UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

JUL - 5 2007

OFFICE OF
PREVENTION, PESTICIDES AND
TOXIC SUBSTANCES

Mr. Dale A. Ormond
Acting Director
Risk Management Directorate
U.S. Army Chemical Materials Agency
5183 Blackhawk Road
Aberdeen Proving Ground, MD 21010-5424

Dear Mr. Ormond:

In response to the request dated December 20, 2007 by the U.S. Army Chemical Materials Agency (CMA), the National Program Chemicals Division (NPCD) of the Office of Pollution Prevention and Toxics (OPPT), U.S. Environmental Protection Agency (EPA) grants renewal of the National Approval to CMA to dispose of polychlorinated biphenyls (PCBs). This approval, entitled "Approval to Dispose of Polychlorinated Biphenyls (PCBs)," permits the Department of the Army to incinerate M55 chemical agent rockets containing PCBs, using the Deactivation Furnace System (DFS) process at its Pine Bluff Chemical Agent Disposal Facility (PBCDF), Pine Bluff Arsenal, Pine Bluff, Arkansas; and Umatilla Chemical Agent Disposal Facility (UMCDF), Umatilla Chemical Depot, near Hermiston, Oregon. This nationwide approval is issued pursuant to Section 6(e)(1) of the Toxic Substances Control Act (TSCA) of 1976 (Public Law 94-469), and the Federal PCB Regulations, 40 CFR Part 761.70, and subject to conditions specified in this approval becoming effective July 7, 2007 and terminating July 6, 2012.

This approval authorizes CMA and the Systems Contractor (Washington Demilitarization Company) to dispose of PCBs at the Pine Bluff Chemical Agent Disposal Facility and the Umatilla Chemical Agent Disposal Facility. The existing approval, which terminates on July 6, 2007, authorizes CMA and the Systems Contractor to dispose of PCBs at the Tooele Chemical Agent Disposal Facility (TOCDF), Tooele, Utah and at the Anniston Chemical Agent Disposal Facility (ANCDF) at Anniston, Alabama, as well as, at PBCDF and UMCDF. Your letter dated April 11, 2007 requests that NPCD remove TOCDF and ANCDF from the renewed approval, since TOCDF and ANCDF have concluded their PCB disposal activities. ANCDF is in the final stages of PCB Disposal Closure and TOCDF submitted on April 13, 2007 the "TOCDF PCB Decontamination Verification Report, March 2007" to support the request for omission from the National Approval. NPCD has reviewed the TOCDF decontamination results in the report and concurs with TOCDF that 40 CFR 761 no longer applies to DFS activities since PCBs are no longer being incinerated at these two facilities.

The June 6, 2002 approval was extended twice. The first extension was from March 31, 2007 to June 6, 2007, so that the approval was for a full five-year period as originally intended. Subsequently, NPCD extended the approval again to July 6, 2007 to provide EPA the opportunity to establish a website (http://www.epa.gov/pcb/pubs/armyincinrenewal.html) to enable the public to review background information relevant to EPA's intent to renew the approval and to provide the public the opportunity to comment. EPA also published a notification in the Federal Register of its intent to renew the approval with notice of availability of Trial Burn Results (Federal Register/Vol. 72, No. 101/ May 25, 2007/Notices (Pages 29317-29319). EPA received no comments from the public. NPCD finds that this approval renewal does not present an unreasonable risk of injury to health or the environment from PCBs.

This TSCA PCB Disposal Approval may be modified, withdrawn, or amended with further conditions at any time EPA has reason to believe that the operation of the DFS process presents an unreasonable risk of injury to health or the environment. Withdrawal of the approval or imposition of further conditions may also result from future EPA rulemaking with respect to PCBs. Moreover, violation of any condition of this approval may subject CMA and the Systems Contractor at the facilities to an enforcement action and/or termination of this approval.

Finally, this approval is based upon a conclusion drawn by EPA, supported by test burn results from the four Army facilities (TOCDF, ANCDF, PBCDF and UMCDF) that, when operated in accordance with the conditions of approval, using the DFS process does not present an unreasonable risk of injury to health or the environment. Please contact Hiroshi Dodohara of my staff at (202) 566-0507 if you have any questions regarding this approval.

Sincerely,

Maria J. Doa, Ph.D.
Director
National Program Chemicals Division

Enclosure

cc: Craig Brown
U.S. EPA Region 4

Lou Roberts
U.S. EPA Region 6

Dan Bench
U.S. EPA Region 8

Dan Duncan
U.S. EPA Region 10

Enclosure

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

IN THE MATTER OF THE DEPARTMENT OF THE ARMY, CHEMICAL MATERIALS AGENCY DEMILITARIZATION, ABERDEEN PROVING GROUND MARYLAND, AND TO THE SYSTEM CONTRACTORS DFS, CHEMICAL DEMILITARIZATION FACILITIES	)))))))	APPROVAL TO DISPOSE OF POLYCHLORINATED BIPHENYLS (PCBs)

AUTHORITY

This approval is issued pursuant to Section 6(e)(1) of the Toxic Substances Control Act of 1976 (TSCA), Public Law No. 94-469, and the Federal PCB Regulations, 40 CFR 761.70. Background and Findings related to this approval are attached to this approval as Appendix I.

The Department of the Army is the owner of a process known as the Deactivation Furnace System (DFS), operational at the Pine Bluff Chemical Agent Disposal Facility (PBCDF), Arkansas; and Umatilla Chemical Agent Disposal Facility (UMCDF), Oregon. The DFS thermally destroys PCBs in non-liquid form contained in shipping and firing tubes for chemical agent rockets. The Chemical Materials Agency (CMA), Aberdeen Proving Ground, Maryland represents the Department of the Army. Washington Demilitarization Company, LLC (WDC) of Washington Group International, Inc. is the operator at the UMCDF and PBCDF. The Environmental Protection Agency (EPA) has carefully scrutinized CMA's and WDC's operations. In addition, EPA has audited and observed demonstrations of the DFS process capabilities. Pursuant to 40 CFR 761.70, EPA finds that the DFS process at PBCDF and UMCDF (when operated in accordance with the conditions of this approval) does not pose an unreasonable risk of injury to health or the environment.

EFFECTIVE DATES

This approval to operate shall become effective July 7, 2007, and shall expire July 6, 2012.

FOREWORD

If any administrative or procedural requirement of this approval has been satisfied by other parties, or has been previously satisfied by the permittee (e.g., completion of a risk assessment, financial responsibility for a specific site, public participation), the permittee is relieved of that requirement to the extent that it is duplicative.

CONTENTS

DEFINITIONS

"Analytical data" means (a) a document from a chemical analysis laboratory on the appropriate letterhead, or (b) appropriate chemical instrument printouts with appropriate controls, standards, and written instrumental operating parameters and conditions. Technical judgment or experience is not considered analytical data.

"Business hours" means 8:00 a.m. to 5:00 p.m. local time on weekdays, except United States Government holidays.

"Change in scale" means a doubling or more of the volume of Waste Feed notified to be treated at a site.

"Day" means a calendar day, unless otherwise specified.

"Duplicate analysis" means two gas chromatographic analyses of the analyte prepared from one sample of material.

"DFS Facility" means the Deactivation Furnace System (DFS) at the Pine Bluff Chemical Agent Disposal Facility, Arkansas; and Umatilla Chemical Agent Disposal Facility, Oregon.

"Lifetime exposure risk" means the risk to an average adult individual who is exposed to a stated average concentration of a toxic material daily, over the course of a 70-year lifetime.

"Lost time injury" or "Lost workday injury" means an injury occurring during the operation of a DFS facility which results in an employee not performing his/her normal assignments during the workday and/or any successive workday(s) following the day of the injury.

"Minimal" with regard to an amount of PCB wastes means less than ten percent of total wastes treated.

"Non-soil" solids and materials include non-pumpable sludge and sediment.

"Operations" means the process of treating PCBs, including set up and take down of the CMA/System Contractors unit, as well as actual treatment.

"OPPT" means the Office of Pollution Prevention and Toxics, United States Environmental Protection Agency (7404); (202) 566-0500; Facsimile (202) 566-0473.

"PCB" means polychlorinated biphenyls as defined in 40 CFR 761.3.

"PCB release" and "PCB spill" have the same meaning as "spill" as defined in EPA's PCB Spill Cleanup Policy in 40 CFR 761.123.

"Process Failure" means the inability of the DFS unit to treat the feedstock for reasons other than contaminants (such as chlorinated solvents).

"Site" means the geographically contiguous property unit (such as a single manufacturing plant) at which the DFS disposal operations are conducted.

"Site location" means a street address or a directional description which would allow a site to be found by an EPA inspector.

"System contractor" means the on-site field operator of the prime contractors who will operate the Deactivation Furnace System at the Pine Bluff Chemical Agent Disposal Facility, Arkansas (Washington Demilitarization Company); and Umatilla Chemical Agent Disposal Facility (Washington Demilitarization Company), Oregon.

"2 ppm PCBs" treatment criterion is defined as follows: (a) When Aroclor patterns are detected in the chromatogram of treated material, the Aroclor will be quantified using Method 8082 or another method approved by EPA, then the criterion for PCBs in the treated sample is "less than 2 ppm total PCBs (as calculated by comparison of total areas or height to an external Aroclor standard having a similar pattern to the sample);" or (b) When Aroclor patterns do not exist, the sample will be quantified using the method using the Dry Color Manufacturing Association (DCMA) standard, or another method approved by EPA, then the criterion is "less than 2 ppm per PCB congener (or per resolvable gas chromatographic peak, as calculated by comparison to an external standard homolog peak having the nearest retention time to each appropriate PCB peak to be quantified)."

"3 ppb PCBs" treatment criterion is defined as follows: (a) When Aroclor patterns are detected in the chromatogram of treated material, the Aroclor will be quantified using Method 8082 or another method approved by EPA, then the criterion for PCBs in the treated sample is "less than 3 ppb total PCBs (as calculated by comparison of total areas or height to an external Aroclor standard having a similar pattern to the sample);" or (b) When Aroclor patterns do not exist, the sample will be quantified using the method using the Dry Color Manufacturing Association (DCMA) standard, or another method approved by EPA, then the criterion is "less than 3 ppb per PCB congener (or per resolvable gas chromatographic peak, as calculated by comparison to an external standard homolog peak having the nearest retention time to each appropriate PCB peak to be quantified)."

"Year" means 365 days, except that in leap years "year" means 366 days.

CONDITIONS OF APPROVAL

1. Prior Written Notice, Authorized Operations and Public Participation

   a. Prior Written Notice

      (1) CMA must send a non-confidential written notice to the addressees listed in paragraph b. at least 30 days before:

         A. Conducting a permitted disposal activity at a DFS Facility, or
         B. Resuming a permitted PCB Disposal activity after a shutdown of PCB waste feed for 30 or more consecutive days.

      (2) The notice must include:

         A. The DFS facility name and telephone number;
         B. The names, titles, addresses, and telephone numbers of the addressees required to be notified in paragraph b;
         C. Estimates of the amount and type of PCB (Aroclor, etc.) to be treated and estimates of the concentration of PCBs in the material. The estimates shall be based on analytical data from a representative sample of the material to be disposed of and/or historic analytical data from similar material;
         D. The time(s) and date(s) the PCB disposal activity is scheduled to take place.

      The information is provided for public information purposes and for facilitating scheduling of government compliance monitoring and oversight of PCB disposal operations.

   b. Addressees: The CMA must send the notice described in paragraph a. to: EPA Headquarters' Office of Pollution Prevention and Toxics (Mail Code: 7404), the EPA Regional Office for the Region in which the DFS Facility is located, the state agency, and the local jurisdiction.

EPA CONTACTS

Name, Region	Telefax Number	Contact Number
Hiroshi Dodohara, EPA HQ	(202) 566-0473	(202) 566-0507
Craig Brown, Region IV	(404) 562-8972	(404) 562-8990
Lou Roberts, Region VI	(214) 665-7446	(214) 665-7579

   c. Authorized Operations: CMA shall continue M55 rocket disposal operations with firing tubes containing 50 ppm PCBs or greater at PBCDF and UMCDF as

authorized in correspondences from EPA to PBCDF and UMCDF dated December 30, 2004 and October 20, 2005. Copies of these correspondences are provided in Appendix 2

d Public Participation: EPA held initial public meetings in Pine Bluff and Umatilla with little public participation. In lieu of local public meetings for the post-trial burn period, EPA expanded the scope of public participation by publishing a Federal Register notice and opening a website on EPA PCB website availing the public to trial burn data and an opportunity to submit comments in writing and electronically.

2. Operating Conditions: CMA and System Contractor may use the CMA DFS to destroy PCB-contaminated shipping and firing tubes containing chemical and nerve agent rockets, limited to the M441 shipping/firing tubes, under the following operating conditions. These conditions are based on the Army's results from trial burns performed at PBCDF and UMCDF. These trial burns indicated that the TSCA incinerator requirements for 99.9999% destruction and removal efficiency (six 9s DRE) of PCBs were achieved. PCB emission rates were at minimum an order of magnitude lower than the health risk assessment (HRA). Dioxins and furans were not detected in the stack samples.

a. **Pine Bluff Chemical Agent Disposal Facility, Pine Bluff, Arkansas and Umatilla Chemical Agent Disposal Facility, Hermiston, Oregon**

Operation of the DFSs in the PBCDF and UMCDF is subject to the conditions expressed herein, and must be consistent with the materials and data included in the Army application "Preliminary Operating Permit Application, for the Department of the Army Tooele Army Depot, Chemical Agent Disposal Facility, Submitted to Division Director, National Programs Chemicals Division, Office of Pollution Prevention and Toxics, Washington, D.C." dated July 1993; "R&D Test Plan, PCB Destruction Unit Deactivation Furnace System (DFS), Final, Facility Operator," dated November 27, 1995; "Pine Bluff Chemical Agent Disposal Facility, Pine Bluff, Arkansas; Deactivation Furnace System, Toxic Substances Control Act, Agent Trial Burn, Data Report, October 2005," and "UMCDF Deactivation Furnace System GB Rocket Toxic Substances Control Act Agent Final Trial Burn Report, Revision 0, January 2006, Volume 1 of 2."

Target Values: For this approval, Target Values are the desired operating condition for the parameters specified. These Target Values are based on the average values demonstrated during the DFS RCRA/TSCA Trial Burn of 1997 and Trial Burn II of 1998. The process value may deviate from the Target Value within the Process Limits whenever minor operational upsets occur; however, the process value should generally exhibit the Target Value and the instrument setting for the specified parameter should generally be kept at the Set Point.

Set Points: For this approval, EPA has defined set points as the value of incinerator process control setting(s) that achieves the Target Values, such as Combustion Air volume and Fuel Gas control for the afterburner.

Process Limits: Process Limits are placed such that whenever the process value deviates from the Target Values during major operational upsets, an Automatic Waste Feed Cut Off (AWFCO) is activated. However, the Process Limits should be placed such that a minor operational upset will not activate the AWFCO.

(1) Regulatory Interlocks: Feed to the DFS shall immediately be shut off automatically for:

(A) Failure of the monitoring operations specified in Condition 5d through 5f.

(B) Failure of the recording equipment monitoring the PCB feed rate and quantity measuring and recording equipment failing as specified in Condition 5.a, must be immediately replaced by manual recording of the PCB feed rate.

(C) The Afterburner Exhaust Gas Excess Oxygen (O_2) (16-AIT_175, 24-AIT-206)* an instantaneous AWFCO at <3.0%.

(D) The Combustion Efficiency (16-AIT-781, 16-AIT-781B). The AWFCO required by §761.70(b)(2) for Combustion Efficiency (CE) at 99.9% is replaced by Conditions 2(b)(3) and 2(c)(3) which require AWFCOs based on carbon monoxide (CO) concentration. CO concentration in the flue gas is considered an indicator of the effectiveness of combustion processes. CE based AWFCOs may be activated by varying concentrations of CO depending on the types of waste and fuel. This action is taken by EPA to install a more consistent form of process control. (see Appendix II, Correspondence 3),

(E) During Compliance Testing and Trial Burns, stack sampling analysis must indicate that the Destruction and Removal Efficiency (DRE) for PCBs in the CMA/System Contractor system shall be a minimum of 99.9999%. DRE shall be calculated as follows:

$$DRE = 100 \times \frac{\text{PCB Feed Rate In, lb/hr - PCB Stack Emissions, lb/hr}}{\text{PCB Feed Rate In, lb/hr}}$$

b. Pine Bluff Chemical Agent Disposal Facility, Pine Bluff, Arkansas

Operating Conditions and Operational Interlocks: The PBCDF DFS incinerator shall operate at the following conditions whenever PCBs are being incinerated:

(1) Rocket Feed Rate:

Rocket feed rate Target is 33 rockets per hour with a 5-minute delay AWFCO at a feed rate greater than 33 rockets/hr and an instantaneous AWFCO at 33 rockets per hour rolling average.

(2) Afterburner Exhaust Temperature (16-TIC-092):

When feeding rockets at 33 rockets per hour, the Afterburner Exhaust Gas temperature Target Value shall be 2150°F, with a 5-minute delay AWFCO at < 2050°F*. Set point control(s) must be positioned to achieve 2150°F.

(3) The Afterburner Exhaust Gas CO (16-AIT-059, 16-AIT-060) Target Value is < 10 ppm, adjusted to 7% O_2. There shall be a 5-minute delay AWFCO at > 100 ppm, adjusted to 7% O_2.

(4) PBCDF shall comply with provisions of Permit Number 29-H, Arkansas Department of Pollution Control and Technology, Permit for Hazardous Waste Management Facility, EPA ID No. AR01213820707.

Where Permit No. 29-H addresses Rocket Feed Rate, Afterburner Temperature and Afterburner Exhaust Gas CO, PBCDF shall comply with Condition 2(b)(1) through 2(b)(3) of this Approval.

c. Umatilla Chemical Agent Disposal Facility, Hermiston, Oregon

Operating Conditions and Operational Interlocks: The UMCDF DFS incinerator shall operate at the following conditions whenever PCBs are being incinerated:

(1) Rocket Feed Rate:

Rocket feed rate Target is 37 rockets per hour with a 5-minute delay AWFCO at a feed rate greater than 37 rockets/hr and an instantaneous AWFCO at 37 rockets per hour rolling average.

(2) Afterburner Exhaust Temperature (16-TIC-092):

When feeding rockets at 37 rockets per hour, the Afterburner Exhaust Gas temperature Target Value shall be 2100°F, with a 5-minute delay AWFCO at < 2050°F*. Set point control(s) must be positioned to achieve 2100°F.

(3) The Afterburner Exhaust Gas CO (16-AIT-059, 16-AIT-060) Target Value is < 10 ppm, adjusted to 7% O_2. There shall be a 5-minute delay AWFCO at > 100 ppm, adjusted to 7% O_2.

(4) UMCDF shall comply with provisions of Permit Number ORQ 000 009 431, Storage and Treatment of Hazardous Waste, Umatilla Chemical Agent Disposal Facility, State of Oregon, Department of Environmental Quality, 256 East Hurlburt, Suite 105, Hermiston, Oregon.

Where Permit No. ORQ 000 009 431 addresses Rocket Feed Rate, Afterburner Temperature and Afterburner Exhaust Gas CO, UMCDF shall comply with Condition 2(c)(1) through 2(c)(3) of this Approval.

*Low temperature AWFCO value specified in State RCRA permits for PBCDF (Permit no. 29-H) and for UMCDF (Permit no. ORQ 000 000 009 431)

3. Waste Restrictions and Analytical Requirements: The following requirements (Condition 3) do not apply if the process residues are disposed of in EPA-approved facilities, including chemical waste landfills and Subtitle C landfills (for solid residues), or deep well injection or wastewater treatment facilities which are approved for PCB disposal of liquid residues.

Representative samples of the treated material and residue from each shift (12 hr.) operation must be collected and analyzed in duplicate (i.e., duplicate analysis) by gas chromatography for PCB concentrations. Any processed ash or other non–aqueous waste, such as desiccated brine, that was discovered to contain equal to or greater than 2 ppm PCB must be managed as if it contained the original concentration of PCBs as found in the firing/shipping tubes prior to processing. It must be stored in an appropriate manner and reprocessed through the incinerator until process operations have indicated complete removal (less than 2 ppm) of PCBs. Alternatively it may be disposed of in an approved chemical waste landfill. Any DFS scrubber brine discovered to contain equal to or greater than 3 ppb PCB must be incinerated in EPA-approved PCB incinerators unless it can be shown that the discharge is controlled under an existing National Pollutant Discharge Elimination System (NPDES) permit which contains a standard limiting PCB discharge.

Such waste materials include kiln and cyclone discharge, desiccated brine, and scrubber brines. Whenever an agency(s) requires the sampling and analysis of treated material or residue for polychlorinated dibenzodioxins and polychlorinated dibenzofurans (including 2,3,7,8-tetrachlorodibenzodioxins (TCDDs) and 2,3,7,8-tetrachlorodibenzofurans (TCDFs)) the analysis must be accomplished using laboratory techniques with detectable limits below 0.2 parts per billion (ppb).

Analytical Methods: The chemical analysis of PCBs requires use of gas chromatography. Any gas chromatographic method that is appropriate for the material being analyzed may be used, including EPA Method 608, "Organochlorine Pesticides and PCBs" at 40 CFR part 136, Appendix A;" EPA Method 8082, "Polychlorinated Biphenyls (PCBs) by Capillary Column Gas Chromatography" of SW-846, "OSW Test Methods for Evaluating Solid Waste," which is available from NTIS, and ASTM Standard D-4059, "Standard Test Method for Analysis of Polychlorinated Biphenyls in Insulating Liquids by Gas Chromatography," which is available from ASTM.

4. Incinerator Failure: If the quality control testing, as described below and in Conditions 3, reveals that after the first five composite samples (i.e. the first 60 hours of operation) that the DFS has not been able to achieve the required less than 2 ppm PCB residue in both cyclone ash and HDC ash streams at the same time, then CMA/System Contractor must stop operations of the DFS. The CMA must notify the EPA Regional Office and the NPCD (202) 566-0500 or by FAX at (202) 566-0473 during the business hours in Washington, D.C. on the day of the failure or, if failure does not occur during business hours, during the next regular business day, and file a written report within fifteen (15) days. The affected unit shall not resume operation until the problem has been corrected to the satisfaction of the EPA, as expressed in writing.

5. Monitoring and Recording: Provisions must be made to assure that the following process elements are suitably monitored and recorded for all PCBs processed, such that materials harmful to health or the environment are not inadvertently released:

a. quantity of PCB contained in M441 shipping/firing tubes and concentration of PCBs (based on nominal 1247 ppm PCBs) and other raw materials (i.e., feedstock and chemical reagents) fed into the CMA/System Contractor DFS system;

b. the rate and quantity of PCBs (M441 shipping/firing tubes feed rate times the PCB concentration) fed shall be measured and recorded at least every 15 minutes;

c. quantity and concentration of PCBs in the treated material, including process wastes (the method of disposal and location of the disposal facility for each waste should be documented) (see Condition 3 for applicable conditions);

d. temperature and pressure of combustion at least once during every half-hour interval;

e. the kiln exhaust temperature and the afterburner temperature shall be continuously measured and recorded;

f. the afterburner exhaust gas shall be monitored continuously for O_2, CO_2, and CO when PCBs are being incinerated;

g. date and time of operations; and

h. name, address, and EPA identification number of the facility.

The records must be compiled and maintained in accordance with the time(s) and location(s) specified in Condition 16.

6. Annual Quality Control Monitoring: Upon request from EPA, CMA/System Contractor shall conduct annual monitoring of the facility for PCBs destruction and removal efficiencies and HCl removal efficiency, and mass emission rates for particulates, 2,3,7,8-tetrachlorodibenzodioxin (TCDD), and 2,3,7,8-tetrachlorodibenzofuran (TCDF) and total polychlorinated dibenzodioxins and total polychlorinated dibenzofurans. This annual monitoring must be consistent with procedures outlined in SW-846, and may be part of an air permit compliance demonstration such as a State Air Permit. If the limits specified in the Conditions of Approval are not complied with, U.S. EPA must be notified within one day of receipt of the test results, and CMA/System Contractor shall cease incineration of PCBs. If no disposal operations were conducted during the year of an anniversary of this permit, EPA may request monitoring during the first disposal operation in the following year after the anniversary. All parameters shall be monitored as required under this condition.

7. PCB Releases: In the event CMA/System Contractor believes, or has reason to believe, that a fugitive release of PCBs other than stack gas emission has or might have occurred from the unit during processing, the System Contractor must inform the appropriate EPA Regional Administrator or PCB Coordinators by phone immediately after remedial actions have been taken to ensure the protection of health and the environment.

A written report describing the incident must be submitted by the fifteenth (15th) business day after the day of the incident. No PCBs may be processed in that facility until the release problem has been corrected to the satisfaction of the EPA, as expressed in writing.

8. Spills: Any spills of PCBs or other fluids shall be promptly controlled and cleaned up as provided in the Spill Prevention, Control and Countermeasures Plan provided in the application and trial burn plan. In addition, a written report describing the spill, operations involved, cleanup actions and changes in operation to prevent such spills in the future must be submitted to the appropriate EPA Regional Administrator within fifteen (15) business days. PCB spills must be reported in accordance with the PCB spill reporting requirements prescribed under Section 311 of the Clean Water Act for discharges to navigable waters and under the Comprehensive Environmental Response, Compensation, and Liability Act (Superfund) for discharges to other media.

9. Safety and Health: CMA/System Contractor must take all necessary precautionary measures to ensure that operation of the DFS is in compliance with the applicable safety and health standards, as required by Federal, State and local laws and regulations and ordinances. Any lost-time injury occurring as a result of the operation of the DFS must be reported to the PCB Disposal Site Coordinator in the appropriate EPA Regional Administrator by the next business day. A written report describing the accident must also be submitted within five business days.

10. Facility Security: The facility shall be secured (e.g., fence, alarm system, etc.) to ensure that only those individuals participating in the operations and approved visitors are allowed in the area.

11. Incident Notification: Any notification of an EPA Regional Administrator required by conditions (6),(7), (8), and (9) shall also be made by telephone to the NPCD (202) 566-0500 within the time frame specified. In addition, CMA/System Contractor shall file a written report with the Director, National Program Chemicals Division, Office of Pollution Prevention and Toxics, Office of Prevention, Pesticides and Toxic Substances, 1200 Pennsylvania Avenue N.W., Washington, D. C. 20460 within the time frame specified.

12. Waste Disposition: Treated material such as the Heated Discharge Conveyor discharge ash or cyclone ash or process waste such as desiccated brine must be disposed of as PCB waste pursuant to 40 CFR 761 unless it is established through representative sampling that the material contains levels of PCBs less than 2 ppm by individual congeners or less than 2 ppm total PCBs if the analytical chromatogram indicates Aroclor patterns. Spent scrubber brines must be disposed of as PCB waste pursuant to 40 CFR 761 unless it is established through representative sampling that the material contains levels of PCBs less than 3 ppb by individual congeners or less than 3 ppb total PCBs if the analytical chromatogram indicates Aroclor patterns. PCB-contaminated equipment on the CMA/System Contractor unit may be transferred off-site only in accordance with the U.S. Department of Transportation (DOT) requirements at 49 CFR Part 172. Such requirements include placarding the equipment if the unit is not decontaminated after use.

13. Agency Approvals/Permits: No operation may commence until CMA/System Contractor has obtained all necessary approvals/permits from Federal, State and local agencies. CMA/System Contractor is responsible for obtaining such approvals/permits.

14. Personnel Training: CMA/System Contractor shall be responsible for ensuring that personnel directly involved with the handling or disposal of PCB-contaminated M55 Rockets and shipping/firing tubes using the DFS incinerator are demonstrably familiar with the general requirements of this approval. At a minimum, the general requirements must include:

a. the disposal of M441 shipping/firing tubes which may be treated using the DFS Facilities, and the expected upper limit of PCB contamination which may be treated;

b. basic recordkeeping requirements under this approval and the location of records;

c. notification requirements;

d. waste disposal requirements for process and by-product wastes generated during the operation of the DFS incinerator;

e. safety, operation, and maintenance procedures;

f. procedures for using, inspecting, repairing, and replacing facility emergency and monitoring equipment;

g. spill prevention and cleanup plan; and

h. reporting requirements.

In this regard, CMA/ System Contractor must maintain on-site during the operations of its unit a copy of this approval; the Spill Prevention, Control and Countermeasure plan; and sampling and analytical procedures, as Condition 3 requires, used to determine PCB concentrations of treated M441 shipping/firing tubes. In addition, a copy of the sampling and analytical procedures must be maintained in the laboratory conducting the analysis.

15. Financial Assurance: Not Applicable.

16. Recordkeeping: CMA/ System Contractor shall collect and maintain for a period of five years from the date of the demonstration the following information:

a. Continuous and short interval data described below:

(1) Rate and quantity of PCBs fed to the combustion system;

(2) Temperature of the combustion process;

(3) Afterburner exhaust gas analysis, including oxygen, carbon monoxide and carbon dioxide.

b. Data and records on the monitoring of afterburner emissions and combustion efficiency as required by these conditions.

c. The total weight in kilograms of any solid residues generated by the incineration of PCBs during operations, and the total weight in kilograms of any solid residues disposed by the facility as required by this approval.

d. The name and address of each client whose PCBs were processed by the DFS.

e. A copy of each gas chromatogram, including QC requirements such as relevant standards and blanks, from the test required by Conditions 2, 3 and 12.

f. The date(s) time and duration of the operations.

g. The name, address and telephone number of the operator and supervisor.

h. An annual report shall be submitted to U.S. EPA Headquarters and to the appropriate EPA Regional Office by 60 days after each anniversary of the effective date of this permit. The annual report shall include information required in Conditions 16c, 16d, 16f and 16g. Data required in Condition 5 and 16e shall be stored at a centralized location at each facility and made available for EPA review.

The documents must be compiled within 60 days following completion of the treatment; must be kept at one centralized location; and must be available for inspection by authorized representatives of the EPA upon request. CMA/ System Contractor must also maintain the records required by 40 CFR 761.180(f). If CMA/System Contractor terminates operation of the CMA DFS, these records or their copies must be submitted to the Director of the Office of Pollution Prevention and Toxics, USEPA.

17. Ownership or Operational Transfer: CMA/ System Contractor must notify EPA at least 30 days before transferring ownership or operations responsibility of the CMA/ System Contractor PCB Decontamination Unit(s). CMA/ System Contractor must also submit to EPA, at least 30 days before such transfer, a notarized affidavit signed by the transferee which states that the transferee will abide by CMA/ System Contractor's EPA approval. It is CMA/ System Contractor's responsibility to include in the notification: the name, the address, phone number, and other pertinent information about the transferee. CMA/ System Contractor must also submit a report of permitted disposal activities, including quantities and concentrations of PCB materials treated; proof that generated wastes have been appropriately disposed; certification that any CMA/ System Contractor facilities, where disposal equipment and/or supplies have been kept/maintained, will be appropriately cleaned/removed before the transfer; and a description of exactly what part (equipment and/or operating staff) of CMA/ System Contractor will be transferred. In order for the CMA/ System Contractor EPA approval to be transferred and prior to conducting any PCB disposal operations, the transferee must provide financial assurance for closure and liability relevant to the type of activities in CMA/ System Contractor's approval.

Within thirty days of receiving such notification and affidavit, EPA may issue an amended approval substituting the transferee's name for the CMA/ System Contractor's name, or may require the transferee to apply for a new PCB disposal approval. In the latter case, the transferee must submit a demonstration test plan for EPA review and upon approval perform a demonstration at a site with materials of PCB concentration proposed by the transferee and approved by EPA. Should CMA/ System Contractor and the transferee fail to provide EPA with the required written documentation related to the sale or ownership or operations responsibility transfer and/or to provide this documentation within the specified time frame, this permit shall be null and void.

18. Additional DFS Incinerator Units: CMA/ System Contractor must file a written pre-operation report with the Director for National Program Chemicals Division of the Office of Pollution Prevention and Toxics within thirty (30) days from the date of construction of each additional DFS incinerator to be operated in the United States. This report should contain the following information:

a. date of construction of the unit;

b. identification of the new DFS unit;

c. certification by an independent, registered professional engineer to the effect that the DFS incinerator is substantially identical to the original demonstrated system in terms of engineering design, hardware, process capacity, quality and workmanship;

d. certification by the chief executive officer of CMA signifying that the new DFS system has been completed in such manner; and

e. a list of all non-substantive changes made to the design and construction of the new DFS system which are not identical to the original TOCDF DFS incinerator.

EPA will hold an initial public meeting in each community affected by the additional DFS units and a follow-up meeting after trial burn data from additional units becomes available.

19. Major Modifications: No major modifications may be made to the CMA DFS incinerator design or operations, as described in the application and demonstration plan for this approval, without prior written approval of the EPA Regional Administrator. The Regional Administrator may require the submission of any information necessary to evaluate the request for a major modification. For the purpose of this approval, "major modification" means any change to capacity, design, efficiency, waste type, or any other changes affecting overall performance or environmental impact. A major modification includes any modification that may affect the characteristics of the stack emission products. After such a modification, the operator must monitor stack emissions and report stack emission concentrations for the following parameters:

a. Oxygen, O_2
b. Carbon monoxide, CO
c. Carbon dioxide, CO_2
d. Nitrogen oxides, NO_x

e. Hydrochloric acid, HCl
f. Total chlorinated organic content, RCl
g. PCBs
h. Total particulate matter

The operator must also report emission rates for parameters e, f, g, and h.

The EPA Regional Administrator will determine whether to allow for public participation in the review of a modification, and if public participation is allowed, will determine what form public participation will take. Public participation may include public notice, public review of appropriate permit-related documents, a period for public comment, a public meeting, and/or a hearing.

20. Approval Severability: The conditions of this approval are severable, and if any provision of this approval or any application of any provision is held invalid, the remainder of this approval shall not be affected thereby.

21. Approval Effective Date: This approval shall expire five calendar years from the date the permit becomes effective. For an approval renewal, EPA may require additional information and/or testing of the CMA DFS incinerator. In order to continue the effectiveness of this approval pending EPA action on reissuance, CMA/ System Contractor must submit a renewal request letter to EPA at least 90 calendar days, but not more than 180 calendar days, prior to the expiration date of this approval.

APPROVAL

1. Approval to dispose of PCBs is hereby granted to the Department of the Army, U.S. Army Chemical Materials Agency, Aberdeen, Maryland, and to the System Contractor at other DFS Facilities, subject to the conditions expressed herein, and consistent with the materials and data included in the permit application filed. EPA reserves the right to impose additional conditions when it has reason to believe that the continued operation of the CMA DFS unit presents an unreasonable risk of injury to health or the environment. Any such proposed additional conditions shall be preceded by reasonable advance notice to CMA/ System Contractor and opportunity for CMA/ System Contractor to comment on the proposed modifications.

Any departure from the conditions of this approval or the terms expressed in the application must receive prior written authorization of the Director, National Program Chemicals Division, Office of Pollution Prevention and Toxics. In this context, "application" shall be defined as all data and materials which have been received by this Agency from CMA/ System Contractors regarding the CMA DFS incinerator.

2. This approval to dispose of PCBs does not relieve CMA/ System Contractors of the responsibility to determine and comply with all applicable Federal, State and local regulations. Violations of any applicable regulations will be subject to enforcement, and may result in termination of this approval. This approval may be rescinded at any time for failure to comply with the terms and conditions herein, failure to disclose all relevant facts, or for any other reasons which the Director, National Program Chemicals Division deems necessary to protect health or the environment.

3. CMA/System Contractors shall be responsible for the actions of any authorized DFS incinerator employees when those actions are within the scope of operating or moving the DFS Process, and shall assume full responsibility for compliance with all applicable Federal, State and local regulations including, but not limited to, any advance or emergency notification and accident reporting requirements.

4. EPA reserves the right for its employees or agents to inspect the DFS Facilities' PCB disposal activities at any location or reasonable time.

5 July 2007
Date

Maria J. Doa, Ph.D.
Director
National Program Chemicals Division

APPENDIX I
DFS INCINERATOR

BACKGROUND

Section 6(e)(1)(A) of the Toxic Substances Control Act (TSCA) requires that EPA promulgate rules for the disposal of polychlorinated biphenyls (PCBs). The rules implementing section 6(e)(1)(A) were published in the Federal Register of May 31, 1979 (44 FR 31514) and recodified in the Federal Register of May 6, 1982 (47 FR 19527). Those rules require, among other things, that various types of PCBs and PCB Articles be disposed of in EPA-approved landfills (40 CFR 761.75), incinerators (40 CFR 761.70), high efficiency boilers (40 CFR 761.71), or by alternative methods (40 CFR 761.60(e)) that demonstrate a level of performance equivalent to EPA-approved incinerators or high efficiency boilers. The May 31, 1979 Federal Register also designated Regional Administrators as the approval authority for PCB disposal facilities.

On March 30, 1983, EPA issued a procedural rule amendment to the PCB rule (48 FR 13185). This procedural rule change transferred the review and approval authority of mobile and other PCB disposal facilities that are used in more than one region to the Office of Prevention, Pesticides and Toxic Substances (OPPTS). The purpose of the amendment is to eliminate duplication of effort in the regional offices and to unify the Agency's approach to PCB disposal. The amendment gives the Assistant Administrator authority to issue nationwide approvals (i.e., approvals which will be effective in all ten EPA regions) to mobile and other PCB disposal facilities that are used in more than one region. The authority was subsequently delegated to the Director, National Programs Chemical Division, Office of Pollution Prevention and Toxics.

PCBs, having been identified within the M55 Agent Rocket shipping and firing tube assembly, required the Army to begin disposal operations of the Rocket at the prototype demilitarization facility, Johnston Atoll Chemical Agent Disposal System (JACADS) Facility in Johnston Island, Pacific Ocean. Destruction of M55 Rocket components is performed in the Deactivation Furnace System (DFS). The DFS is one component of the demilitarization facilities for chemical munitions, storage containers, and the detoxification of nerve agents (GB and VX) and mustard agent (H and HD) fills. The demilitarization facilities include the DFS, the Dunnage Incinerator, the Liquid Incinerator (LIC) and the Metals Parts Furnace. The Army disposes of the M55 Rockets only in the DFS.

Under Congressional mandate and compliance with the Chemical Weapons Convention, the Department of the Army must dispose of existing stocks of chemical warfare agent munitions. The Army planned to operate eight facilities throughout the country to dispose of chemical agents. One of these facilities, Aberdeen Chemical Agent Disposal Facility (ABCDF), has completed the disposal of its stockpile of bulk mustard gas and has completed closure of the facility. In addition, Tooele Chemical Agent Disposal Facility (TOCDF) and Anniston Chemical Agent Disposal Facility (ANCDF) have completed their disposal of the M55 Chemical Agent Rockets. Both facilities are in the final stages of closure under TSCA.

M55 Rocket stockpiles were located in Tooele, Utah, Anniston, Alabama, Pine Bluff, Arkansas, and Umatilla, Oregon. The Army planned to operate a DFS at each of these locations for the disposal of M55 Rockets. These DFS facilities are at different stages of disposal: the DFS in Utah and Alabama have completed the disposal of the M55 Rocket while the facilities in Arkansas and Oregon continue their disposal of the M55 Rockets. As the DFS facility in each location is intended to be identical in design and operation, EPA is using a nationwide approval process for these facilities. Concentrating the review and approval for these facilities in the National Program Chemicals Division of the Office of Pollution Prevention and Toxics has enabled EPA to develop expertise in the complex technical issues involved in the simultaneous destruction of PCBs and chemical agent munitions. The knowledge gained from the start-up and trial burn processes at one DFS facility was applied to the next DFS facility. EPA believes that the nationwide approval process, in coordination with the EPA offices in the affected regions, is the best way to ensure that no DFS facility presents an unreasonable risk of injury to health or the environment from PCBs.

In 1993, the Army completed the operations verification tests (OVT) of the Army Johnston Atoll Chemical Agent Disposal Systems at JACADS. The completion of the OVT at Johnston Atoll was pivotal because, by Congressional Order, no chemical agent disposal activity may be conducted at any Army facility excepting Tooele, Utah, until the completion of the OVT effort at Johnston Atoll. Congress enacted Public Law 100-456, September 29, 1988, National Defense Authorization Act, FY 1989, establishing the deadline of December 31, 1990 to complete the OVT at Johnston Atoll. The deadline for eliminating the chemical agent stockpile was originally April 30, 1997, but has been extended to 2007 and subsequently to 2012.

The Army submitted in July 1993, an application and demonstration plan for a nationwide TSCA permit to dispose of PCBs in M55 Rockets at TOCDF. The application was updated June 6, 1996, December 12, 1996, and the demonstration plan, on April 8, 1996. Trial burn operations began December 15, 1996 with the Fuel Only/Baseline Run. The Army rescheduled the trial burn to January 1997. Four trial burn tests were completed January 7, 9, 10, and 11, 1997. The trial burn results were problematic which resulted in the Utah State Department of Environmental Quality invalidating the 1997 Trial Burn. Subsequently, the Army performed the TOCDF Trial Burn II in November 1998. As construction was completed at the remaining three facilities, trial burns were performed at each facility. ANCDF completed its trial burn in 2004 followed by Pine Bluff Chemical Agent Disposal Facility (PNCDF) in Arkansas and Umatilla Chemical Agent Disposal Facility (UMCDF) in Oregon in 2005.

FINDINGS

1. In 1979, the U.S. Department of the Army initiated operations to destroy M55 rockets in the Deactivation Furnace System (DFS) located in the Chemical Agent Munitions Disposal System (CAMDS) in Tooele Army Depot, Tooele, Utah. In the fall of 1985, PCBs were identified in the F/S tubes which encase the M55 rockets.

The M55 Rocket firing/shipping (F/S) tubes consist of either chopped or matted fiberglass, depending on manufacturer, and weigh approximately 14 pounds each. The two types of tubes are readily discernable visually. Analytical results from a sample of 55 tubes revealed

that the chopped variety consistently contained PCBs below 50 mg/kg (50 ppm). The matted type showed some results below 50 mg/kg PCBs; however, the majority of matted tubes contained PCBs above 2000 mg/kg with a high concentration of 4290 mg/kg. One matted tube that had been painted or coated, contained a level of 15,200 mg/kg PCBs and was considered a statistical outlier and therefore not used by the Army in the calculation of PCB content.

Additional samples of the F/S tubes revealed that 3% of the 147 chopped tubes sampled contained PCB concentrations of over 50 ppm. The 1000 matted F/S tubes sampled exhibited a bimodal distribution with 47% of the matted tubes containing less than 50 ppm PCBs and 53% of the tubes containing PCBs concentrations of over 2700 ppm. The highest concentration of PCBs in the matted F/S tubes was found to be 5800 ppm. The Army has sampled rockets from the TOCDF stockpile of M55 rockets to characterize the feedstock. The average concentration was 1,247 ppm PCBs analyzed from a number of rockets. This concentration was used to calculate the destruction and removal efficiency of the TOCDF incinerator.

2. The Deactivation Furnace System contains the Explosive Containment Room (ECR), the Retort, and the Pollution Abatement System (PAS). Operators transport the rockets from storage, unpack and load them onto a conveyor leading to the ECR. Instruments control operations in the ECR automatically. A punch unit pierces the rocket warheads, draining and removing up to 95% of the chemical agent. A shearing apparatus cuts the rocket into eight segments. The pieces are dropped into the Retort through a sliding gate and then through a tipping valve. The sliding gate acts as a barrier to contain any deflagration or explosion. The rocket segments travel through the Retort countercurrent or opposite to flow of hot gases and exit through a heated discharge conveyor.

3. Combustion gases pass through a blast attenuation duct and flow into the Cyclone separating large particulates from the gas stream. The gases continue through a slagging afterburner and a quencher, and are then cleansed, using a Venturi scrubber and a packed bed scrubber. Finally, the gases pass through a mist eliminator and are discharged.

4. The Retort is a rotary kiln with the burner located at the exit (rocket segment exit) rated at eight million BTU/hr. Fugitive emissions are controlled by operating the furnace under negative pressure. The kiln rotates at 0.33 to 2 rpm. The kiln retains solids in the kiln about 6 to 24 minutes and for an additional 19 minutes in the heated discharge conveyor. The Retort and conveyor operate at a minimum temperature of 1000°F. Dimensions of the Retort are nominally 5-feet in diameter and 32 feet 10-1/2 inches long.

5. A sealed drum below the cyclone collects particulates, primarily fiberglass. The cyclone collection has been changed to include a gate discharge valve mechanism. The collected material is periodically analyzed for chemical agents.

6. The afterburner, with a retention time of greater than two second, operates at 2150°F. The quench tower reduces exhaust gases to less than 300°F while the Venturi scrubber removes particulates. A single closed loop brine system serves both the quench tower and the Venturi scrubber. A packed tower removes acidic gases while a controller unit in the closed loop system maintains brine pH at a level of about 8.

7. Details of the Deactivation Furnace System and the agent rockets were filed with EPA Headquarters in Washington, D.C. in the application and demonstration plan for TSCA PCB Disposal approval dated July 1993.

8. **Trial Burns**:

a. TOCDF:

(1) **Trial Burn July 2003**: TOCDF performed a DFS Agent Trial Burn in July 2003 for VX M55 Chemical Agent Rockets to comply with the Utah Department of Environmental Quality requirements. Emission test results demonstrated that TOCDF did not meet the 99.9999% Destruction and Removal Efficiency (six 9s DRE) required by PCB regulations for non-liquid PCB incinerators (§761.70(b))(Table A). A fuel-only-burn (FOB) test normally performed at the outset of a trial burn, revealed high PCB emissions. This is anomalous because no PCBs or hazardous waste is incinerated during a FOB test. The PCB emission during the FOB test was < 2.6E-05 lb/hr as compared to < 0.05.4E-05 lb/hr for Run 1, at least one order of magnitude higher.

Analysis from additional samples revealed significant quantities of PCB in the samples. Stack samples results tabulated in Tables A1 through A4 showed substantial quantities of PCBs. Solvent extracts from TOC and Dioxin samples were sampled for PCBs and revealed elevated PCB quantities. Substantial quantity of PCBs was also found in the Field Blank. PCBs were not detected in the Reagent Blank and the Method Blank contained insignificant amount of PCBs, indicating that the contamination was not from the laboratory. Clearly, the high PCB emissions originated from an extraneous PCB source not related to the M55 Rockets. A Post-Trial Burn study was performed to determine the source of the extraneous PCBs.

Table A. VX RCRA Agent Trial Burn, July 2003

Parameter	Units	FOB	Run 1	Run 2	Run 3	Average
Rocket Feed Rate	Rockets/hr	0	21.8	20.8	21.3	
PCB Feed Rate	lb/hr	0	0.3732	0.3561	0.3647	
PCB Emission Rate	lb/hr	< 2.6E-05	< 5.4E-07	< 6.2E-07	< 5.5E-07	
PCB DRE	%	NA	>99.999856	>99.999825	>99.999848	>99.999843
PCB TEQ Concentration	ng/dscm	< 0.0035	< 0.0027	< 0.0028	< 0.0027	

			Run 5	Run 6	Run 8	
PCB TEQ Concentration	ng/dscm		< 0.0052	< 0.0053	< 0.0050	

Table A1. Total PCBs in Stack Samples, ng

Tests / Parameter	FOB	Run 1	Run 2	Run 3	Run 5	Run 6	Run 8
PCB, ng	4461	165	107	95.9	92.2	73.4	64.5

Table A2. Post Trial Burn Study, Total PCBs in Samples, ng

Tests / Parameter	Field Blank	Reagent Blank	Method Blank 1	Method Blank 2
PCB, ng	59.9	ND	1.84	0.89

Table A3. PCBs in Solvent Extracts from TOC Samples, ng

TOC Trains / Parameter	FOB	Run 1	Run 2	Run 3	Run 5	Run 6	Run 8	Field Blank
PCB, ng	118	114	32.8	90.7	69	74.1	NA	90.1

Table A4. PCBs in Solvent Extracts from Dioxin Samples, ng

Dioxin Trains / Parameter	FOB	Run 1	Run 2	Run 3	Run 5	Run 6	Run 8	Field Blank
PCB, ng	1865	93.3	NA	NA	NA	NA	NA	42.3

(2) **Post-Trial Burn Study**: Tests performed to determine the source of extraneous PCBs were inconclusive. To determine whether process changes through repairs and maintenance may have been the source of extraneous PCBs, TOCDF collected process samples, i.e., (a) coating material used on the exhaust duct after it had been cleaned, (b) fiberglass media in the mist eliminator after repair on the unit was completed, (c) new fiberglass material, and (d) anti-foam additive (Table B). PCBs were not detected in the process samples. Ambient air samples from the DFS stack sampling shelter contained small quantities of PCBs but not significant enough to be the source of the extraneous PCBs.

Table B. Post Trial Burn Study, Process Equipment Samples, Total PCBs, ng

TOC Trains / Parameter	Exhaust Duct Coating	Mist Eliminator Media, used	Mist Eliminator Media, new	Mist Eliminator Additive	Ambient DFS Sampling Shelter Sample 1	Ambient DFS Sampling Shelter Sample 2
PCB, ng	ND	ND	ND	ND	5.04	2.81

Following this, TOCDF performed tests at the stack sampling contractor's (TRC) facility using actual stack sampling trains. Flexible Teflon tubes are used to transport

stack gas from the sampling probe to the sample collection train. The Teflon tubes, or sample transfer lines, were one of the suspected sources of the extraneous PCBs. Clean unused stack sampling probes and Teflon transfer lines trains were utilized for the tests. Three sampling trains were set up to sample ambient air in TRC's facility. The probe, transfer lines and glassware were rinsed with toluene and the rinsate analyzed for PCBs. Small quantities of PCBs were detected (see Table B1). Each sampling train was prepared and used in a different manner. One sampling train had all glassware heated at 400°C for two hours and the probe and transfer line heated as done in actual stack sampling (Baked, Heated). A second sampling train had glassware not heat treated and the probe and transfer line not heated during sampling (Non-Baked, Unheated). The third sampling train had glassware not heat treated and the probe and transfer line heated as done in actual stack sampling (Non-Baked, Heated). Analytical results indicate that when the transfer lines are heated, significant quantities of PCBs are captured in the sampling train. This fact convincingly points to the transfer lines being the source of the extraneous PCBs.

EPA collected a sample of the transfer line, new and unused, and analyzed the sample by solvent extraction and thermal extraction using a temperature close to the field sampling temperature. No PCBs were detected. This finding offsets the conclusion reached by TOCDF, thus the result is inconclusive.

Table B1. PCBs in Teflon Transfer Lines at TRC and EPA Analysis, ng

Dioxin Trains / Parameter	TRC Non-Baked, Heated	TRC Non-Baked, Unheated	TRC Baked, Heated	TRC Toluene Rinse 1	TRC Toluene Rinse 2	EPA solvent extracted	EPA thermal extracted
PCB, ng	130	35.3	447	< 4.93	< 1.00	ND	ND

(3) **TSCA VX Mini Burn, October 2003**: To test the premise that the Teflon transfer line used in the ATB stack sampling was the source of extraneous PCBs, TOCDF retained another contractor, URS, who provided an all-glass sampling train for use. Employing the all-glass sampling train and a sampling train with a transfer line using Teflon tubing from a different manufacturer, TOCDF performed a two-test mini trial burn. Results of the Mini-Burn in Table C indicate that the new sample trains provided acceptable emission results. TOCDF then proceeded to a full Trial Burn.

Table C. Mini Burn PCB Emission Results

Parameter	Units	Run 1A*	Run 1B	Run 2A*	Run 2B
Rocket Feed Rate	Rockets/hr	21.86	21.86	20.38	38
PCB Feed Rate	Lb/hr	0.3743	0.3743	0.3489	0.3489
PCB Emission Rate	Lb/r	<3.3E-07	<2.7E-07	<1.3E-07	<8.5E-08
PCB DRE	%	>99.999913	>99.999928	>99.999964	>99.999976

*The A designates an all-glass sampling train and B designates use of Teflon sample transfer lines.

(4) **TSCA VX Performance Tests, November 2003**: After results of the Mini Burn proved acceptable, TOCDF proceeded with the TSCA Trial Burn. Using the sampling trains from the Mini Burn, the TSCA VX Trial Burn resulted in acceptable PCB emissions, meeting the required six 9s DREs for PCB incinerators (Table D and Table D1).

Table D. TSCA VX Trial Burn

Parameter	Units	FOB RunA*	FOB Run B	Run 1A*	Run 1B
Rocket Feed Rate	Rockets/hr	0	0	20.18	20.18
PCB Feed Rate	Lb/hr	0	0	0.3455	0.3455
PCB Emission Rate	Lb/r	<5.8E-08	<5.8E-08	<5.7E-08	<5.7E-08
PCB DRE	%			>99.999983	>99.999983

Table D1. TSCA VX Trial Burn

Parameter	Units	Run 2A*	Run 2B	Run 4A*	Run 4B
Rocket Feed Rate	Rockets/hr	20.37	20.37	20.99	20.99
PCB Feed Rate	Lb/hr	0.3488	0.3488	0.3594	0.3594
PCB Emission Rate	Lb/r	<6.3E-08	<6.3E-08	<6.0E-08	<5.9E-08
PCB DRE	%	>99.999982	>99.999982	>99.999984	>99.999984

*A designates an all-glass sampling train.

b. Anniston

(1) **Trial Burn 1**: Over concerns that Teflon transfer lines may contain PCBs, the Army directed ANCDF to use the all-glass sampling train. At TOCDF, the all-glass sampling train was suspended vertically from a building structure to sample the horizontal DFS Stack. At ANCDF, no structure was available for suspending a sampling train vertically. Therefore, the all-glass sampling train was used on the Common Stack where horizontal mounting and usage could be executed. The Common Stack, designed to discharge flue gas from three incinerators, the DFS, the LIC and the MPF, necessarily is constructed with a diameter larger than the DFS. Thus, when only the DFS is operating, the volume of flue gas from one incinerator results in gas velocity which is too low to meet the minimum requirement for stack sampling. To augment the flue gas flow in the Common Stack thus increasing the stack gas velocity to acceptable levels, the LIC was operated with fuel only, no feed, along with the DFS. DRE results from the Common Stack during Trial Burn 1 for Runs 1, 2 and 4 did not meet the six 9s DRE required for PCB incinerators. In contrast, DRE results from the DFS for Runs 1, 2 and 4 met the six 9s DRE but the result for Run 3 did not. Despite this, it should be emphasized that the PCB emissions rates from the stacks did meet the State PCB emissions standard and the PCB Toxicity Equivalent emissions were less than the Health Risk Assessment value (Table E1).

Table E. Trial Burn 1, PCB Emission Results

	Common Stack		DFS Stack		State PCB Standard, g/sec
Run No.	DREs .	PCB Emission, g/s	DREs .	PCB Emissions, g/s	
1	99.99928*	<5.29E-07	99.99990	<7.13E-08	6.45E-07
2	99.99963	2.68E-07	99.99990	<7.03E-08	
3	99.99998	<1.54E-08	99.99981	<1.38E-07	
4	99.99979	<1.57E-07	99.99993	<4.81E-08	

Table E1. Trial Burn 1, PCB Toxicity Equivalent Emissions

	Common Stack	DFS Stack	HRA PCB Toxicity Eq., g/sec
Run No.	PCB Toxicity Eq., g/sec	PCB Toxicity Eq., g/sec	
1	<2.78E-11	<2.34E-11	2.00E-10
2	<3.06E-11	<2.24E-11	
3	<8.12E-13	<2.40E-11	
4	<1.67E-11	<2.23E-11	

(2) **Extraneous PCBs**: During the shakedown phase of the LIC, ANCDF detected PCBs in the flue gas, during fuel only tests with no PCBs introduced into the unit. Natural gas being the fuel for the LIC and the fact that natural gas pipelines have been known to be contaminated with PCB, the source of the extraneous PCBs was thought to be the natural gas. Another possible source was ambient air. There are technical references to PCBs being detected after the occurrences of forest fires. During Trial Burn 1, a number of forest fires, including controlled fires, occurred. Samples of the following possible source were taken:

- Natural gas pipeline
- Stack sampling ports
- The Pollution Abatement System Filtration System (PFS)
  - Condensate
  - HEPA filter elements (new)
  - Carbon (new) for the carbon filter banks.
- Water treatment chemical in the Pollution Abatement System (PAS)
- XAD-2 Resin for the sack sampling train

All sample results were negative. Ambient air samples were collected during the replicate Trial Burn 2.

(3) **Trial Burn 2**: ANCDF carried out Trial Burn 2 by sampling flue gas from the Common Stack, the DFS stack, the LIC stack and the Ambient Air which provides combustion air to the incinerators. As results in Table F indicates, DREs calculated from PCB emissions in the Common Stack and DFS complies with the six 9s DRE requirement for PCB incinerators. PCB emission rates are less than the State emission standard. Likewise, Dioxin TEQ emissions comply with the MACT standard and permit limits as indicated in Tables F1 and F2.

Table F. Trial Burn 2, PCB Emission Results

	Common Stack		DFS Stack		
Run No.	DREs	PCB Emissions, g/sec	DREs	PCB Emissions, g/sec	Alabama CAA Emission Rate, g/sec
2	99.999987	4.66E-08	99.999995	1.87E-08	6.45E-07
3	99.999974	9.27E-08	99.999995	1.87E-07	
4	99.999993	2.84E-07	99.999993	2.64E-08	

Table F1. Trial Burn 2, Dioxin/Furan Total and TEQ at the DFS, g/sec

	Common Stack		DFS Stack		MACT Concentration Limit, TEQ, ng/dscm
Run No.	Emission Rate Total, g/sec	Concentration Total, ng/dscm	Emission Rate TEQ, g/sec	Concentration TEQ, ng/dscm	
2	<5.26E-11	<0.0144	<9.79E-12	<0.0027	**0.2**
3	<5.44E-11	<0.0154	<9.98E-12	<0.0028	
4	<5.31E-11	<0.0147	<1.01E-11	<0.0028	

Table F2. Trial Burn 2, RCRA/CAA Dioxin/Furan Emission Rate at the DFS, g/sec

	PCDDs					PCDFs					
Run No	2,3,7,8 Tetra-	Penta-	Hexa-	Hepta-	Octa-	2,3,7,8 Tetra-	Penta-	Hexa-	Hepta-	Octa-	Total CDD/CDF
2	<7.42E-12	<1.57E-11	<3.13E-11	<1.25E-11	<1.67E-11	<7.60E-12	<2.03E-11	<3.22E-11	<2.03E-11	<1.52E-11	<0.008
3	<7.61E-12	<1.47E-11	<3.17E-11	<1.17E-11	<1.47E-11	<7.78E-12	<2.14E-11	<3.22E-11	<2.12E-11	<1.65E-11	<0.008
4	<8.23E-12	<1.53E-11	<3.19E-11	<1.42E-11	<1.42E-11	<6.22E-12	<2.20E-11	<3.22E-11	<1.78E-11	<1.69E-11	<0.008
Permit Limit	**5.54E-11**	**2.77E-10**	**7.57E-10**	**5.93E-11**	**1.26E-11**	**5.54E-11**	**5.68E-10**	**1.16E-10**	**6.69E-11**	**5.54E-11**	**0.2**

(4) **PCBs in Ambient Air**: Stack sampling trains were set up in four locations starting with the Common Stack and the two contributory stacks, the DFS stack and the LIC stack, and the ambient air site. The ambient air sampling location was adjacent to the air intake to the Munitions Demolition Building. Combustion air to all the incinerators enters through this intake. Table F3 lists the PCB concentration at all four locations. Results indicate that the Ambient Air contains PCBs at significant levels. Generally, the PCB concentration in the Ambient Air is about a factor higher than the PCB concentration in the three stacks. Previously mentioned, ANCDF believed that forest fires occurring during Trial 1, both controlled and uncontrolled, contributed PCBs into Ambient Air. Samples of soil and vegetation were collected from two sites where fires were known to have occurred during Trial Burn 1 and one unburned site. PCBs were detected in the forest fire samples; however, the congener or chemical profiles of the Ambient Air PCBs did not match those of the forest fire PCBs.

With the forest fires discounted as the source of PCBs, another possible source of the extraneous PCBs was considered. The Solutia plant, (formerly Monsanto), and the surrounding contaminated sites have been monitored in the past for PCBs in the

surrounding air. PCBs had been detected in nearby air samples. However, Solutia and the sites are located about six miles away in a south east direction in the opposite direction of the prevalent wind. Thus Solutia and the contaminated sites are unlikely sources of the Ambient Air PCBs. The source of the extraneous PCBs has not been determined.

Table F3, Trial Burn 2, PCB Emission Concentrations, ng/dscm

Run No	DFS Stack	LIC Stack	Common Stack	Ambient Air
2	5.1	7.9	10.0	25.9
3	5.3	6.2	25.0	24.1
4	6.8	23.8	7.4	36.5
Avg.	5.3	12.3	14.1	28.8

c. Pine Bluff:

The TSCA Trial Burn at PBCDF achieved the six 9s DREs required of PCB incinerators, and the MACT Dioxin concentration and emission rate (Table G).

Table G: PBCDF Trial Burn, October 2005

Parameter	Run 1	Run 2	Run 3	Avg.	MACT Limit
Rocket Feed Rate, Rkt/hr	33.40	32.86	33.43	33.23	
PCB Feed Rate, b/hr	0.902	0.887	0.902	0.897	
PCB Emission Rates, lbs/hr	< 2.67E-07	< 3.23E-07	< 2.83E-07	< 2.91E-07	
DREs, %	> 99.99997	> 99.99996	> 99.99997	< 99.99997	
PCDDs/PCDFs, Concentration, TEQs Totals, ng/dscm	< 0.013	0.019	0.018	0.017	0.2
PCDDs/PCDFs, emission rates, TEQs g/sec	< 6.01E-11	< 6.26E-11	< 6.02E-11	< 6.09E-11	6.69E-10

d. Umatilla:

As was with the PBCDF Trial Burns, the UMCDF Trial achieved the six 9s DREs required of PCB incinerators, the RCRA Permit Limit and the MACT limit for Dioxin concentration and emission rate.

Table H: UMCDF Trial Burn, October 2005

Parameter	Run 2	Run 3	Run 4	Avg.	RCRA Permit Limit MACT Limit
Rocket Feed Rate, Rkt/hr	35.3	36.0	37.0	36.08	
PCB Feed Rate, b/hr	0.97	0.99	1.02	0.99	
PCB Emission Rates, lbs/hr	< 1.72E-07	< 1.54E-07	< 1.54E-07	< 2.01E-07	
DREs, %	> 99.99998	> 99.99998	> 99.99998	< 99.99998	
PCDDs/PCDFs, Concentration, TEQs Totals, ng/dscm	< 0.0139	0.0141	0.0316	0.0199	0.2
PCDDs/PCDFs, emission rates, TEQs g/sec	< 5.63E-11	< 5.61E-11	< 1.27E-11	< 8.009E-11	6.69E-10

9. The four Chemical Agent Disposal Facilities at Tooele, Utah; Anniston; AL; Pine Bluff, AR; and Umatilla, OR, demonstrated performance of the DFS. EPA finds that the DFS meets or exceeds the operating performance criteria for incineration of non-liquid PCBs under 40 CFR 761.70. The currently accepted performance level for EPA-approved incinerators is 99.9999% destruction and removal efficiency (DRE) for PCBs. The Agency has judged that these criteria are met and that the operation of this thermal destruction technology will not present an unreasonable risk to human health or the environment.

Appendix II
Correspondence

(1) Correspondence: US EPA, To: Clara Moraga, From: Maria J. Doa, Ph.D., Director, NPCD, Dec. 30, 2004

(2) Correspondence: US EPA, To: Lt. Col. CM USA Holliday, et. al. From: Maria J. Doa, Ph.D., Director, NPCD, Oct. 20, 2005.

(3) Correspondence: US EPA, To: Lt. Col. CM USA Donna Rutten, et. al., From: Maria J. Doa, Ph.D., Director, NPCD, Dec. 12, 2006.

Appendix II - 1
Correspondence

(1) Correspondence: US EPA, To: Clara Moraga, From: Maria J. Doa, Ph.D., Director, NPCD, Dec. 30, 2004

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

DEC 30 2004

OFFICE OF
PREVENTION, PESTICIDES AND
TOXIC SUBSTANCES

Clara Moraga
Assistant Site Manager
Pine Bluff Chemical Agent Disposal Facility
57-210 Webster Road
Pine Bluff, AR 71802

Dear Ms. Moraga:

This is in response to your email dated December 13, 2004, informing the National Program Chemicals Division (NPCD) of the Environmental Protection Agency (EPA) of your intention to begin chemical agent M55 rocket disposal operations no earlier than the second quarter of Fiscal Year 2005. The M55 rockets, which contain PCBs greater than 50 ppm in the shipping/firing tubes, are regulated under the Toxic Substances Control Act (TSCA). Conditions 1.a and 1.b of the National PCB Disposal Approval (Permit) issued June 6, 2002, require each chemical agent disposal facility designated in that approval to provide certain information to EPA prior to receiving authorization to proceed with PCB disposal operations. You included in your email an electronic copy of a memorandum from the Assistant Secretary of the Army for Acquisition, Logistics and Technology concurring with the procedure to notify Congress of the plan by Pine Bluff Chemical Agent Disposal Facility (PBCDF) to begin chemical agent disposal operations. This satisfies Conditions 1.a and 1.b of the Permit. Therefore, by this letter, I authorize PBCDF to begin PCB disposal operations beginning the second quarter of Fiscal Year 2005.

Please contact Hiroshi Dodohara, at (202) 566-0507, for any technical questions regarding this correspondence.

Sincerely,

Maria J. Doa, Ph.D.
Director
National Program Chemicals Division

cc: PCB Coordinator -
Regions IV, VI, VIII, X

James Sales
EPA Region VI

Mr. Mike Bates, Chief HW Div.
Arkansas DEQ

Mr. Joe Hoover, Active Sites Br.
Arkansas DEQ

[redacted] [redacted]

Correspondence 1 - 3

DEPARTMENT OF THE ARMY
OFFICE OF THE ASSISTANT SECRETARY OF THE ARI
ACQUISITION LOGISTICS AND TECHNOLOGY
103 ARMY PENTAGON
WASHINGTON DC 20310-0103

09 DEC 2004

SAAL-ZC

MEMORANDUM FOR DEFENSE ACQUISITION EXECUTIVE

SUBJECT: Congressional Notification of the Start of Destruction Operations at the Pine Bluff Chemical Agent Disposal Facility (PBCDF)–ACTION MEMORANDUM

This memorandum provides Army concurrence to proceed with the notification to the President of the Senate, the Speaker of the House, and the Defense Committees of the Army's intent to begin destruction operations at the Pine Bluff Chemical Agent Disposal Facility (PBCDF).

The Program Manager for the Elimination of Chemical Weapons has provided notice to Headquarters, Department of the Army of meeting the necessary requirements to begin disposal operations at the PBCDF no earlier than the Second Quarter Fiscal Year 2005.

In accordance with Title 50 United States Code Section 1512, notification must be provided to the President of the Senate and the Speaker of the House at least 30 days prior to the start of these operations.

Coordination information is provided on the HQDA Form 5.

I concur with proceeding with Congressional notification of the planned start up of operations at the PBCDF as indicated by my signature. Recommend forwarding the proposed letter for Secretary of Defense signature (Tab A).

Encl

Claude M. Bolton, Jr.
Assistant Secretary of the Army
(Acquisition, Logistics and Technology)

TAB D Coordination Sheet

SUBJECT: Congressional Notification of the Start of Operations at the Pine Bluff Chemical Agent Disposal Facility

Legislative Affairs	Mr. Stanley	10/1/04
Army	Claude M. Bolton Jr.	09 DEC 2004
General Counsel		
Public Affairs		

Correspondence 1 - 5

"Moraga, Clara CMA-PBA (PKI)" <MoragaC@pbcdf.com>
12/13/2004 10:11 AM

To Hiroshi Dodahara/DC/USEPA/US@EPA
cc
bcc
Subject PBCDF progress

Attached is a scanned copy of Mr. Bolton's concurrence for the PBCDF start-up.[Moraga, Clara CMA-PBA (PKI)] He is the Assistant Secretary for the Army (Acquisition, Logistics, Technology) Is a prereq step essentially saying - the Notification to Congress SHOULD proceed and has his support.

This just FYI that things are progressing Dodi in support of our firing up early 2005; so hope the recent change pages and resubmittal of our PBCDF TBP is going well? If any issues, please let us know ASAP so we can address them. Otherwise, if it's looking ok to you, please let us know that it meets with your technical concurrence.

THanks!
Clara

PBCDF Coord DAE.tif

Appendix II - 2
Correspondence

(2) Correspondence: US EPA, To: Lt. Col. CM USA Holliday, et. al. From: Maria J. Doa, Ph.D., Director, NPCD, Oct. 20, 2005.

Correspondence 2 - 1

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

OCT 20 2005

David E. Holliday, Lt. Col., CM, USA
Commander

OFFICE OF
PREVENTION, PESTICIDES AND
TOXIC SUBSTANCES

Don E. Barclay
UMCDF Site Project Manager

Douglas G. Hamrick
Washington Demilitarization Company
Project General Manager
Umatilla Chemical Agent Disposal Facility
78072 Ordnance Road
Hermiston, OR 97838

Gentlemen:

The National Program Chemicals Division (NPCD) of the Environmental Protection Agency (EPA) authorizes the Umatilla Chemical Disposal Facility (UMCDF) to commence Interim Operations upon completion of the PCB Disposal Deactivation Furnace System (DFS) Agent Trial Burn. Your letter dated October 17, 2005 requested approval to continue operations after completion of the Trial Burn scheduled for completion on October 23, 2005. On October 15, 2005, NPCD received the draft submission of data indicating the destruction and removal efficiency of 99.9999% (six 9s DRE) during shakedown operations, as required by Condition 2.b.(3) of the National Approval dated June 6, 2003 pursuant to the Toxic Substances Control Act (TSCA). NPCD reviewed this report and found this report acceptable. Pertinent data from the report is summarized in Table A of the Enclosure. NPCD authorizes UMCDF to operate the DFS at a maximum rocket feed rate of 29.3 rockets per hour, which is the average of the two highest feed rate during the shakedown tests. This authorization becomes effective on October 24, 2005 during which post-Trial-Burn operations begin.

Please direct all technical questions pertaining to this approval to Hiroshi Dodohara at (202) 566-0507.

Sincerely,

Maria J. Doa, Ph.D.
Director
National Program Chemicals Division

Enclosure

Enclosure

Table A
Results from the Umatilla Chemical Agent Disposal Facilty

October 6 – October 10, 2005

Parameters	Units	Run 1 10-9-05	Run 2 10-9-05	Run 3 10-10-05	Run 4 10-10-05
PCB DRE	%	NA[2]	>99.99997	>99.99997	>99.99997
PCB Emission Rate	gm/sec	NA[2]	<2.28E-08	<2.22E-08	<2.25E-08
Shipping/firing tube weight	lb	NA[2]	13.73	13.73	13.73
PCB Concentration in tube	ppm	NA[2]	2,006	2,006	2,006
Rocket Feed Rate	rocket/hr	29.6	27.3	29.3	29.3
PCB Feed Rate	lb/hr	NA[2]	0.753	0.807	0.807
Rotary Retort Temp., ROHA[1]	°F	1,134.0	1,108.3	1,125.1	1,137.6
Afterburner Temp.	°F	2,100.4	2,100.5	2,100.2	2,100.4
Afterburner Flow Rate, ROHA[1]	°F	0.610	0.626	0.609	0.608
CO concentration, ROHA	ppmv	0.0	0.0	0.0	0.2

cc: Joe Stang
Army CMA

Cathy Massimino
EPA Region X

Dan Duncan
EPA Region X

Dennis Murphy
Oregon DEQ

Appendix II - 3
Correspondence

(3) Correspondence: US EPA, To: Lt. Col. CM USA Donna Rutten, et. al., From: Maria J. Doa, Ph.D., Director, NPCD, Dec. 12, 2006.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

DEC 1 2 2006

OFFICE OF
PREVENTION, PESTICIDES AND
TOXIC SUBSTANCES

Donna E. Rutten, Lt. Col., CM, USA
Commander

Don E. Barclay
UMCDF Site Project Manager

Douglas G. Hamrick
Washington Demilitarization Company
Project General Manager
Umatilla Chemical Agent Disposal Facility
78072 Ordnance Road
Hermiston, Oregon 97838

Dear Lt. Colonel Rutten and Messrs. Barclay and Hamrick:

This is in response to your letter dated October 19, 2006, which requests relief from the minimum combustion efficiency (CE) operating limit imposed in the TSCA PCB Disposal Approval dated June 6, 2002. The National Program Chemicals Division (NPCD) of the Environmental Protection Agency (EPA) authorizes the Umatilla Chemical Disposal Facility (UMCDF) to discontinue the application of CE as part of the operational control system. However, UMCDF must retain the capability to monitor CE for purposes such as periodic comprehensive testing required by Federal, state and other agencies.

Ideally, to be an effective process control for combustion, carbon dioxide (CO_2) and carbon monoxide (CO), the two parameters of CE should be analyzed at the exit of combustion devices, the secondary combustor in this case. However, continuous monitoring systems which analyze gas directly from combustion devices may require high maintenance schedules. Sampling may be interrupted periodically because of obstruction in the sampling line. Because downtime for maintenance of this system may be significant, it may interfere with the effective treatment of the M55 Rockets. In addition, CO_2, having an affinity to be absorbed by aqueous solutions, may be absorbed by the caustic quench water and scrubber solution giving inaccurate CO_2 results. CO, being less absorptive, may be more appropriate as a control variable. As a result, many conventional incinerator designs place flue gas analyzers at or in the vicinity of the stack, measuring conditions at the point where the combustion gas discharges to the environment.

Condition 5.f of the National Permit requires continuous monitoring of the afterburner exhaust gas for CO_2 and CO. In Condition 2.a.(2).Q, the National Permit specifies an automatic waste feed cutoff (AWFCO) with a five-minute delay, activated when the combustion efficiency (CE) increases above 99.90%. In addition, Condition 2.a.(2).H requires a 5-minute delay AWFCO at > 100 ppm CO with an instantaneous AWFCO at 200 ppm CO. This is more stringent than the RCRA required AWFCO at a >100 ppm CO hourly rolling average.

Whether the replacement of the TSCA-required CE AWFCO with the 100 ppm CO limit is less restrictive and potentially poses a risk to health and the environment is addressed below. Table A (Enclosure) in Columns A and C, lists the CO limits which would activate the CE AWFCO for various fuels commonly used in hazardous waste incinerators. Additional values are presented in the last row from the combustion of PCB-contaminated mineral oil with natural gas fuel to assess the effect of incinerating PCB waste on the AWFCO CO limit. In Columns B and D, values of CO_2 in the combustion products are presented at two oxygen levels. One is at 3 % O_2, the limit for the incineration of PCBs, and at 7%, the O_2 level to which all combustion species are adjusted for regulatory consistency. The CO activation limits are estimated from the CO_2 values.

Column A lists the CO limits beginning with natural gas, progressing to heavier fuels and ending with the PCB waste combustion results. All values are above 100 ppm indicating that at the 3% O_2 level, the 100 ppm CO limit is more stringent than the CE AWFCO. Values in Column C are mixed. The lighter fuels show values less than 100 ppm; however, the PCB-contaminated mineral oil mixture exhibits a value above 100 ppm. Thus, with hazardous waste mixtures the 100 ppm CO limit is effective.

An additional concern must be addressed. This is the "rounding-off" phenomenon when computing and manipulating values with differences of three or more orders of magnitude. The CE equation works with CO_2 values in percent region with CO values in parts per million, which is a difference of at least three orders of magnitude. For example, many computers may round-off the number "99.85" or "99.86" to "99.9." As a result, when rounding off at 99.86% CE, the smallest CO limit in Table A would be 109.3 ppm and not the 78.1 ppm for natural gas in Column C. Likewise, the CO limit for the natural gas/PCB waste combustion would be 145 ppm. Thus, because such wide variation may occur in computed values, a non-computed value such as the CO limit may be more appropriate to implement as a control.

Finally, the UMCDF CO_2 and CO monitoring system is designed conventionally with the sampling point at the inlet to the stack. The flue gas is exposed to the quenching and scrubber solution and the uncertainties of absorption and the lag time between exiting the secondary combustor and entering the stack. Yet, UMCDF operates an effective Deactivation Furnace System to dispose of chemical agent M55 rockets. Data from the Trial Burn completed in October 2005 (Table B) indicate CO approaching zero, confirming effective combustion and disposal of PCB and chemical agent M55 rockets. Thus, by imposing a stringent AWFCO based on CO and discontinuing a potentially inconsistent AWFCO based on CE, NPCD finds this action does not present an unreasonable risk to health or the environment.

Please direct all technical questions pertaining to this approval to Hiroshi Dodohara at (202) 566-0507.

Sincerely,

Maria J. Doa, Ph.D.
Director
National Program Chemicals Division

Enclosure

cc: Joe Stang
Army CMA

Dan Duncan
EPA Region X

Rich Duval
Oregon DEQ

Enclosure

Table A. Combustion Efficiency
Comparison of AWFCO CO Limits for Various Fuels at CE of 99.9%

	Combustion Efficiency = 99.9%			
Type of Fuel	**A** CO AWCFO Limit at 3% O_2, ppm	**B** CO_2 Concentration in Combustion Products at 3% O_2, per cent	**C** CO AWCFO Limit at 7% O_2, ppm	**D** CO_2 Concentration in Combustion Products at 7% O_2, per cent
Natural Gas	101	10.1	78.1	7.8
Propane	117	11.7	91.7	9.17
Low End #2 Fuel Oil (C_{10})	125	12.5	97.5	9.75
High End #2 Fuel Oil (C_{19})	135	13.5	98.9	9.89
Residual Oil (Nominal)	175	17.5	136	13.6
Coal	180	18.0	140	14.0
Natural Gas Plus Waste Feed of Mineral Oil + Aroclor 1254 (50/48/2) ratio	137	13.7	107	10.7

EXAMPLE CALCULATION:

Combustion of Propane (C_3H_8): Basis: One mole of air consists of 0.79 moles nitrogen (N_2) and 0.21 moles of oxygen (O_2). Gas analysis are performed on a dry basis, thus water (H_2O) is eliminated from the combustion gas during calculations.

The combustion equation for Propane is given below starting with X moles of Propane. The quantity of Propane is dependent on the concentration of oxygen remaining after combustion. The two oxygen concentrations selected for assessment are 3%, the minimum allowed by the PCB regulations and 7%, the nominal level to which combustion gas species are adjusted during analysis.

$$0.79\ N_2 + 0.21\ O_2 + X\ C_3H_8 = 0.79\ N_2 + (0.21 - 3X - 2X)\ O_2 + 3X\ CO_2 + 4X\ H_2O$$

EXAMPLE CALCULATION, (cont'd)

For 3% oxygen in combustion gas and CE = 99.9%:

The oxygen concentration $[O_2]$ in this case is the factor (0.21 – 3X – 2X) divided by the total quantity of combustion gas which is (0.79 N_2 + (0.21 – 3X – 2X) O_2 + 3X CO_2) minus the water. Molar volumes of all gas species are assumed to be equal.

Thus the oxygen concentration can be represented by:

$[O_2]$ = (0.21 – 3X – 2X) / (0.79 + 0.21 – 3X - 2X + 3X) = 0.03 on a dry basis
$[O_2]$ = (0.21 – 5X) / (1 – 2X) = 0.03 and solving for X,
(0.21 – 5X) = 0.03(1 – 2X)
5X – 0.03X = .21 – 0.03
4.97X = 0.18
X = 0.0362 moles of Propane

The concentration of carbon dioxide $[CO_2]$ may be calculated by going back to the combustion equation and calculation the quantity of CO_2 (3X) and dividing by the total quantity of combustion gas, on a dry basis (0.79 + 0.21 – 3X – 2X + 3X) or (1 – 2X).

$[CO_2]$ = 3X / (0.79 + 0.21 – 3X – 2X + 3X)
[CO2] = (3)(0.0362) / (1 – 2(0.0362))
[CO2] = 0.1086 / (1 – (2)(0.0362))
[CO2] = 0.1086 / 0.928
[CO2] = 0.117 or 11.7%

Finally, the concentration of carbon monoxide [CO] that activates the automatic feed shut down or AWFCO may be calculated using the Combustion Efficiency equation:

CE = $[CO_2]$ / (CO_2] + [CO]) x 100, thus
CE = 0.117/(0.117 + [CO]) x 100 = 99.9 and solving for [CO].
(0.117)(0.999) + 0.999[CO] = 0.117
0.116883 + 0.999[CO] = 0.117
[CO] = 0.000117
[CO] = 117 ppm

Table B
Results from the Umatilla Chemical Agent Disposal Facility

October 6 – October 10, 2005

Parameters	Units	Run 1 10-9-05	Run 2 10-9-05	Run 3 10-10-05	Run 4 10-10-05
PCB DRE	%	NA[2]	>99.99997	>99.99997	>99.99997
PCB Emission Rate	gm/sec	NA[2]	<2.28E-08	<2.22E-08	<2.25E-08
Shipping/firing tube weight	lb	NA[2]	13.73	13.73	13.73
PCB Concentration in tube	ppm	NA[2]	2,006	2,006	2,006
Rocket Feed Rate	rocket/hr	29.6	27.3	29.3	29.3
PCB Feed Rate	lb/hr	NA[2]	0.753	0.807	0.807
Rotary Retort Temp., ROHA[1]	°F	1,134.0	1,108.3	1,125.1	1,137.6
Afterburner Temp.	°F	2,100.4	2,100.5	2,100.2	2,100.4
Afterburner Flow Rate, ROHA[1]	°F	0.610	0.626	0.609	0.608
CO concentration, ROHA	ppmv	0.0	0.0	0.0	0.2

1. ROHA = rolling hourly average
2. UMCDF omitted Run 1 to be part of the Trial Burn, and did not analyze sample for PCBs.