



STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

1315 W. 4th Avenue • Kennewick, Washington 99336-6018 • (509) 735-7581

April 24, 2001

Mr. Steven H. Wisness
United States Department of Energy
Office of River Protection
P.O. Box 550, MSIN: A2-15
Richland, Washington 99352

RECEIVED
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EDMC

Dear Mr. Wisness:

Re: Nonradioactive Air Emissions Notice of Construction (NOC) for the Thermal
Stabilization of Polycubes at the Plutonium Finishing Plant (PFP) Approval Order

Enclosed is Order No. DE 01NWP-001. The cover letter submitted with the NOC Application requested exemption from new source review under Washington Administrative Code (WAC) 173-400-110. However, the application title stated, "Criteria/Toxic Air Pollutant Emissions." The text of the application, under 7.0 Emissions Estimation, also listed the estimated emissions for criteria pollutants of concern and, since the application is considered to be part of the Washington State Department of Ecology's (Ecology's) Approval Order, the values listed therein are enforceable limits. This should not pose a problem for this project, but in the future it would be better to separate a request for exemption from the NOC Application.

The enclosed Approval Order may be appealed. Appeal procedures are described in the Approval Order.

If you have any questions concerning the content of this letter or the enclosed document, please feel free to contact Jerry Hensley at (509) 736-3017.

Sincerely,

Michael Wilson, Manager
Nuclear Waste Program

MW:JH:sb
Enclosure

cc: Roger Bowman, FH
Richard Engelmann, FH
Karl Hadley, FH
Kirk Peterson, FH
Dwayne Speer, FH

J.H. Richards, CTUIR
Pat Sobotta, NPT
Russell Jim, YIN
Mary Lou Blazek, OOE
Administrative Record: PFP

**STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY**

IN THE MATTER OF APPROVING A NONRADIO-)
ACTIVE AIR EMISSIONS NOTICE OF)
CONSTRUCTION APPLICATION FOR)
CRITERIA/TOXIC AIR POLLUTANT EMISSIONS)
FROM THERMAL STABILIZATION OF)
POLYUBES AT THE PLUTONIUM FINISHING)
PLANT FOR THE DEPARTMENT OF ENERGY-RL)

NOC APPROVAL ORDER
NUMBER: DE01NWP-001

To: Mr. Steven H. Wisness, Director
Office of Site Services
United States Department of Energy
Richland Operations Office
P.O. Box 550, MSIN: A2-15
Richland, Washington 99352

FINDINGS:

On December 18, 2001, the United States Department of Energy, Richland (DOE-RL), submitted a Notice of Construction (NOC) application for the Plutonium Finishing Plant (PFP) for criteria/toxic air pollutant emissions from thermal stabilization of polycubes located in the Hanford site's 200 West Area.

In relation to the above, the Department of Ecology, State of Washington, pursuant to RCW 70.94.152, WAC 173-400, and WAC 173-460 makes the following determinations:

1. The facility, if operated as herein required, will be in accordance with applicable rules and regulations, as set forth in Chapter 173-400 WAC and 173-460 WAC, and the operation thereof will not result in ambient air quality standards being exceeded. Information submitted in the NOC shows emissions will be below the threshold levels contained in WAC 173-400-110(5)(d), allowing exemption of the proposed activities from New Source Review under WAC 173-400-110.
2. The proposed project, if constructed and operated as herein required, will provide all known, available, and reasonable methods of emission control.

A. LAWS AND REGULATIONS

All proposed activities associated with the thermal stabilization of polycubes at PFP by DOE-RL, referred herein to as the permittee, shall comply with all requirements as specified in:

- RCW Chapter 70.94, Washington Clean Air Act

- WAC Chapter 173-400, General Regulations for Air Pollution Sources
- WAC Chapter 173-460, Controls for New Sources of Toxic Air Pollutants

B. EMISSIONS

Operation of the muffle furnaces at PFP, and activities associated with the thermal stabilization of polycubes, will generate emissions of criteria air pollutants at levels less than the threshold values contained in WAC 173-400-110(5)(d), and toxic air pollutants at levels specified in Approval Condition 1.A. of this Order.

- C. **BACT** -- WAC 173-400-113 requires the use of Best Available Control Technology (BACT) to control emissions. Since emissions will be below the threshold levels contained in WAC 173-400-110(5)(d), no technology controls are warranted.
- D. **T-BACT** -- WAC 173-460-040(4)(b) requires the use of Best Available Control Technology for Toxics (T-BACT) to control toxic emissions. Emissions resulting from the proposed operations have been quantified in sufficient detail to demonstrate ambient impact compliance. Based on the calculations and discussion provided in the application, Ecology determines that no additional controls are warranted.

ADDITIONAL FINDINGS:

PFP is located on the Hanford site in the 200 West Area, approximately 51 kilometers (31.7 miles) northwest of Richland, Washington. Construction of PFP started in 1947, and production of plutonium metal began in 1949. Facilities at PFP include production areas, such as the Remote Mechanical A and C (RMA and RMC) lines for conversion of plutonium nitrate solutions to plutonium metal, the Plutonium Reclamation Facility (PRF) for removal of plutonium from process residues, laboratories for routine analysis and for actinide research, and vaults for storage of plutonium in various forms. Most of the plutonium bearing materials left in PFP when production operations stopped in 1989 remain either in containers or on surfaces in enclosed process areas as hold up.

Plutonium bearing materials in containers, and as hold up, need to be stabilized to minimize safety concerns, reduce radiation exposure to PFP and Hanford Site personnel, and reduce public risk.

PFP activities are focused on the stabilization of plutonium bearing materials to a form suitable for long term storage; immobilization of residual plutonium bearing materials; and removal of readily retrievable, plutonium bearing materials left behind in process equipment and process areas.

During the 1960's and 1970's, polycubes were thermally stabilized using a pyrolysis process at PFP. The proposed process of thermal stabilization of polycubes in muffle furnaces results in emissions of air contaminants not emitted since implementation of WAC 173-460 (effective 9/18/91).

The proposed activity would use the muffle furnaces in the 234-5Z Building to stabilize polycubes. The resulting plutonium oxides would be packaged to meet storage requirements specified in *Stabilization, Packaging, and Storage of Plutonium Bearing Materials* (DOE-STD-3013).

1. PROCESS DESCRIPTION

The proposed action is thermal stabilization of polycubes in muffle furnaces using a batch process. The thermal stabilization process will convert polycubes to a form suitable for long term storage.

The polycubes are a mixture of plutonium and/or uranium oxide in a polystyrene matrix, cast into the shape of rectangular parallelepipeds. The polycubes, varying in size from 1.27 centimeters by 5.08 centimeters by 5.08 centimeters (0.5 inch by 2 inches by 2 inches) up to 5.08 centimeters by 5.08 centimeters by 5.08 centimeters (2 inches by 2 inches by 2 inches), contain less than 0.1 metric ton (220 pounds) of plutonium and are packaged in vented containers (WHC-SD-CP-TI-204).

Polycubes also contain other materials [i.e., aluminum paint and/or polyvinyl chloride (PVC) tape] that have been used to cover and/or seal the polycube surfaces. An engineering study (WHC-SD-CP-TI-204) suggested that approximately 2.5 weight percent of the standard 5.08 centimeter (2 inch) cube is associated with PVC tape while 4.5 weight percent represents the weight of a cloth tape with polyethylene backing.

The proposed action will use the existing muffle furnaces (up to 5 total) located in the former RMC and RMA lines of the 234-5Z Building. The muffle furnaces are used for stabilizing the plutonium bearing materials (i.e., metal, alloys, and oxides) to meet the DOE STD 3013 storage requirements. Support activities include sampling the thermally stabilized material for residual moisture content and repackaging the thermally stabilized material for long term storage.

The thermal stabilization of polycubes involves the following:

- Transferring the containers from the 2736-Z vaults to a glovebox in 234-5Z Building;
- Removing the polycubes from the containers and placing batch-size quantities of polycube material into trays (referred to as boats). The average batch size is approximately 400 grams (0.88 pounds);
- Placing the boat into one of the muffle furnaces and ramping up the temperature to 550 °C (1022 °F) to ensure all volatile organic material is driven off leaving a carbonaceous charred material;
- Allowing the furnace to cool down, and repeating the process until the boat is full of charred material;
- Thermally stabilizing charred material at approximately 950 °C (1742 °F) for a set amount of time;

- Allowing the furnace to cool down; and
- Sieving, sampling, and packaging.

The programmed ramping up of the temperature allows for maximum efficiency and safety in removing organic compounds from the polycubes.

2. VENTILATION AND EMISSIONS CONTROL SYSTEMS

The muffle furnace offgas stream consists of a mixture of air, water, carbon monoxide, carbon dioxide, volatile organic hydrocarbons, and a small amount of entrained plutonium oxide. Particulates greater than 2 microns (8×10^{-5} inch) are removed with ceramic process filters. Essentially all residual contamination is removed when the offgas stream is run through the furnace offgas process filter(s) before entering the E-4 exhaust header. The offgas proceeds through two testable stages of high efficiency particulate air (HEPA) filtration before exiting the 291-Z-1 stack. The stack offgases include air with a small amount of water and carbon dioxide.

The radioactive particulate emissions from the stack are controlled by two testable stages of HEPA filters. The emissions are regulated under WAC 246-247. Washington State Department of Health approved modification to the *Radioactive Air Emissions Notice of Construction for Stabilization of Plutonium Metal and Oxides in the Muffle Furnaces at the Plutonium Finishing Plant* (DOE/RL-96-79) on June 15, 2000. The modification addressed the processing of polycubes in the existing muffle furnaces.

Processing of the polycubes will use existing controls, resulting in low levels of emissions of toxic air pollutants (TAPs). These emissions, summarized in Section 7.0, are well below small quantity emission rates (SQER) described in WAC 173-460-080. Therefore, no additional controls are proposed for this process.

THEREFORE, IT IS ORDERED that the project as described in said NOC Application, and more specifically detailed in plans, specifications, and other information, submitted to the Department of Ecology in reference thereto, is approved for construction, installation, and operation, provided the following conditions are met:

APPROVAL CONDITIONS:

1. TOTAL EMISSION LIMITS

- A. The activities described in the NOC application will be permitted without additional control technologies required, provided that the total emissions from all activities will not exceed the Small Quantity Emission Rates (SQERs) for constituents where a SQER is listed. Constituents without a listed SQER cannot result in exceedance of WAC 173-460 ASILs.
- B. A new NOC will be required, if total emissions of toxic air pollutants exceed the SQERs, unless dispersion modeling demonstrates that emissions would continue to result in concentrations less than the ASILs. Results of any such dispersion modeling

demonstrations/calculations will be maintained on file at the facility and made available upon inspection.

- C. A new NOC also is required if total emissions of criteria pollutants would exceed the WAC 173-400-110 thresholds.

2. GENERAL REQUIREMENTS

In accordance with the method(s) identified in Section 6 of this Order, an annual assessment shall be conducted to document compliance that no monitoring and/or sampling systems are needed. This assessment will be reported annually beginning as part of the Calendar Year 2001 nonradioactive inventory of airborne emissions report as specified in WAC 173-400-105.

3. EMISSION CONTROL MONITORS

The projected emission levels of any pollutants regulated by WAC 173-400 or -460 from the thermal stabilization of the polycubes are so low that the levels are not practical to measure. A monitoring system for TAPs at such a low emission rate is not economically feasible. Therefore, no additional monitoring systems are required for this process.

4. MANUALS

Operating and maintenance procedures for the processes/activities described in the NOC Application that have the potential to affect emissions to the atmosphere shall be developed and on file at the facility and updated, as necessary, within the scope of this approval. Copies of these procedures shall be available to Ecology upon request.

5. INITIAL NOTIFICATIONS & SUBMITTALS

All notifications and submittals required under these Approval Conditions shall be sent to:

Washington State Department of Ecology
Nuclear Waste Program
1315 West Fourth Avenue
Kennewick, Washington 99336-6018

6. MONITORING and RECORDKEEPING

Facility operating records will be maintained on file to verify the low emission estimates stated in the notice of construction application have not been exceeded. Each batch of material from the total polycube inventory entering the furnaces will also be recorded (i.e., grams of polycube material per unit time) on the facility operating records, which are classified. These classified records shall be kept on-site by the Permittee and made available to cleared Ecology personnel, upon request. The records will cover a minimum of the most recent sixty- (60-) month period.

Emissions from the polycube thermal stabilization process will be reported in the annual Hanford report, pursuant to WAC 173-400-105.

7. ASIL EVALUATION

The methodology used in evaluating emissions to demonstrate potential total emissions are below the SQER values as described in Section 7.0 of the NOC Application may be modified with Ecology's concurrence.

8. GENERAL CONDITIONS

- A. **Visible Emissions:** Ecology defers regulatory authority for this condition to the Washington State Department of Health (DOH) because of abatement control technology installed pursuant to the DOH License in accordance with WAC 246-247.
- B. **Commencing/Discontinuing Construction and/or Operations:** This approval shall become void if the proposed activities are not commenced within eighteen (18) months after receipt of this Order approving the NOC Application, or if activities are discontinued for a period of eighteen (18) months.
- C. **Compliance Assurance Access:** Access to the source by EPA, DOH, or Ecology shall be allowed for the purposes of compliance assurance inspections. Failure to allow access is grounds for revocation of the Order approving the NOC.
- D. **Modification to Facility or Operating Procedures:** Any modification to any equipment or operating procedures, contrary to information in the NOC Application, shall be reported to Ecology at least sixty (60) days before such modification. Such modification may require a new, or amended, NOC Approval Order.
- E. **Activities Inconsistent with this Order:** Any activity undertaken by the Permittee or others, in a manner that is inconsistent with the NOC Application, and this determination, shall be subject to Ecology enforcement under applicable regulations.
- F. **Obligations under Other Laws or Regulations:** Nothing in this Order shall be construed to relieve the Permittee of its obligations under any local, state, or federal laws, or regulations.
- G. Nothing in this approval shall be construed as obviating compliance with any requirement of law other than those imposed pursuant to the Washington Clean Air Act, and rules and regulations thereunder.
- H. A two (2) month testing and break-in period is allowed, after any part or portion of this project becomes operational, to make any changes or adjustments required to comply with applicable rules and regulations pertaining to air quality and conditions of operation imposed herein. Thereafter, any violation of such rules and regulations, or of the terms of this approval, shall be subject to the sanctions provided in Chapter 70.94 RCW.

Authorization may be modified, suspended or revoked in whole, or part, for cause including, but not limited to, the following:

1. Violation of any terms or conditions of this authorization;
2. Obtaining this authorization by misrepresentation, or failure to disclose fully all relevant facts.

The provisions of this authorization are severable and, if any provision of this authorization, or application of any provisions of this authorization to any circumstance, is held invalid, the application of such provision to their circumstances, and the remainder of this authorization, shall not be affected thereby.

Any person feeling aggrieved by this ORDER may obtain review thereof by application, within thirty (30) days of receipt of this ORDER, to:

Pollution Control Hearings Board
P.O. Box 40903
Olympia, Washington 98504-0903

Concurrently, copies of the application must be sent to:

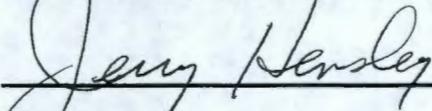
Washington State Department of Ecology
P.O. Box 47600
Olympia, Washington 98504-7600

Washington State Department of Ecology
1315 West Fourth Avenue
Kennewick Washington 99336-6018

These procedures are consistent with the provisions of Chapter 43.21B RCW, and the rules and regulations adopted thereunder.

DATED at Kennewick, Washington, this 24th day of April 2001.

PREPARED AND REVIEWED BY:

 P.E.

APPROVED BY:

