Subpart X Permit Renewal for Open Burning Case Study

Radford Army Ammunition Plant

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Facility Background

- Facility has operated since 1941 is located in Pulaski and Montgomery Counties in Virginia.
- The Radford facility produces single, double, and triple base powders; rocket propellants; as well as medium caliber cartridges, larger mortar and artillery charges.
- The Open Burning Grounds (OBG) are located on the back of the New River which bisects the facility.
- Facility also runs two rotary kiln incinerators to treat explosive wastes.

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Subpart X Permit Renewal

- Initial permit was issued in 2005

- DEQ initiated a pre-application meeting in 2014 to emphasize required application submittal content:
  - Revised human health and ecological risk assessment reports
  - Alternative treatment technology analysis report

    - When DEQ received pushback on requiring these elements the omnibus provision in RCRA was invoked.

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Identified Issues

- Previous risk assessment based off of bang-box emissions data.
- Risk assessment needed to account for population growth in the area to accurately assesses impacts.
- Air dispersion modeling needed to be updated for current meteorological conditions.
- No alternative treatment technology analysis required for initial permit.

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RAAP Renewal Permit Processing Timeline

ACTION	DATE
Renewal Application Received	June 15, 2015
Administrative Completeness Determination Made	Oct. 26, 2015
First Technical NOD	Feb. 5, 2016
Air Modeling Sensitivity Analysis Report Approved	May 8, 2018
MPRA Protocol Third NOD Response and Air Modeling Alternate Receptor Memo Approved	Feb. 20, 2019

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Renewal Permit Processing Timeline (cont.)

ACTION	DATE
Revised Ecological Risk Assessment Protocol Approved	May 14, 2019
HHRA Report Third NOD Response Approved	July 24, 2020
Draft Final HHRA Report Received	Aug. 20, 2020
DEQ Finalizes Eco Risk Assessment Report	Sept. 14, 2020
HHRA Approved and Deemed Complete	Oct. 5, 2020
Draft Permit to EPA Region III for Review	Oct. 21, 2020
Draft Permit Public 60-Day Comment Date Starts	March 24, 2021
Draft Permit Public Informational Briefing	April 21, 2021
Draft Permit Public Hearing	April 28, 2021
Draft Permit Public Comment Period Ends	May 24, 2021

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Drone Emissions Sampling of OBG Operations

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Drone Sampling

- EPA's Office of Research and Development had piloted an emissions sampling program for landfill emissions using balloons.
- DEQ encouraged all Subpart X permitted facilities to coordinate a study for air emissions from the open burning or open detonation operations to supplement air emission factors used in the risk assessments.
- Radford agreed to pursue the emissions sampling during the renewal process and it was completed in 2016.
- Drone sampling results were incorporated into the risk assessment via development of site-specific emission factors.

Risk Assessments

- Performed to ensure conditions of the permit are protective of human health and the environment
- Evaluates worst case scenarios of air emissions from open burning activities
- Evaluates both potential long-term (chronic) and short-term (acute) impacts across multiple exposure scenarios
- An ecological risk assessment evaluated population level impacts to representative species in surrounding habitats

New Limits in the Draft Permit Informed by Risk Assessment

- Propellant burns called “Dry” Burns - 5,600 pounds/day for up to 183 days/year
  - Previous 8,000 pounds/day for up to 365 days/year allowed
- New limit equals 1,024,800 pounds/year of propellant wastes
- Skid burns called “Wet” Burns - 2,000 pounds/day for up to 365 days/year.
  - No change from previous amount allowed.
- New limit equals 730,000 pounds/year of skid wastes
- **The reductions in propellant burns equal a 51% reduction in total annual throughput from the current permit.**

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Alternative Treatment Technology Analysis

Table 10. Weighted Decision Matrix - Which Waste Propellant Treatment Option is Best for Treating Propellant Containing Foreign-Object-Matter (FOD)?

Decision Factors		Status Quo (OBG)	HTO/SCWO	Donovan	APE 1236	SDC	DAVINCH	EDS	Actodemil®	Decineration™ Rotary Furnace System
Criteria	Wt.	1	2	3	4	5	6	7	8	9
Safety hazards	3.0	0	-3	-3	-3	-3	-3	-3	-1	-3
Waste stream variability	2.0	0	-3	-2	-2	-3	-3	-3	-2	-3
Environmental releases	2.0	0	3	2	2	2	2	2	-2	2
Engineering controls	1.0	0	-3	3	3	3	-1	-1	1	1
Layout possibilities	1.0	0	2	1	2	2	2	2	2	2
Support	1.0	0	-2	0	2	2	2	2	1	2
Weighted Scores		0.0	-12.0	-5.0	-2.0	-4.0	-8.0	-8.0	-7.0	-6.0

Which waste propellant treatment option would be the best method for treating FOD-containing propellants?

The open burning (OB) of waste propellants has been practiced for many years in the in the United States; federal requirements for miscellaneous units are in 40 CFR 264.600-603 (Subpart X) and adopted by reference in 9VAC20-60-264 with other applicable requirements in 9VAC20-60-10 through 1505. In OB operations, explosives or munitions are destroyed by self-sustained combustion, which is ignited by an external source, such as flame, heat, or a detonatable wave.

▶ **Winner: Status Quo**

Criteria	Definition
Safety hazards	Treatment of energetics and associated pre-treatment, treatment, and post-treatment
Waste stream variability	How much flexibility and support is provided by each technology
Environmental releases	Intermittent/quasi-instantaneous releases that are challenges to monitor and model
Engineering controls	Ease of managing treatment technology and maintaining equipment
Layout possibilities	How much flexibility of site layout is possible without violating Department of Transportation (DOT) and MIL-STD 286 arc tables
Support	How good is the support community at answering tough questions about using the alternative treatment technology, is the theme upgraded regularly to keep up with changes to OB technology

Note on calculation

The formula for weighted scores uses a Sumproduct formula and has conditional formatting applied. Please check that the formula and conditional formatting includes the correct cell ranges if you add or remove any rows or columns.

Instructions: Select and insert a score of **-3 to +3** for each criteria. The score will be multiplied by the weight to arrive at the total weighted score.
Keep the first column for **status quo** (i.e. no change) and score the options against the status quo.

Key:

1 Status Quo (OBG)-Open Burning Ground
2 HTO/SCWO-Hydrothermal Oxidation (HTO) or Supercritical Water Oxidation (SCWO) with Pretreatment
3 Donovan-Controlled Detonation Chamber (referred to as Donovan Chamber)
4 APE 1236-Deactivation Furnace APE1236 System
5 SDC-Static Detonation Chamber (SDC)
6 DAVINCH-Detonation of Ammunition in a Vacuum-Integrated Chamber (DAVINCH)
7 EDS-Explosive Destruction System (EDS)
8 Actodemil ®-ARCTECH's Actodemil ® Treatment Technology
9 Decineration™ Rotary Furnace System

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Alternative Treatment Technology Analysis

- DEQ contacted various vendors of commercially and pilot scale alternative treatment technology to discuss viability
- Radford's report reviewed fourteen technologies which could be used to address the waste streams.
- Out of those technologies the contained burn chamber was identified as being a viable technology to implement.
- A Class 3 modification to Radford's incinerator permit was issued in 2019 to construct the contained burn chamber.
- To ensure timely implementation of alternative DEQ included a construction schedule requirement in the renewal permit for the incinerator.

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Issues Identified in Process

- Facility did not see benefit in performing risk assessment or alternative treatment technology analysis.
- Time to finalize renewal ~ 6 years.
- Arranging drone sampling delayed development of risk assessment report.
- Community frustration with implementation of alternative treatment technology.
- Facility pushback on including construction schedule requirement in incinerator permit.

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