum impacts were determined. These impacts define the net change in air quality resulting from the proposed modification. Five years of meteorological data were used in the significant impact analysis. Maximum modeled concentrations were compared to the CO significance levels listed in Table 3.

Table 3. PSD Class II Significant Impact Levels

Pollutant	Averaging Time	PSD Class II Significant Impact Levels (µg/m^3)
CO	1-hour	2000
	8-hour	500

5.4 Class II Visibility Analysis

A Class II visibility analysis was not conducted since the proposed project will not result in a significant increase in emissions of any visibility imparing pollutant (i.e., NOx or PM10). CO is not a visibility impairing pollutant that requires evaluation.

6.0 MODEL RESULTS

The results of the CO significant impact modeling analysis are presented in Table 4. As shown, the project will result in insignificant ambient impacts. A more refined NAAQS analysis was therefore not required. The meteorological data as well as model input and output have been provided electronically. Model summary results can be found in Attachment B.

Table 4. Significant Impact Results

Pollutant	Surface Characteristics	Averaging Time	Maximum CO Impact (µg/m^3)	PSD Class II Significant Impact Level (µg/m3)
CO	Airport	1-hour	224	2000
		8-hour	38.2	500
	Site	1-hour	247	2000
		8-hour	44.6	500

7.0 CLASS I AREA IMPACTS

7.1 Class I AQRV Analysis

There are five Class I areas located within 300km of the HSAAP (please see Figure 8).[a] The closest Class I area is the Linville Gorge Wilderness Area, located 95km to the southeast. CO emissions do not require evaluation by the FLM's. Therefore, no Class I AQRV analysis will be conducted.

7.2 Class I Increment Analysis

There are no PSD increments for CO. Therefore, a Class I increment analysis will not be conducted.

[a] Class I areas are pristine areas (e.g., large National Parks and Wilderness Areas) that have been designated by Congress and are afforded a greater degree of air quality protection. All other areas are designated as Class II areas.

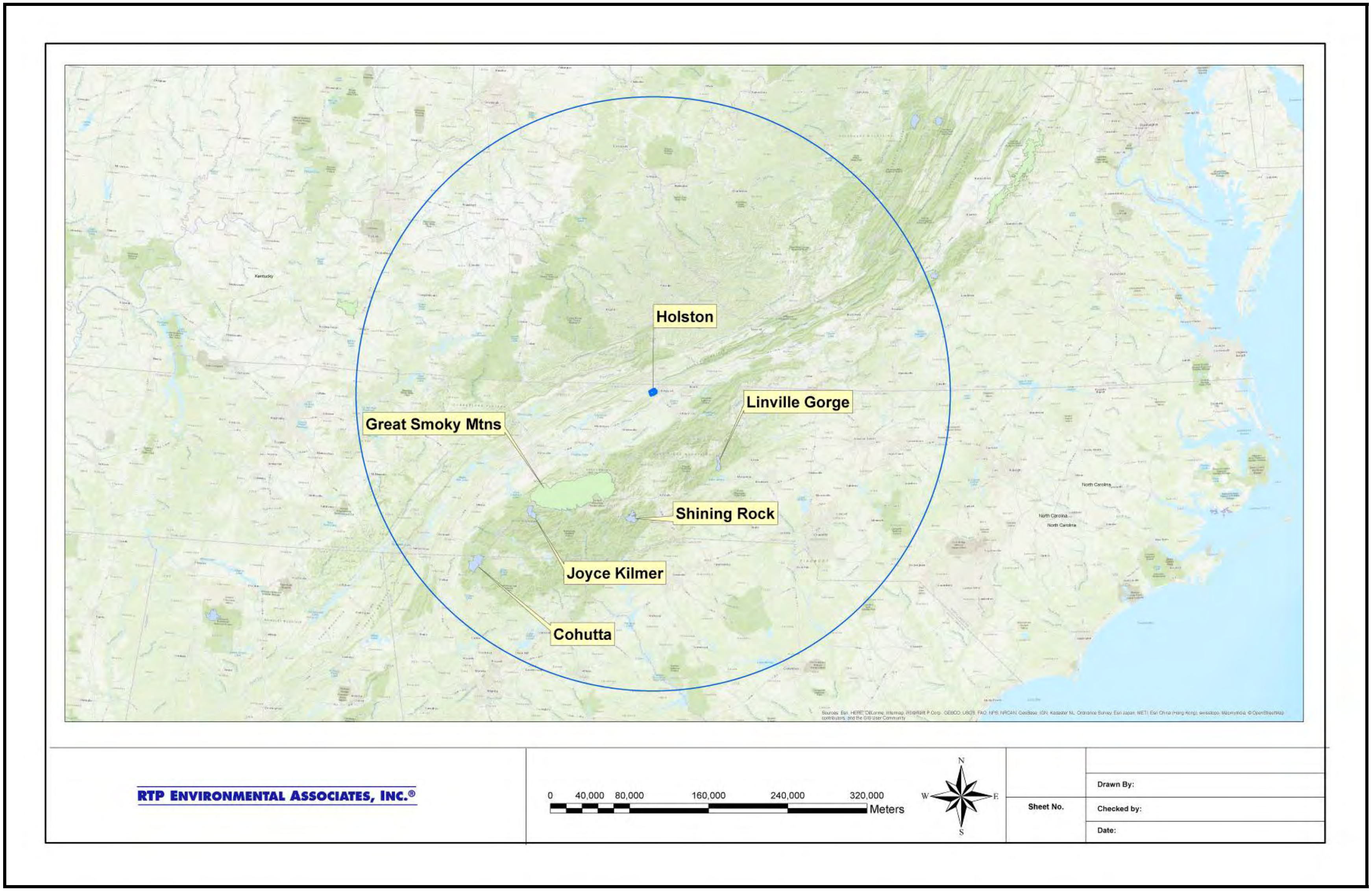

Figure 7. Class I Areas Relative to the Holston Site (300km Radius Shown)

Attachment A

MODEL INPUT DATA

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Holston Inputs (NAD83, Z[redacted]

Source ID	[redacted]	Base Elevation (ft)	Stack Height (ft)	Temp (F)	Exit Velocity (ft/sec)	Stack Diameter (ft)	CO (lb/hr)
7	[redacted]	1217.88	75.00	300.00	127.00	5.00	6.0000
8	[redacted]	1217.81	75.00	300.00	127.00	5.00	6.0000
9	[redacted]	1215.39	75.00	300.00	127.00	5.00	6.0000
10	[redacted]	1211.81	75.00	300.00	127.00	5.00	6.0000
13	[redacted]	1201.25	42.00	220.00	21.00	1.00	1.1500
14	[redacted]	1199.05	50.00	68.00	42.32	0.98	3.4200
15	[redacted]	1203.64	35.00	450.00	11.00	0.87	0.2000
16	[redacted]	1203.08	35.00	450.00	11.00	0.87	0.2000
17	[redacted]	1199.54	55.00	850.00	4.30	0.30	5.0800
20	[redacted]	1205.71	40.27	68.00	42.32	0.98	5.0000
21	[redacted]	1195.14	112.86	95.09	59.06	0.33	2.4500
23	[redacted]	1199.93	40.00	350.00	32.000	1.00	2.8000
24	[redacted]	1199.77	40.00	350.00	32.000	1.00	2.8000
25	[redacted]	1199.61	40.00	350.00	32.000	1.00	2.8000
26	[redacted]	1199.48	40.00	350.00	32.000	1.00	2.8000
27	[redacted]	1201.41	23.00	-460.00	0.030	1.00	0.2300

Attachment B

MODEL SUMMARY RESULTS

REDACTED COPY

Model Summary Output

Holston CO SIL Analysis Results (5-29-18)													
Model	File	Pollutant	Average	Group	Rank	Conc/Dep	East (X)	North (Y)	Elev	Hill	Flag	Time	Met File
AERMOD 18081	Holston SIL_5yrs_CO.SUM	CO	1-HR	ALL	1ST	224.3012	351800	4045600	390.97	410.16	0	12020108	BRS-RNK_2012_2016.SFC
AERMOD 18081	Holston SIL_5yrs_CO.SUM	CO	8-HR	ALL	1ST	38.20424	352650	4037450	400.87	676.98	0	13010508	BRS-RNK_2012_2016.SFC
AERMOD 18081	Holston SIL_5yrs_CO_SS.SUM	CO	1-HR	ALL	1ST	247.2037	352115	4045745	391.75	458.3	0	14113008	BRS-RNK_2012_2016_SS.SFC
AERMOD 18081	Holston SIL_5yrs_CO_SS.SUM	CO	8-HR	ALL	1ST	44.63241	353077	4046068	392.88	392.88	0	15052708	BRS-RNK_2012_2016_SS.SFC

Holston CO SIL Analysis Results (5-29-18)

Pollutant	Average	Group	Rank	Conc (ug/m3)	SIL (ug/m3)	% SIL	Surface Characteristics
CO	1-HR	ALL	1ST	224.30	2000	11%	Airport
	8-HR	ALL	1ST	38.20	500	8%	
CO	1-HR	ALL	1ST	247.20	2000	12%	Site
	8-HR	ALL	1ST	44.63	500	9%	

.REFERENCES

1. Guidelines on Air Quality Models, (Revised). Appendix W of 40 CFR Part 51, 82 FR 5182, January 17, 2017.

2. Air Dispersion Modeling Protocol for the Expansion Project at the Holston Army Ammunition Plant in Kingsport, TN, May 2018, submitted to TDEC May 17, 2018. Approved with requested revision to upper air meteorological data by Mr. Haidar Al-Rawi, May 18, 2018.

3. Auer, Jr., A.H. "Correlation of Land Use and Cover with Meteorological Anomalies." Journal of Applied Meteorology, 17:636-643, 1978.

4. Guideline for Determination of Good Engineering Practice Stack Height (Technical Support Document for Stack Height Regulations (Revised). EPA-450/4-80-023R, U.S. Environmental Protection Agency, June 1985.

5. *Sierra Club v. EPA*, No. 10-1413, 2013 WL 216018 (Jan. 22, 2013).

6. Ambient Monitor Guidelines for Prevention of Significant Deterioration, EPA-450/4-87-007, USEPA, May 1987.

7. Ambient Monitor Guidelines for Prevention of Significant Deterioration, EPA-450/4-87-007, USEPA, May 1987.

8. See footnote 1 to 40 CFR 51.166(i)(5)(i)(f) and USEPA's 1990 NSR Workshop Manual, page C.28., footnote b.

9. Guidance on the Development of Modeled Emission Rates for Precursors (MERPs) as a Tier 1 Demonstration Tool for Ozone and PM2.5 under the PSD Permitting Program, USEPA, December 2, 2016.

10. Guidance on the Use of EPA's MERPs to Account for Secondary Ozone and Fine Particulate Formation in Tennessee, Permit Modeling Unit, TDEC, April 10, 2018.

Appendix D
Federal Land Manager Consultation

From: Rick Bolton
To: andrea_stacy@nps.gov
Cc: susan_johnson@nps.gov; john_notar@nps.gov; bob_carson@nps.gov; jim_renfro@nps.gov; bjackson02@fs.fed.us; Haidar Alrawi (Haidar.Alrawi@tn.gov); David Keen; bob.winstead@baesystems.com; Shelton, William (US SSA) (william.shelton@baesystems.com); Jimmy Ogle (james.ogle@baesystems.com); amy.crawford@baesystems.com; John Shipp; Julie Verissimo
Subject: FEDERAL LAND MANAGER - NATIONAL PARK SERVICE NOTIFICATION OF PSD APPLICAITON FOR BAE-HOLSTON, TN PROJECT
Date: Friday, May 18, 2018 10:16:02 AM
Attachments: image001.png
Importance: High

Andrea,

I am working for BAE Systems who operates the Holston Army Ammunitions Plant (HSAAP) in Kingsport, Tennessee. HSAAP is the major supplier of explosive materials, primarily RDX- and HMX-based products, to the U.S. Department of Defense. The combined processes to produce RDX and HMX at HSAAP are currently at capacity to meet product demand for the U.S. Military and a significant increase in capacity is needed to meet the projected orders for the currently forecasted years. Consequently, HSAAP is undertaking a large portfolio of expansion projects known as the Expansion Program ("the Project").
The Project will result in the need for new process buildings. Two other unrelated process buildings are also scheduled to be added during the same construction period. Emissions from these new process buildings and support equipment will include nitrogen oxides ("NO_X"), carbon monoxide ("CO"), particulate matter ("PM"), volatile organic compounds ("VOC"), hazardous air pollutants ("HAP's"), and greenhouse gases ("GHG's"). The combined emissions from these new process buildings are expected to be above some PSD significant emission rates. Process types include combustion for steam, chemical manufacturing, milling, distillation, coating operations, chemical storage, etc. HSAAP spans over 6,000 acres and two counties (Hawkins and Sullivan). There are over [redacted] buildings and storage magazines on site. The approximate Universal Transverse Mercator (UTM) coordinates of HSAAP are 354,150 meters east and 4,044,500 meters north (UTM Zone 17, NAD 83). The facility is owned by the Department of Defense and is operated by BAE Systems (BAE). HSAAP is classified under the regulations governing PSD and Title V as a major source. Hawkins and Sullivan Counties are classified as attainment or unclassifiable for all regulated pollutants

While the emission calculations for the Project are not final, preliminary calculations indicate that the Project will result in increases in emissions of VOC (116 TPY) and GHG's (600,000 TPY), and possibly CO (73 TPY), that are in excess of PSD significant emission rates. The Army and BAE have developed this expansion project that includes retirement of the existing coal-fired boilers. This retirement of the existing coal-fired boilers will result in a reduction of 334 tons per year (TPY) of NOx, 152 TPY of CO, 58 TPY of PM_{10} & 58 TPY of $PM_{2.5}$, 7 TPY of VOCs and 1,732 TPY of SO_2.

The following table provides a summary of the Project accounting of emissions, including the retirement of the coal-fired boilers. The nearest Class I Area is 95 km. As you can see, Q/D will actually be negative.

Pollutant	Project Increase in Emissions (TPY)
PM	(3)
PM_{10}	(3)
$PM_{2.5}$	(3)
SO_2	(1,719)
NO_X	(35)
CO	73
VOC	116

We are targeting May 31, 2018, to submit the formal PSD application to TDEC/APC and we have had two pre-application meetings with TDEC/APC to discuss the project details in the recent weeks. The modeling protocol has been sent to Haidar Alrawi,TDEC/APC.
If you need further information please let me know.

Best Regards,

Rick Bolton, Sr., PM
(615) 483 9559 *cell*
(615) 255 9300 *main*
(615) 252 2835 *direct*
220 Athens Way, Suite 410
Nashville, TN 37228

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Appendix E
Confidential Business Information Request

DEPARTMENT OF ENVIRONMENT AND CONSERVATION
DIVISION OF AIR POLLUTION CONTROL

REQUEST FOR PROTECTION ORDER FOR CONFIDENTIAL INFORMATION

The Tennessee Air Quality Act, TCA 68-201-105(b)(2), grants the Department the authority to issue a protection order to prevent public dissemination of any secret formula, processes, or methods used in any manufacturing operation. The composition of air contaminants shall not be considered secret unless so declared by the Division of Air Pollution Control. Only information submitted on or as an attachment to this form will be considered for confidential treatment. Entire applications or similar documents will not be approved in total unless otherwise determined. Specific items of applications should be submitted as attachments for consideration. Information submitted on or attached to this form will be considered as confidential if approved. All disapproved information will be treated as confidential until 45 days from the date signed by the Director. If an appeal is received, information will be treated as confidential throughout the appeal period. For sources subject to the major source operating permit provisions at Division Rule 1200-3-9-.02(11), the confidential information provisions of subpart 1200-3-9-.02(11)(d)(iii) shall apply in reviewing the request for treatment of information as confidential.

1. Company Name BAE SYSTEMS Ordnance Systems Inc.

2. Company Address Holston Army Ammunition Plant
4509 West Stone Drive
Kingsport, Tennessee 37660

3. Brief Description of Material Requested for Coverage Under the Protection Order
The enclosed copy of the complete permit application that contains confidential information and all documents and files contained in the cd accompanying. A complete redacted copy of the application is provided for public viewing.

4. List Requested Confidential Information: (List form number, item number, and information. Items may be attached and identified by reference.)

Complete OSI HSAAP Expansion Project 31 MAY 2018 - PSD Application CONFIDENTIAL Version

5. Authorized Signature [signature]

Signer's Name (Type or Print) Robert E. Winstead

Title BAE Systems HSAAP Director EHSS Date 31 MAY 2018

(continued on reverse)

For Division Use Only:

This request for a Protection Order is:

☐ Approved ☐ Disapproved ☐ **Granted in part as detailed below**

____

____

____

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____

Should you wish to appeal this administrative decision, your appeal will be handled in accordance with the provisions of the Tennessee Air Quality Act at TCA 68-201-108(a) and the contested case hearing provisions of the Uniform Administrative Procedures Act compiled in title 4, chapter 5, part 3. Your petition for appeal must be received within 45 days of the date below and must be addressed to the Director, Tennessee Division of Air Pollution Control, 9th Floor, L & C Annex, 401 Church Street, Nashville, Tennessee 37243-1531.

____
Date

____
Director
Division of Air Pollution Control