

STATE OF MISSOURI

PERMIT BOOK



DEPARTMENT OF NATURAL RESOURCES

MISSOURI AIR CONSERVATION COMMISSION

PERMIT TO CONSTRUCT

Under the authority of RSMo 643 and the Federal Clean Air Act the applicant is authorized to construct the air contaminant source(s) described below, in accordance with the laws, rules and conditions as set forth herein.

Permit Number: 012012-001 Project Number: 2011-07-068

Parent Company: General Dynamics Ordnance and Tactical Systems

Parent Company Address: 11399 16<sup>th</sup> Court N, Suite 200, St. Petersburg, FL 33716

Installation Name: General Dynamics Ordnance and Tactical Systems  
Munition Services

Installation Address: 4174 County Road 180, Carthage, MO 64836

Location Information: Jasper County, S25, T28N, R32

Application for Authority to Construct was made for:  
The modification of a thermal treatment process for the treatment and disposal of rocket motor propellant. This review was conducted in accordance with Section (5), Missouri State Rule 10 CSR 10-6.060, *Construction Permits Required*.

- 
- Standard Conditions (on reverse) are applicable to this permit.
- Standard Conditions (on reverse) and Special Conditions are applicable to this permit.

JAN 4 2012

EFFECTIVE DATE

DIRECTOR OR DESIGNEE  
DEPARTMENT OF NATURAL RESOURCES

## STANDARD CONDITIONS:

Permission to construct may be revoked if you fail to begin construction or modification within two years from the effective date of this permit. Permittee should notify the Air Pollution Control Program if construction or modification is not started within two years after the effective date of this permit, or if construction or modification is suspended for one year or more.

**You will be in violation of 10 CSR 10-6.060 if you fail to adhere to the specifications and conditions listed in your application, this permit and the project review.** In the event that there is a discrepancy between the permit application and this permit, the conditions of this permit shall take precedence. Specifically, all air contaminant control devices shall be operated and maintained as specified in the application, associated plans and specifications.

You must notify the departments' Air Pollution Control Program of the anticipated date of start up of this (these) air contaminant source(s). The information must be made available not more than 60 days but at least 30 days in advance of this date. Also, you must notify the Department of Natural Resources Regional office responsible for the area within which you are located within 15 days after the actual start up of this (these) air contaminant source(s).

A copy of this permit and permit review shall be kept at the installation address and shall be made available to Department of Natural Resources' personnel upon request.

You may appeal this permit or any of the listed special conditions to the Administrative Hearing Commission (AHC), P.O. Box 1557, Jefferson City, MO 65102, as provided in RSMo 643.075.6 and 621.250.3. If you choose to appeal, you must file a petition with the AHC within 30 days after the date this decision was mailed or the date it was delivered, whichever date was earlier. If any such petition is sent by registered mail or certified mail, it will be deemed filed on the date it is mailed. If it is sent by any method other than registered mail or certified mail, it will be deemed filed on the date it is received by the AHC.

If you choose not to appeal, this certificate, the project review and your application and associated correspondence constitutes your permit to construct. The permit allows you to construct and operate your air contaminant source(s), but in no way relieves you of your obligation to comply with all applicable provisions of the Missouri Air Conservation Law, regulations of the Missouri Department of Natural Resources and other applicable federal, state and local laws and ordinances.

The Air Pollution Control Program invites your questions regarding this air pollution permit. Please contact the Construction Permit Unit at (573) 751-4817. If you prefer to write, please address your correspondence to the Missouri Department of Natural Resources, Air Pollution Control Program, P.O. Box 176, Jefferson City, MO 65102-0176, attention: Construction Permit Unit.

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**SPECIAL CONDITIONS:**

The permittee is authorized to construct and operate subject to the following special conditions:

*The special conditions listed in this permit were included based on the authority granted the Missouri Air Pollution Control Program by the Missouri Air Conservation Law (specifically 643.075) and by the Missouri Rules listed in Title 10, Division 10 of the Code of State Regulations (specifically 10 CSR 10-6.060). For specific details regarding conditions, see 10 CSR 10-6.060 paragraph (12)(A)10. "Conditions required by permitting authority."*

General Dynamics Ordnance and Tactical Systems  
 Jasper County, S25, T28N, R32

1. **Superseding Condition**  
 The conditions of this permit supersede all special conditions found in the following construction permits previously issued by the Air Pollution Control Program: 072009-004 and the amendment 072009-004A.
  
2. **Annual Emission Limitation**
  - A. General Dynamics Ordnance and Tactical Systems Munition Services (GD-OTS MS) shall emit less than ten (10.0) tons of hydrogen chloride (HCl) (CAS 7647-01-0) from the Propellant Thermal Treatment System (PTTS) in any consecutive twelve (12) month period.
  
  - B. Attachment A or equivalent forms, such as electronic forms, approved by the Air Pollution Control Program shall be used to demonstrate compliance with Special Condition 2.A.
  
3. **Hourly Emission Limitations**
  - A. GD-OTS MS shall not discharge hydrogen chloride into the atmosphere from the following stacks in excess of the listed amounts:

Table 1: Hydrogen chloride (HCl) emission rate limits

Emission Point	Description	Pollutant	Lbs/hr
EP-03	Incinerator Stack (Building 6)	HCl	1.305
EP-05	PTTS (Building 3)	HCl	2.640
EP-06	Static Kiln (Building 1)	HCl	0.052
EP-07	Thermal Treatment Unit 1 & 2 (Building 1)	HCl	0.190
EP-08	Thermal Treatment Unit 3 & 4 (Building 1)	HCl	0.190

- B. Compliance with the maximum hourly emission rate limitations shall be verified according to the initial performance testing requirements set forth in Special Condition 4.

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The permittee is authorized to construct and operate subject to the following special conditions:

- C. Continuous compliance with the emission rate limit for the PTTS (EP-05) shall be verified using a HCl continuous emission monitoring system (CEMS) according to Special Condition 5.
- 4. Initial Performance Testing
  - A. GD-OTS MS shall conduct initial performance testing to confirm the emission rates shown in Table 1 and to certify the accuracy of the HCl PTTS (EP-05) CEMS. These tests shall be done in accordance with the procedures outlined below. The results of the June 2011 Comprehensive Performance Test (Building 6) can be used to confirm the emission rates for EP-03.
  - B. GD-OTS MS shall conduct initial performance testing to confirm the emission rate of particulate matter (condensable and filterable) shown in Table 2.

Table 2: Particulate Matter (PM) Emissions

Emission Point	Description	Pollutant	Lbs/hr
EP-05	PTTS (Building 3)	PM	0.30

- C. A completed Proposed Test Plan must be submitted to the Air Pollution Control Program at least 30 days prior to the proposed test date of any such performance tests so that a pretest meeting may be arranged, if necessary, and to assure that the test date is acceptable for an observer to be present. The Proposed Test Plan must include specification of test methods to be used and be approved by the director prior to conducting the required emissions testing.
- D. Within 180 days of permit issuance, GD-OTS MS shall have conducted the required performance tests.
- E. Performance tests shall be conducted under representative conditions. Operations during periods of startup, shutdown, and malfunction shall not constitute representative conditions for the purpose of a performance test.
- F. Each performance test shall consist of three separate runs using the applicable test method. For the purpose of determining compliance with an emission rate limit, the arithmetic mean of the results of the three runs shall apply.

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The permittee is authorized to construct and operate subject to the following special conditions:

- G. Two copies of a written report of the performance test results must be submitted to the staff director within 90 days of completion of the performance testing. The report must include legible copies of the raw data sheets, analytical instrument laboratory data, and complete sample calculations from the required Environmental Protection Agency Method for at least one sample run for each air pollutant tested.
  - H. No later than 30 days after the performance test results are submitted, GD-OTS MS shall provide the staff director with a report characterizing the emissions of each air pollutant tested according to Special Condition 4.A and 4.B. This report shall include the emission rates in pounds per hour and pounds per ton (rocket motors) in order that the Air Pollution Control Program may verify the potential emissions from this project.
  - I. In the event that the measured emission rates of HCl exceed the emission rates used in the air quality analysis (Table 1), then within 90 days of completion of the performance testing, GD-OTS MS shall submit to the Air Pollution Control Program an application for an amendment to this construction permit with a revised potential emissions calculations and a revised ambient impact air quality analysis.
  - J. In the event that the measured emission rates of particulate matter exceed the emission rates used in the potential emissions calculations (Table 2), then within 90 days of completion of the performance testing GD-OTS MS shall submit to the Air Pollution Control Program an application for an amendment to this construction permit with the revised potential emissions calculations.
  - K. The above time frames associated with this performance testing condition may be extended upon written request of GD-OTS MS and approval by the staff director.
5. Continuous Emission Monitoring System (CEMS)
- A. GD-OTS MS shall install, certify, operate, calibrate, test and maintain a CEMS to continuously monitor and record the HCl concentration in the PTTS exhaust stack (EP-05).
  - B. The CEMS shall be certified by the Air Pollution Control Program director after review and acceptance of a demonstration of conformance with Performance Specification Z, also referred to as Other Test Method (OTM) 23, "Procedure DD: Quality Control and Quality Assurance Requirements

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### SPECIAL CONDITIONS:

The permittee is authorized to construct and operate subject to the following special conditions:

for Hydrochloric Acid Continuous Emissions Monitoring Systems at Stationary Sources". GD-OTS MS's Quality Control and Quality Assurance (QA/QC) plan shall also adhere to the quality assurance procedures outlined in 40 CFR Part 60, Appendix F, Procedure 1, "Quality Assurance Requirements for Gas Continuous Emission Monitoring Systems Used for Compliance Determinations". GD-OTS MS shall submit its QA/QC plan for review and approval to the Air Pollution Control Program Compliance/Enforcement Section within 120 days of permit issuance.

- C. GD-OTS MS shall install, certify, operate, calibrate, test and maintain a continuous monitoring system to monitor and record the PTTS exhaust stack (EP-05) flowrate (corrected to standard dry conditions).
  - D. GD-OTS MS shall use the CEMS data and the exhaust flowrate to calculate the average pounds HCl emitted per minute.
  - E. GD-OTS MS shall verify compliance with the annual emission limit specified in Special Condition 2.A by calculating the sum of all emissions measured according to Special Condition 5.D.
  - F. GD-OTS MS shall verify continuous compliance with the PTTS (EP-05) emission rate limit specified in Special Condition 3.A. by calculating a 60-minute rolling average of the emissions measured according to Special Condition 5.D.
  - G. GD-OTS MS shall keep documentation sufficient to support all emission calculations required by Special Condition 5 for not less than five years.
6. Propellant Thermal Treatment Operating and Maintenance Requirements
- A. GD-OTS MS shall control the feed rate to the Propellant Thermal Treatment Chambers (PTTCs) (EU1 and EU2) to a maximum of 1.01 tons (gross rocket motor weight) per hour.
  - B. GD-OTS MS shall restrict the type of feed material to the PTTCs (EU1 and EU2) to M26 Multiple Launch Rocket System rocket motor segments as specified in the permit application.
  - C. GD-OTS MS shall record the total amount of rocket motor segments combusted in each PTTC (EU1 and EU2) in units of gross motor weight at least once every day.

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## SPECIAL CONDITIONS:

The permittee is authorized to construct and operate subject to the following special conditions:

- D. GD-OTS MS shall develop an operation and maintenance plan that describes procedures for operation, inspection, maintenance, and corrective measures for all components of the PTTS, including the PTTCs and the associated pollution control equipment. The plan shall be documented and available for review by any Missouri Department of Natural Resources' personnel upon request.
  - E. GD-OTS MS shall maintain an operating and maintenance log for the PTTS which shall include the following:
    - 1) Incidents of malfunction, with impact on emissions, time, date and duration of event, probable cause, and corrective actions; and
    - 2) Maintenance activities, with inspection schedule, repair actions, and replacements, etc.
7. Capture Device Requirements
- A. GD-OTS MS shall design, construct, and operate each PTTC (EU1 and EU2) to function as a total enclosure such that all emissions associated with the combustion of the rocket motor propellant are captured and exhausted to the air pollution control system (CD-1, CD-2, CD-3).
  - B. GD-OTS MS shall maintain a negative static pressure within the PTTC to ensure compliance with Special Condition 7.A.
  - C. GD-OTS MS shall continuously monitor and record the static pressure inside the ash discharge conveyor to demonstrate compliance with special condition 7.B.
  - D. At least one time per calendar year (no less than 9 calendar months and no more than 15 calendar months following the previous calibration), GD-OTS MS shall calibrate the static pressure gage required by Special Condition 7.C. and verify the actual face velocity at each natural draft opening exceeds 200 feet per minute at all times during the combustion cycle.
  - E. GD-OTS MS shall maintain an operating and maintenance log associated with the ventilation of the PTTCs which shall include the following:
    - 1) Incidents of malfunction, with impact on emissions, time, date and duration of event, probable cause, and corrective actions; and
    - 2) Maintenance activities, with inspection schedule, repair actions, and replacements, etc.

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### SPECIAL CONDITIONS:

The permittee is authorized to construct and operate subject to the following special conditions:

- F. For each set of ten incidents of malfunction, including emergency safety releases, resulting in fugitive emissions of propellant combustion emissions during a 90-day consecutive period, GD-OTS MS shall submit to the Air Pollution Control Program's Compliance/Enforcement Section a written report within 30 calendar days of the 10th exceedance documenting the incidents, the results of the investigations, and the corrective measures taken.
8. Dry Scrubber (CD-1) Requirements
- A. GD-OTS MS shall control HCl emissions from the PTTS using a dry scrubber as specified in the permit application.
  - B. GD-OTS MS shall develop and implement a control device monitoring plan to verify the proper operation of the dry scrubber. The plan shall be documented and available for review by any Missouri Department of Natural Resources' personnel upon request. At a minimum, the plan shall include the following:
    - 1) A minimum sorbent feed rate on a 60-minute rolling average; and
    - 2) A sorbent blower operating signal; and
    - 3) The sorbent specifications, including the brand (i.e. manufacturer) and type of sorbent used during the initial performance test. The sorbent may be substituted at any time after the initial performance test with a different brand or type of sorbent, provided that the replacement has equivalent or improved properties. The substitution shall be documented in the control device monitoring plan for the dry scrubber and also in the operating and maintenance logs for the PTTCs and the air pollution control system (CD-1, CD-2, CD-3).
  - C. GD-OTS MS shall record the monitoring parameters as specified in the plan developed according to Special Condition 8.B. at least once every hour. The monitored parameters shall be maintained within design conditions specified in the plan.
  - D. GD-OTS MS shall maintain an operating and maintenance log for the dry scrubber and auxiliary equipment which shall include the following:
    - 1) Incidents of malfunction, with impact on emissions, time, date and duration of event, probable cause, and corrective actions; and
    - 2) Maintenance activities, with inspection schedule, repair actions, and replacements, etc.

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## SPECIAL CONDITIONS:

The permittee is authorized to construct and operate subject to the following special conditions:

### 9. Baghouse (CD-2) Requirements

- A. GD-OTS MS shall control emissions from the PTTS using baghouses as specified in the permit application. The baghouses shall be operated and maintained in accordance with the manufacturer's specifications. Each baghouse shall be equipped with a gauge or meter, which indicates the pressure drop across the control device. These gauges or meters shall be located such that the Department of Natural Resources' employees may easily observe them. Replacement filters for the baghouses shall be kept on hand at all times.
- B. GD-OTS MS shall monitor and record the operating pressure drop across the baghouses at least once every 24 hours. The operating pressure drop shall be maintained within the design conditions specified by the manufacturer's performance warranty.
- C. GD-OTS MS shall install and monitor a broken bag detector for each baghouse that indicates when a baghouse has exceeded an emission rate of one (1.0) milligram per actual cubic meter of particulate matter.
- D. The operating and maintenance plan required by Special Condition 6.D. shall include a corrective measures plan that specifies the procedures GD-OTS MS will follow in the case of a bag leak detection system alarm or malfunction. The corrective measures plan must include, at a minimum, the procedures used to determine and record the time and cause of the alarm or bag leak detection system malfunction as well as the corrective measures taken to correct the control device or bag leak detection system malfunction.
- E. GD-OTS MS shall maintain an operating and maintenance log for the baghouses which shall include the following:
  - 1) Incidents of malfunction, including bag leak detection system alarms, with impact on emissions, time, date and duration of event, probable cause, and corrective actions; and
  - 2) The percent of the operating time during each 6-month period that the PTTS operates during malfunction events, including bag leak detection system alarms,
  - 3) Maintenance activities, with inspection schedule, repair actions, and replacements, etc.
- F. If the duration of malfunction events exceed five percent of the total operating time recorded within a 6-month block period, GD-OTS MS shall

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### SPECIAL CONDITIONS:

The permittee is authorized to construct and operate subject to the following special conditions:

submit to the Air Pollution Control Program's Compliance/Enforcement Section a written report within 30 calendar days at the end of the 6-month period that describes the causes of the baghouse malfunctions and the corrective actions taken to minimize these events.

10. Wet Scrubber (CD-3) Requirements
  - A. GD-OTS MS shall control HCl emissions from the PTTs using a packed bed wet scrubber as specified in the permit application.
  - B. GD-OTS MS shall develop and implement a control device monitoring plan to verify proper operation of the wet scrubber. The plan shall be documented and available for review by any Missouri Department of Natural Resources' personnel upon request. At a minimum, the plan shall include the following:
    - 1) A minimum pressure drop across the wet scrubber on a 60-minute rolling average; and
    - 2) A minimum pH on a 60-minute rolling average; and
    - 3) A minimum scrubber water flowrate on a 60-minute rolling average; and
    - 4) A maximum flue gas flowrate on a 60-minute rolling average.
  - C. GD-OTS MS shall record the monitoring parameters as specified in the plan developed according to Special Condition 10.B. at least once every hour. The monitored parameters shall be maintained within design conditions specified in the plan.
  - D. GD-OTS MS shall maintain an operating and maintenance log for the wet scrubber which shall include the following:
    - 1) Incidents of malfunction, with impact on emissions, time, date and duration of event, probable cause, and corrective actions; and
    - 2) Maintenance activities, with inspection schedule, repair actions, and replacements, etc.
11. Requirements for Future Alterations

GD-OTS MS shall notify the Air Pollution Control Program before initial startup of any modifications to the facility design that could impact the release parameters or emission rates as specified in the Memorandum from the Modeling Unit entitled "Ambient Air Quality Impact Analysis (AAQIA) for General Dynamics Ordnance and Tactical Systems (General dynamics)" (November 15, 2011). In the event that the Program determines that the changes are significant, GD-OTS MS shall submit an updated Ambient Air Quality Impact Analysis (AAQIA) to the

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**SPECIAL CONDITIONS:**

The permittee is authorized to construct and operate subject to the following special conditions:

Program that continues to demonstrate compliance with the Risk Assessment Levels for Hazardous Air Pollutants.

REVIEW OF APPLICATION FOR AUTHORITY TO CONSTRUCT AND OPERATE  
SECTION (5) REVIEW

Project Number: 2011-07-068  
Installation ID Number: 097-0138  
Permit Number:

General Dynamics Ordnance and  
Tactical Systems Munition Services  
4147 County Road 180  
Carthage, MO 64836

Complete: August 15, 2011

Parent Company:  
General Dynamics Ordnance and Tactical Systems  
P.O. Box 1386  
Joplin, MO 64802

Jasper County, S25, T28N, R32

REVIEW SUMMARY

- General Dynamics Ordnance and Tactical Systems Munition Services (GD-OTS MS) has applied for authority to modify the propellant thermal treatment system (PTTS) originally permitted under Project Number 2008-09-026, Permit Number 072009-004.
- Hazardous Air Pollutant (HAP) emissions are expected from the proposed modification. HAPs of concern from this process are hydrogen chloride (HCl) (CAS 7647-01-0) and polychlorinated dibenzo-p-dioxins and polychlorinated dibenzofurans (D/Fs) which are produced from the combustion of the ammonium perchlorate-based rocket motor propellant.
- None of the New Source Performance Standards (NSPS) apply to the proposed equipment.
- The Maximum Achievable Control Technology (MACT) standard, 40 CFR Part 63, Subpart EEE, *National Emission Standards for Hazardous Air Pollutants from Hazardous Waste Combustors* does not apply to the proposed equipment because the propellant thermal treatment chambers (PTTCs) do not meet the 40 CFR 260.10 definition of an incinerator as referenced in the MACT.
- None of the National Emission Standards for Hazardous Air Pollutants (NESHAPs) set forth in 40 CFR 61 apply to the proposed equipment.
- A dry scrubber (CD-1), baghouses (CD-2), and a wet scrubber (CD-3) are being used to control the particulate and HCl emissions from the PTTCs.

- This review was conducted in accordance with Section (5) of Missouri State Rule 10 CSR 10-6.060, *Construction Permits Required*. Potential emissions of HCl are conditioned to below de minimis levels.
- This installation is located in Jasper County, an attainment area for all criteria air pollutants.
- This installation is not on the List of Named Installations [10 CSR 10-6.020(3)(B), Table 2].
- Ambient air quality modeling was performed to determine the ambient impact of HCl and D/Fs. Potential emissions of HCl and D/Fs are below the Screening Model Action Levels (SMALs). However, GD-OTS MS agreed to a voluntary request to ensure compliance with the Air Pollution Control Program's Risk Assessment Levels (RALs) for HCl and D/Fs.
- Emissions testing is required to verify the maximum emission rates used in the ambient impact analysis.
- An amendment to your Part 70 Operating Permit is required for this installation within one year of permit issuance.
- Approval of this permit is recommended with special conditions.

#### INSTALLATION DESCRIPTION

General Dynamics Ordnance and Tactical Systems Munition Services (GD-OTS MS), formerly known as EBV Explosives Environmental Company, is a reactive hazardous waste processing facility located in Jasper County, Missouri near the city of Carthage. The facility accepts hazardous waste from the following groups: government agencies, such as the Department of Defense, the explosives manufacturing industry, users of explosive devices and materials, and various other manufacturing industries. The hazardous wastes processed include explosive/reactive materials, explosive and energetic devices, propellants, nitroglycerin containing pharmaceuticals, ammunition and materials contaminated with explosive/reactive waste.

GD-OTS MS operates one hazardous waste incinerator (EP-03) which is subject to the Hazardous Waste Combustor MACT, 40 CFR 63, Subpart EEE. As a requirement of this regulation, the facility obtained a Part 70 Operating Permit from the Air Pollution Control Program in 2002. The facility also holds a Hazardous Waste Facility Permit, known as a Resource Conservation and Recovery Act (RCRA) permit, from the Missouri Department of Natural Resources. The following table summarizes the construction permits that have been issued to GD-OTS MS from the Air Pollution Control Program.

Table 3: Summary of Construction Permits

Permit Number	Description
0990-002	The installation of two (2) hazardous waste incinerators.
0894-007	The installation of a diesel fired emergency generator.
0990-002B	The elimination of the direct liquid feed system for the incinerator.
072009-004	The installation of a thermal treatment system for the treatment and disposal of MLRS rocket motors (ammonium perchlorate – based propellant).
072009-004A	An amendment to correct the as-built maximum design rate of the propellant thermal treatment chambers.

MLRS=Multiple Launch Rocket System

## PROJECT DESCRIPTION

GD-OTS MS obtained Permit Number 072009-004 for the construction of the PTTS. The PTTS consists of two thermal treatment units designed for the treatment and disposal of the propellant used in the rocket motors for MLRS missiles. GD-OTS MS began operation of the PTTS in October of 2009. In February 2011, GD-OTS MS self-reported potential violations of their Air Pollution Control permit to the Missouri Department of Natural Resources and the Environmental Protection Agency. Since that time, GD-OTS MS has been working with the Air Pollution Control Program, the Hazardous Waste Program, and the Environmental Protection Agency to come into compliance with all environmental regulations.

The PTTS is now considered an existing major source of HAP because it has emitted major source levels of HCl. Although a major source that is not subject to a standard under 40 CFR Part 63 would ordinarily be required to undergo a case-by-case MACT analysis, the Air Pollution Control Program is allowing GD-OTS MS to avoid case-by-case MACT review because the PTTS will no longer be a major source once the changes required by this construction permit are implemented. In lieu of case-by-case MACT review, GD-OTS MS was asked to demonstrate through a risk-based modeling analysis that potential emissions of HCl and D/Fs would not pose a risk to public health. For this reason, this permit review includes an ambient impact analysis for HCl and D/Fs even though the potential emissions are less than the SMALs.

According to GD-OTS MS, the operation of the PTTS as permitted under Permit Number 072009-004 had unforeseen problems, resulting in higher than expected emissions of HCl, fugitive emissions from the combustion chambers, and inadequate particulate matter control. The following summarizes the problems with the design and construction of the PTTS.

1. The particulate removal cyclones did not function as intended. The cyclones caused a significant pressure drop within the air pollution control system (APCS) and did not efficiently control particulate matter from the exhaust. For this reason the cyclones were removed resulting in additional particulate being introduced to the baghouses.
2. The original APCS design included a thermal oxidizer. However, the use of a thermal oxidizer in the PTTS would make the facility subject to 40 CFR 63 Subpart EEE. In order to avoid this requirement but retain the thermal oxidizer

for potential future use, the previous owners (EBV Explosives Environmental Company) elected to reconfigure the thermal oxidizer as a thermal expansion chamber. As the thermal oxidizer would have helped reduce particulate emissions, not using the unit as initially designed also resulted in additional particulate passing through to the baghouses.

3. The HCl control strategy was originally designed to inject a soda ash and water slurry into a spray dryer. However, the introduction of water into the soda ash feed system resulted in frequent clogging. For this reason, the use of the water was discontinued and the soda ash was dry injected into the spray dryer. This change resulted in a substantial reduction in HCl control.
4. The design of the emissions capture system for the PTTCs utilized two 75 horsepower induced draft (ID) fans located between the baghouses and the stack. This design was expected to achieve continuous negative pressure in combustion chamber. However, the pressure produced during the combustion process was greater than expected resulting in fugitive emissions from the combustion chambers. For this reason, the two 75 horsepower fans were replaced with two 150 horsepower fans. While this change succeeded in reducing fugitive emissions, the use of the larger fans also resulted in an increase in exhaust flow, further hindering particulate and HCl control.

As a result of these operational difficulties, GD-OTS MS has been performing process optimization studies. One of these studies involved the evaluation of alternative sorbents in the dry scrubber to improve the HCl control efficiency. This study resulted in a change in sorbent from soda ash to sodium bicarbonate. Another study evaluated the capability of a wet scrubber to further control HCl emissions. During this study 10% of the exhaust gasses were routed to a pilot wet scrubber. A summary of the stack tests results from the pilot wet scrubber evaluation are included in Table 4 below.

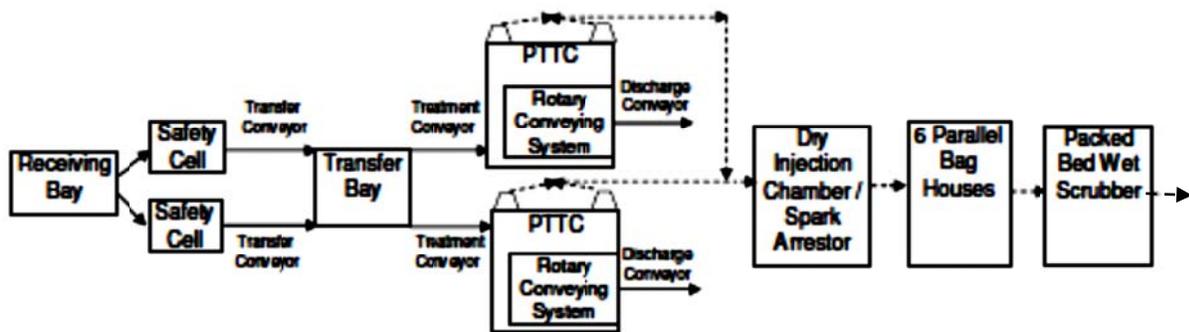
Table 4: Pilot Wet Scrubber Emissions Summary

Pollutant	Emission Factor without Wet Scrubber (lb per ton)	Emission Factor with Wet Scrubber (lb per ton)	Potential Emissions without Wet Scrubber (tons per year)	Potential Emissions with Wet Scrubber (tons per year)
PM	0.30	0.16	1.33	0.71
HCl	22.53	7.77E-02	99.63	0.34
D/Fs	7.98E-08	4.18E-09	3.53E-07	1.85E-08
Arsenic Compounds	1.07E-03	1.35E-06	4.72E-03	5.98E-06
Beryllium compounds	5.33E-06	3.38E-07	2.36E-05	1.50E-06
Cadmium Compounds	6.65E-05	8.30E-06	2.94E-04	3.67E-05
Chromium Compounds	7.66E-06	2.28E-05	3.39E-05	1.01E-04
Lead Compounds	1.07E-05	3.25E-05	4.72E-05	1.44E-04

Based on the process optimization studies, GD-OTS MS is proposing the following modifications to the PTTS in order to reduce its emissions to de minimis levels.

- Eliminate fugitive combustion emissions by increasing the burn chamber volume and increasing exhaust flow.
- Increase exhaust flow by increasing the nominal duct diameter, the ID fan motor, and the stack (EP-05) diameter.
- Implement water injection for exhaust temperature control.
- Apply sorbent injection upstream of the current location to increase the sorbent and HCl reaction time.
- Eliminate the unutilized thermal expansion chamber.
- Redesign ductwork headers to and from the baghouses to support increased flow rate and ensure uniform bag house loading.
- Add an additional baghouse in parallel to the existing five bag houses.
- Add a wet scrubber downstream of the baghouses.

The following diagram shows the process flow of the PTTTS following all proposed modifications.



\*Note: Only one PTTC is operated at a time.

## EMISSIONS/CONTROLS EVALUATION

The pollutants of concern for this project are particulate matter and the hazardous air pollutants, HCl and D/Fs. The emission rates for HCl and D/Fs were provided by the applicant for the ambient impact analysis. All other emission rates were developed based on the pilot wet scrubber testing. Potential emissions of the application represent the potential of the equipment after all modifications are complete and assuming continuous operation (8,760 hours per year). The following table provides an emissions summary for this project.

Table 5: Emissions Summary (tons per year)

Pollutant	Regulatory De Minimis Levels <sup>1</sup>	Existing Potential Emissions	Existing Actual Emissions (2010 EIQ)	Potential Emissions of the Application	Project Conditioned Potential
PM	25.0	N/D	N/D	1.33	N/A
PM <sub>10</sub>	15.0	N/D	1.24	1.33	N/A
PM <sub>2.5</sub>	10.0	N/D	N/D	1.33	N/A
SO <sub>x</sub>	40.0	N/D	0.23	N/D	N/A
NO <sub>x</sub>	40.0	N/D	25.22	20.21	N/A
VOC	40.0	N/D	0.23	N/D	N/A
CO	100.0	N/D	8.12	54.6	N/A
HCl	10.0	N/D	315.72	11.56	<10.0
D/Fs	6.0E-7	N/D	N/D	1.85E-08	N/A
Arsenic Compounds	0.005	N/D	N/D	5.98E-06	N/A
Beryllium compounds	0.008	N/D	N/D	1.50E-06	N/A
Cadmium Compounds	0.01	N/D	N/D	3.67E-05	N/A
Chromium Compounds	0.002	N/D	N/D	1.01E-04	N/A
Lead Compounds	0.01	N/D	0.00	1.44E-04	N/A

N/A = Not Applicable; N/D = Not Determined

<sup>1</sup>The value for hazardous air pollutants represents the SMAL

### AMBIENT AIR QUALITY IMPACT ANALYSIS

Ambient air quality modeling was performed to determine the ambient impact of HCl and D/Fs. The results show compliance with the one-hour, 24-hour and the annual RAL for HCl. A special condition of this permit requires initial performance testing to verify the emission rates used in the modeling analysis.

Table 6: Ambient Impact Analysis for HCl

Pollutant	Modeled Impact (µg/m <sup>3</sup> )	RAL (µg/m <sup>3</sup> ) <sup>[1]</sup>	Time Period
HCl	290.30	2100	1-hour
HCl	40.91	180	24-hour
HCl	4.99	20	Annual

<sup>1</sup>The RAL is a health-based level developed by the Air Pollution Control Program and approved by the Department of Health and Senior Services. Units are in micrograms per cubic meter.

The results also show that the potential emissions of D/Fs have a maximum ambient impact six orders of magnitude less than the RAL. The ambient impact of D/Fs is expected to be extremely low despite the close proximity of the PTTS to the property boundary because the potential emissions of D/Fs are very small. Since GD-OTS MS has already verified the low D/F emission rate during the pilot wet scrubber experiments and the maximum ambient impact is so far below the RAL, no additional performance testing for D/Fs is required for this permit.

Table 7: Ambient Impact Analysis for D/Fs

Pollutant	Modeled Impact ( $\mu\text{g}/\text{m}^3$ )	RAL ( $\mu\text{g}/\text{m}^3$ )	Time Period
D/Fs	1.76E-8	0.03	Annual

Units are in micrograms per cubic meter.

For a detailed discussion of the modeling analysis, please refer to the memo titled “Ambient Air Quality Impact Analysis (AAQIA) for General Dynamics Ordnance and Tactical Systems (General dynamics)” (November 15, 2011).

#### PERMIT RULE APPLICABILITY

This review was conducted in accordance with Section (5) of Missouri State Rule 10 CSR 10-6.060, *Construction Permits Required*. Potential emissions of HCl are conditioned to de minimis levels.

#### APPLICABLE REQUIREMENTS

GD-OTS MS shall comply with the following applicable requirements. The Missouri Air Conservation Laws and Regulations should be consulted for specific record keeping, monitoring, and reporting requirements. Compliance with these emission standards, based on information submitted in the application, has been verified at the time this application was approved. For a complete list of applicable requirements for your installation, please consult your operating permit.

#### GENERAL REQUIREMENTS

- *Submission of Emission Data, Emission Fees and Process Information*, 10 CSR 10-6.110
- *Operating Permits*, 10 CSR 10-6.065
- *Restriction of Particulate Matter to the Ambient Air Beyond the Premises of Origin*, 10 CSR 10-6.170
- *Restriction of Emission of Visible Air Contaminants*, 10 CSR 10-6.220
- *Restriction of Emission of Odors*, 10 CSR 10-3.090

## STAFF RECOMMENDATION

On the basis of this review conducted in accordance with Section (5), Missouri State Rule 10 CSR 10-6.060, *Construction Permits Required*, I recommend this permit be granted with special conditions.

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Kathi Jantz  
Environmental Engineer

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Date

### PERMIT DOCUMENTS

The following documents are incorporated by reference into this permit:

- The Application for Authority to Construct form, dated September 9, 2009, received September 12, 2009, designating E-One Holdings, Inc. as the owner and operator of the installation.
- The Application for Authority to Construct form, dated July 15, 2011, received July 25, 2011, designating General Dynamics Ordnance and Tactical Systems, Inc. as the owner and operator of the installation.
- U.S. EPA document AP-42, *Compilation of Air Pollutant Emission Factors*, Fifth Edition.
- Test report entitled, "Alternative Dry Injection Sorbent, Additional Bag Houses, MLRS Rocket Motor Thermal Treatment Facility, Building 3, Joplin, MO" (July 8, 2011)
- Test report entitled, "Pilot Wet Scrubber, MLRS Rocket Motor Thermal Treatment Facility, Building 3, Joplin, MO" (July 25, 2011)



Mr. David Zoghby  
Senior Director of Marketing  
& Commercial Contracts  
P.O. Box 1386  
Joplin, MO 64802

RE: New Source Review Permit - Project Number: 2011-07-068

Dear Mr. Zoghby:

Enclosed with this letter is your permit to construct. Please study it carefully. Also, note the special conditions, if any, on the accompanying pages. The document entitled, "Review of Application for Authority to Construct," is part of the permit and should be kept with this permit in your files.

Operation in accordance with these conditions, your new source review permit application and with your amended operating permit is necessary for continued compliance. The reverse side of your permit certificate has important information concerning standard permit conditions and your rights and obligations under the laws and regulations of the State of Missouri.

If you have any questions regarding this permit, please do not hesitate to contact Kathi Jantz, at the Departments' Air Pollution Control Program, P.O. Box 176, Jefferson City, MO 65102, or by telephone at (573) 751-4817. Thank you for your attention to this matter.

Sincerely,

AIR POLLUTION CONTROL PROGRAM

Susie Heckenkamp  
New Source Review Unit Chief

SH:kjk

Enclosures

c: Southwest Regional Office  
PAMS File: 2011-07-068

Permit Number: