DCN 266

STATE OF MISSOURI Mel Carnahan, Governor • David A. Shorr, Director
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL QUALITY
P.O. Box 176 Jefferson City, MO 65102-0176

April 11, 1995

HAND DELIVERED: SHARON TURPIN, Environmental Engineer

Mr. Scott Murrell
Chief, Environmental Division
U.S. Army Engineering Center and
Fort Leonard Wood
ATZT-DPW-EE
Fort Leonard Wood, MO 65473

RE: Air Permit Application - Project/Facility No. 3860-0004-026

Dear Mr. Murrell:

Enclosed with this letter is your permit to construct. Please note the special conditions, if any, on accompanying pages. Operation in accordance with these conditions and your permit application is necessary for continued compliance. The document entitled "Review of Application for Authority to Construct" is part of the permit as well and should be kept with the permit in your files.

The reverse side of your permit certificate has important information concerning standard permit conditions, and your rights and obligations under the laws and regulations of the State of Missouri.

If you have any questions or need additional information regarding this permit, you can contact me by phone at (314) 751-4817 or you may write to me at the Department of Natural Resources, Air Pollution Control Program, P.O. Box 176, Jefferson City, MO 65102.

Sincerely,

AIR POLLUTION CONTROL PROGRAM

Michael J. Stansfield, P. E.
Environmental Engineer

MJS:tb

Enclosures

c: Jefferson City Regional Office
Source File

Permit No.: 0495-013

STATE OF MISSOURI

DEPARTMENT OF NATURAL RESOURCES

MISSOURI AIR CONSERVATION COMMISSION

PERMIT TO CONSTRUCT

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

Permit Number: 0495-013 Facility I.D. Number: 3860-0004-026

Owner: U.S. Army Engineering Center and Fort Leonard Wood

Owner's Address: ATZT-DPW-EE, Fort Leonard Wood, MO 65473

Facility Name: U.S. Army Engineering Center and Fort Leonard Wood

Facility Address: ATZT-DPW-EE, Fort Leonard Wood, MO 65473

Legal Description: Pulaski County, S21, T35N, R8W

Application for Authority to Construct was made for:

**** a Chemical Decontamination Training Facility and Thermal Treatment Unit. This review was conducted in accordance with Section (5), Missouri State Rule 10 CSR 10-6.060, "Construction Permits Required." ****

☐ Special Conditions are not applicable to this permit.

☒ Special Conditions do apply to this permit and are listed as attachments starting on page 2.

April 10, 1995
EFFECTIVE DATE

John A. Young
DIRECTOR
DIVISION OF ENVIRONMENTAL QUALITY

) 780-1204 (3-95)

SPECIAL CONDITIONS:

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

Materials Which May Not Be Charged to the Incinerator

a. No hazardous wastes may be charged to this incinerator. A waste is considered to be hazardous if, in order that it be charged to an incinerator, a permit from the Missouri Hazardous Waste Program would first be required in order that such a waste be charged to an incinerator.

b. Certain gas mask filters may not be charged to the incinerator because these filters contain levels of chromium sufficient to characterize the filters as a hazardous waste. Specifically, C2 filter masks, stock number 4240-01-119-2315 may not be charged to the incinerator.

Emission Limits:

a. Particulate matter (as PM_{10}) - 30 milligrams per dry standard cubic meter (0.013 grains per dry standard cubic foot).

b. Carbon monoxide - 50 parts per million by volume.

c. Dioxins/furans - 1.9 nanograms per dry standard cubic meter, toxic equivalency (1989 toxic equivalency factors).

d. Hydrogen chloride - 42 parts per million by volume or 97% reduction (9-hour average), whichever is more stringent.

e. Mercury - 0.47 milligrams per dry standard cubic meter (0.22 grains per million dry standard cubic feet) or 85% reduction, whichever is more stringent.

f. Nerve Agents - no detectable quantity of either GB (sarin) or VX. For purposes of determining a detectable level of either nerve agent, it shall be sufficient to use equipment which is at least as sensitive to GB (sarin) and VX as the gas chromatographs used in the automatic continuous air monitoring system (ACAMS) units located adjacent to the "hot areas" in the training building.

SPECIAL CONDITIONS:

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

Performance Testing Conditions

a. Within 90 days of reaching full operation, but in no case later than 180 days after initial startup, an emission test shall be conducted in order to quantify air pollutant emissions. The stack test shall determine the emission rates of particulate matter (as PM_{10}), carbon monoxide, dioxins/furans, hydrogen chloride, mercury, and the nerve agents GB (sarin) and VX. A completed Proposed Test Plan Form (copy enclosed) will serve the purpose of notification and must be approved by the Air Pollution Control Program staff director prior to conducting emission testing.

b. The date on which performance tests are conducted must be pre-arranged with the Air Pollution Control Program (APCP) a minimum of 30 days prior to the proposed test date so that this Program may arrange a pretest meeting, if necessary, and assure that the test date is acceptable for an observer to be present. A completed Proposed Test Plan form enclosed may serve the purpose of notification and must be approved by the APCP prior to conducting the required emission testing.

c. Two copies of a written report of the performance test results shall be submitted to the Director of the Air Pollution Control Program within 30 days of completion of any required testing. The report must include legible copies of the raw data sheets, analytical instrument laboratory data, and complete sample calculations from the required EPA Test Methods for at least one sample run.

d. The test report is to fully account for all operational and emission parameters addressed both in the permit conditions as well as in any other applicable state or federal rules or regulations.

e. Performance testing shall be conducted under the condition of maximum process/production rate, or within ten per cent (10%) of this rated capacity. The process/production rate at which performance testing is conducted shall become the maximum process/production rate at which the incinerator is permitted to operate, under the authority granted by this permit.

SPECIAL CONDITIONS:

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

f. Actual conditions under which performance testing is conducted shall be recorded every fifteen (15) minutes throughout each of the test runs. These conditions are to include all relevant process/production parameters as well as all parameters relating to the status of emission controls: this data is to be included in the emissions test report. No maintenance or upgrade of emission control efficiency shall be undertaken during emission testing.

g. Testing shall be conducted during periods of representative conditions at the maximum process/production rates, not to include periods of startup, shutdown, or malfunction.

h. Emission testing results, in "mass of pollutant/volume of air," shall be reported for the pollution source airstream, free from any extraneous source of dilution air. Potential dilution airstreams shall either be sealed off prior to testing or else be measured by appropriate EPA test Methods and subtracted from the total airflow at the sampling location. Failure to account for dilution air can lead to cancellation of testing and/or a violation notice for "circumvention."

i. The owner or operator shall provide, or cause to be provided, performance testing facilities as follows:

i. Safe sampling platform(s).
ii. Safe access to sampling platform(s).
iii. Utilities for sampling and testing equipment.
iv. Sampling ports adequate for test methods applicable to this facility. This includes:
(1) Constructing the air pollution control system such that volumetric flow rates and pollutant emission rates can be accurately determined by applicable test methods and procedures;
(2) Providing a stack or duct free of cyclonic flow during performance tests, and;
(3) Removal of the port caps 24 hours prior to testing to verify both their removability as well as full-diameter clearance to the stack; caps may be retained hand tight.

PERMIT NUMBER
0495-013

FACILITY I.D. NUMBER
3860-0004-026

SPECIAL CONDITIONS:

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

j. Performance tests shall be conducted, and data reduced, in accordance with specified EPA Test Methods unless an equivalent or alternative test method is otherwise approved by the Director.

k. Unless otherwise specified, each performance test shall consist of three separate runs using the applicable test method. Each run shall be conducted for the time and under the conditions specified in the applicable standard.

l. For the purpose of determining compliance with applicable standards, the arithmetic mean of results of the three runs shall apply. Only, under rare circumstances and upon approval by the Director, may compliance be determined by the arithmetic mean of two runs.

PROPOSED TEST PLAN

Submitted to: MO Dept. of Natural Resources,
Air Pollution Control Program
P.O. Box 176, Jefferson City, MO 65102

Date Submitted: _____

Attention: _____

Proposed Test Date: _____

1.) FACILITY INFORMATION:		
Name:		
Address:		
City	State:	Zip:
Name & title of Contact Person:		
Phone No. of Contact Person:	Fax No.:	

2.) AIR POLLUTION SOURCE TO BE TESTED:				
Type of Source:				
Reason for Test:	☐	Condition of Permit	☐	Consent Agreement
	☐	Administrative Order		
	☐	Other (specify)		
Permit No. of Source to Be Tested:				
Address of Source:				
Directions to Source (or map attached):				
Initial Start-up Date:				

3.) TESTING FIRM INFORMATION:		
Name of Firm:		
Address:		
City	State:	Zip:
Name & title of Contact Person:		
Phone No. of Contact Person:	Fax No.:	
Number of employees of firm:		
No. of employees actually engaged in air pollution source testing:		
Organizational chart with names & title of personnel: (please attach)		

3.) TESTING FIRM INFORMATION: (cont.)	
Location & description of laboratory facilities:	
Subcontractor(s) utilized by firm for source testing activities:	
Number of air pollution sources previously tested by firm:	
Sources tested by firm in Missouri in past 3 years (source, test, date):	

4.) PERFORMANCE TEST INFORMATION:

	Pollutant	No. of Sampling Points	Total Time per Test Run	No. of Test Runs	Test Method to be Used
1.					
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					
11.					
12.					

PRELIMINARY METHOD 1 DATA

Duct to be Sampled:	Sketch of Stack or Duct with Port Locations & Distances Shown:

Duct Dimensions:

From inside far wall to outside of port	
Nipple length	
Depth (or diameter) of duct	
Width (rectangular duct)	

Equivalent Diameter:

$D_e = \frac{2 \times \text{Depth} \times \text{Width}}{\text{Depth} + \text{Width}} = \frac{2 (\quad)(\quad)}{(\quad + \quad)} =$ _____

Distance from Ports to Nearest Flow Disturbance

	Upstream	Downstream
Diameters		
Diameters		

Stack Area = IN^2

Calculated by:

LOCATION OF TRAVERSE POINTS IN CIRCULAR STACKS

	4	6	8	10	12	14	16	18	20	22	24
1	6.7	4.4	3.2	2.6	2.1	1.8	1.6	1.4	1.3	1.1	1.1
2	25.0	14.6	10.5	8.2	6.7	5.7	4.9	4.4	3.9	3.5	3.2
3	75.0	29.6	19.4	14.6	11.8	9.9	8.5	7.5	6.7	6.0	5.5
4	93.3	70.4	32.3	22.4	17.7	14.6	12.5	10.9	9.7	8.7	7.9
5		85.4	67.7	34.2	25.0	20.1	16.9	15	12.9	11.6	10.5
6		96	80.6	65.8	36	25.9	22.0	18.2	17	14.6	13.2
7			89.5	77.4	64.4	36.8	28.3	23.6	20.4	18.0	16.1
8			96.8	85.4	75.0	63.4	37.5	29.8	25.3	21.8	19.4
9				91.3	82.3	73.1	62.5	38	30.6	26.2	23.0
10				97.4	88.2	80	71.7	61.8	39	31.5	27.2
11					93.3	85.4	78.0	70.4	61.2	39.2	32.3
12					97.9	90.1	83.1	75.4	69	60.7	39.8

LOCATION OF TRAVERSE POINTS IN RECTANGULAR STACKS

	2	3	4	5	6	7	8	9	10	11	12
1	25.0	16.7	12.5	10.0	8.3	7.1	6.3	5.5	5.0	4.5	4.2
2	75.0	50.0	37.5	30.0	25.0	21.4	18.8	16.7	15.3	13.6	12.5
3		83.3	62.5	50.0	41.7	35.7	31.3	27.8	25.0	22.7	20.8
4			87.5	70.0	58.3	50.0	43.8	38.9	35.0	31.8	29.2
5				90.0	75.0	64.3	56.3	50.0	45.0	40.9	37.5
6					91.7	78.6	68.8	61.1	55.0	50.0	45.8
7						92.9	81.3	72.2	65.5	59.1	54.2
8							93.8	83	75.3	68.2	62.5
9								94.4	85.3	77.3	70.8
10									95.3	86.4	79.2
11										95.5	87.5
12											95.8

POINT	% of Stack I.D.	Stack I.D.	Distance from Outside Wall	Nipple Length	Distance from Outside of Port

NOTE: Cyclonic flow must be measured by instrument and shown to be absent prior to the initiation of sampling.

5.) GENERAL

A. Sampling Equipment Information:

The manufacturer and model of the sampling equipment to be used by the tester for the performance tests, along with a description of any equipment which may differ from that required by the specified method(s).

_____

_____

B. Test Procedures:

A description of any test procedures to be used in the conduct of the performance tests which may differ from the specified method(s).

_____

_____

NOTE: Deviations from EPA test methods observed during test procedures will not necessarily be corrected by agency observer and could result in agency rejection of test results.

C. Analytical Procedures:

A description of any analytical procedures which differ from the specified method(s).

_____

_____

D. Data Sheets:

A sample of all field data sheets which do not provide the data shown on the example sheets in 40 CFR 60 for the specified method(s).

E. Air Pollution Control Equipment:

Types and manufacturers of all control equipment:

_____

_____

Design or guarantee efficiency: _____

Design gas volume at full load (acfm): _____

Design pressure drop: _____

Maintenance schedule and method of recordkeeping: _____

6.) SPECIFIC: for Incinerators		
Provide a full description of the source operation, including as a minimum the following:		
A. Manufacturer and type of incinerator:		
B. Type of feed (batch, intermittent, continuous) and frequency:		
C. Design feed rate (lbs/hr, lbs/batch):		
D. Expected normal feed rate:		
E. Type of scales		
F. 24 hour operational flow scheme (ash removal, preheat, burn cycle, postheat, etc.):		
G. Type of fuel:		
H. Secondary chamber volume _____ (cubic feet) & sketch of chamber with inside dimensions:		
I. Type of secondary chamber temperature continuous chart recorder:		
J. Type(s) of waste and relative percentages:		
K. Hospital: YES NO	Licensed No. of Beds:	
Average bed occupancy:		

7.) CONTINUOUS MONITORING SYSTEM

A description of continuous monitoring system(s) including the following:

A. Manufacturer of each monitor:

B. Model number and serial number of each monitor:

C. Description of interface system (for extractive monitors):

D. Description of data acquisition and handling system:

E. Number of copies of operator's manual supplied with each monitor:

F. Name of testing firm that will perform the reference method tests for sulfur dioxide and/or nitrogen oxides during the continuous monitoring system performance evaluations:

G. Name of organization that will perform the continuous monitoring system performance evaluations (Source operator, monitoring system manufacturer or representative, or testing firm):

H. Anticipated starting date of the conditioning period for the monitoring systems:

I. Drawing of the monitoring system location(s) showing stack or duct dimensions, air pollution control equipment, fans, and location(s) of disturbances which affect monitor location(s) determination (May be shown on drawing required on Preliminary Test Method Page or attach to this document).

SOURCE TESTING REPORT FORMAT

COVER
- Plant name and location
- Source sampled
- Testing company or agency, name, and address

CERTIFICATION
- Certification by team leader
- Certification by reviewer (e.g.: Professional Engineer)

INTRODUCTION
- Test purpose
- Test location, type of process
- Test dates
- Pollutants tested
- Observers' names (industry and agency)
- Any other important background information

SUMMARY OF RESULTS
- Emission results
- Process data, as related to determination of compliance
- Allowable emissions
- Description of collected samples
- Visible emissions summary
- Discussion of errors, both real and apparent

SOURCE OPERATION
- Description of process and control device
- Process and control equipment flow diagram
- Process data and results, with example calculations
- Representatives of raw materials and products
- Any specially required operation demonstrated

SAMPLING and ANALYSIS PROCEDURES
- Sampling port location and dimensioned cross section
- Sampling port description, including labeling system
- Sampling train description
- Brief description of sampling procedures, with discussion of deviations from standard methods
- Brief description of analytical procedures, with discussion of deviations from standard methods

APPENDIX
- Compiete results with example calculations
- Raw field data (original, not computer printouts)
- Laboratory report, with chain of custody
- Test log
- Calibration procedures and results
- Project participants and titles
- Related correspondence

REVIEW OF APPLICATION FOR AUTHORITY TO CONSTRUCT AND OPERATE
SECTION (5) REVIEW
Project/Facility No: 3860-0004-026
Permit No: [illegible]

U.S. Army Training Center and Fort Leonard Wood
ATZT-DPW-EE
Fort Leonard Wood, MO 65473

Complete: March 1, 1995
Reviewed: March 28, 1995

Pulaski County, S21, T35N, R8W

REVIEW SUMMARY

- This is a de minimis addition to an existing major source, and is reviewed in accordance with Section (5), Missouri State Rule 10 CSR 10-6.060, *Construction Permits Required.*
- No adverse ambient air quality impact is expected to occur as a result of the operation of the proposed training facility.
- Hazardous air pollutants will be emitted from the incinerator, though in minute amounts. No nerve agents will be emitted from this training facility, as the training exercises themselves, in association with the incinerator, insure that these agents are neutralized.
- There are no New Source Performance Standards (NSPS) or National Emissions Standards for Hazardous Air Pollutant (NESHAP) standards which will apply to this training facility.
- Approval of this permit application is recommended.

PROJECT DESCRIPTION

The U.S. Army Engineering Center and Fort Leonard Wood has applied for authority to install a Chemical Decontamination Training Facility (CDTF) at its facility in Pulaski County. The CDTF will include a hot training area, an incinerator for disposing of training wastes, a standby package boiler, and a 600 kW standby electrical generator. The facility will be used to train army personnel on the identification, handling and decontamination of vehicles and other equipment tainted with nerve agents. As part of the training, instructors will contaminate various pieces of equipment with drops of nerve agents, which will be applied with a syringe. The soldiers will then identify and decontaminate the equipment using decontamination agents and water. The debris from the training, which can include nerve agents, wastewater, uniforms and cleaning materials,

will be burned in the incinerator. The nerve agents involved are binary agents, requiring the mixing of two separate compounds to produce the nerve agents. The binary agents themselves are kept in separate, guarded, locked areas.

The nerve agents which will be used in the training are GB (sarin) and VX. Sarin is a colorless liquid with a vapor pressure of 2.9 mm Hg @ 25°C, a vapor density of 4.86, and a volatility of 22,000 mg/m3 @ 25°C. VX is an odorless amber colored liquid similar in appearance to motor oil. It has a vapor pressure of 0.0007 mm Hg @ 25°C, a vapor density of 9.2, and a volatility of 10.5 mg/m3 @ 25°C. Both of these agents volatilize readily, and being heavier than air, stay low to the ground. Both agents are highly toxic. Both agents degrade readily and rapidly in the presence of caustic agents.

The building in which the training is conducted is constructed as a "building within a building." The training building is functionally divided into a hot area and a cold area. The hot area is where the nerve agents are used, while the cold area is kept uncontaminated. The hot training area is divided into eight functionally separate areas, with each area kept under negative pressure and vented through filter trains made up of prefilters, activated carbon absorption systems and high efficiency particulate air (HEPA) filters. All hot areas are assumed to have air contaminated with nerve agents and chemical decontaminants. The hot area ventilating system is designed to maintain a negative pressure in the hot areas with respect to the cold areas of the building. The pressure in the hot areas varies with expected contamination levels, being least negative in areas adjacent to the cold areas, and becoming increasingly negative from front to rear of the hot area to force any air infiltration to flow from cold areas to hot areas. The air in each zone is exhausted through two sets of HEPA and activated carbon filters for redundancy in each filter train. Each of the filter trains is independent, and has a cross-sectional area sized for its design air flow. Seven automatic continuous air monitoring system (ACAMS) units will be located adjacent to hot areas in the training building. Each ACAMS unit consists of an air pump (1 liter/minute) and two gas chromatographs, one monitoring for sarin and the other monitoring for VX. Nerve agent concentrations are continuously recorded on a strip chart. If either nerve agent is detected at levels equal to or greater then occupationally safe levels established by the Surgeon General, then alarms are triggered on the monitor itself, and in the building control room. The alarm levels are 0.01 ng/l (nanogram/liter) for VX and 0.1 ng/l for sarin. All ACAMS units are backed up by the M43/M43A2 Chemical Agent Detector connected to a M8 Chemical Agent Alarm. This system has a sensitivity of 400 ng/l for VX and 200 ng/l for sarin. The detectors are based on electrochemical (M43 detectors) or ion mobility (M43A2 detectors) technology. In addition to the ACAMS, a Depot Air Monitoring System (DAMS) will be used to monitor for nerve agent air concentrations. The DAMS consist of an air pump (1 liter/minute) and a porous polymer filled tube. Air monitoring will be conducted by pumping air (40 liters total) through the DAMS tube followed by CDTF laboratory analysis of the sorbent. The DAMS monitors are twice as sensitive as the ACAMS units. This system insures that there is no chance that nerve agents will escape the building.

The incinerator is a Midland Ross Pyrobatch model forced draft, batch type, dual chamber unit. It has a rated design capacity of 125 pounds per hour of solid waste; the maximum design heat

release rate is 4,610 BTU/lb. The emissions from the incinerator are ducted through a rich fume reactor, a venturi scrubber, and a packed tower scrubber. A package boiler with a rated heat input capacity of 31.25 MMBTU/hr, fired with No. 2 fuel oil, is associated with the incinerator. The steam from this package boiler is used for space heat and process heat. The standby package boiler is fired with No. 2 distillate fuel, and has a rated heat input capacity of 6.25 MMBTU/hr. The 600kW standby generator uses a reciprocating engine, and is also fired with No. 2 fuel oil.

Fort Leonard Wood has stated in the application that the incinerator will (1) have an operable door lockout mechanism, (2) will be equipped with a continuous chart recorder which will monitor and record the temperature in the secondary chamber (to an accuracy of ±2%), (3) will keep complete paper records of operators on duty, emission tests performed, incinerator maintenance, combustion chamber temperatures and the quantity, type, and suppliers of any off-site waste which is incinerated, (4) will provide training to all incinerator operators, said training to include basic combustion theory, operating procedures, monitoring of combustion control parameters of the incinerator, and all emergency procedures to be followed if the incinerator should malfunction or exceed operating parameters, and (5) will stack test the incinerator within 90 days of reaching full operation in order to determine combustion efficiency and particulate emission rate. In view of the nature of materials incinerated at this facility, additional testing will be required to demonstrate that the incinerator will operate safely.

EMISSIONS/CONTROLS EVALUATION

Emissions are calculated using emissions factors from the U.S. Environmental Protection Agency document AP-42, *Compilation of Air Pollutant Emission Factors*, and from information supplied by the applicant. Emissions calculations are detailed in an appendix to this report. Potential emissions from the operation of this facility are listed in the following table. Potential emissions are calculated based on the operation of the facility for 8,760 hours per year, with all controls in place and operational. Potential emissions from this facility are below the deminimis emissions levels for all pollutants.

CDTF Decontamination Facility		
Pollutant	Hourly Emissions (lbs/hr)	Annual Emission (tons/yr)
PM_{10}	0.28	1.12
Sulfur Dioxide	1.59	7.00
Nitrogen Oxides	7.72	33.71
Carbon Monoxide	3.24	14.36
Volatile Organic Compounds	0.34	1.48
Lead	0.004600	0.020000
Hydrochloric Acid	0.032000	0.142000
Total PCB	0.000001	0.000002

CDTF Decontamination Facility		
Pollutant	Hourly Emissions (lbs/hr)	Annual Emission (tons/yr)
Antimony	0.000800	0.003500
Arsenic	0.000015	0.000070
Beryllium	0.000001	0.000002
Cadmium	0.000300	0.001500
Chromium	0.000048	0.000212
Manganese	0.000035	0.000160
Mercury	0.006690	0.029290
Nickel	0.000037	0.000162
Hydrogen Fluoride	0.001443	0.006322
Chlorine	0.001017	0.004500
TCDD	0.00000006	0.00000027
HxCDD	0.0000000001	0.0000000005
HpCDD	0.0000000003	0.0000000014
OCDD	0.0000000014	0.0000000100
Total CDD	0.00000133	0.00000583
TCDF	0.00000045	0.00000197
PcCDF	0.0000000002	0.0000000010
HxCDF	0.0000000011	0.0000000050
HpCDF	0.0000000013	0.0000000100
OCDF	0.0000000046	0.0000000200
Total CDF	0.00000447	0.00001957

PERMIT RULE APPLICABILITY

This permit review was conducted in accordance with Section (5), Missouri State Rule 10 CSR 10-6.060, *Construction Permits Required.*

APPLICABLE REQUIREMENTS

I. Installation Level: U.S. Army Engineering Center, Fort Leonard Wood

A. General

1. Applicable Requirements: Submission of Emission Data, Emission Fees and Process Information
   a. Regulatory Authority: 10 CSR 10-6.110
   b. Payment of Fees: $25.70 per ton of pollutant as of 1994
   c. Recordkeeping Requirement: Emissions Inventory Questionnaire (EIQ)
   d. Reporting Requirement: April 1 for previous year's emissions (EIQ)

2. Applicable Requirements: Operating Permits
   a. Regulatory Authority: 10 CSR 10-6.065
   b. Emission Limitation: none
   c. Recordkeeping Requirement: none
   d. Monitoring Requirement: none
   e. Reporting Requirement: none

B. Visible Emissions

1. Applicable Requirements: Restriction of Emission of Visible Air Contaminants
   a. Regulatory Authority: 10 CSR 10-3.080
   b. Emission Limitation: Emissions may not exceed an opacity of 20%
   c. Recordkeeping Requirement: none
   d. Monitoring Requirement: Visual Inspection, EPA Method 9
   e. Reporting Requirement: none

C. Odors

1. Applicable Requirements: Restriction of Emission of Odors
   a. Regulatory Authority: 10 CSR 10-3.090
   b. Emission Limitation: Odorous matter may not be emitted in concentrations and frequencies or for durations where odor can be perceived when one volume of odorous air is diluted with seven volumes of odor-free air
   c. Recordkeeping Requirement: none
   d. Monitoring Requirement: Measurements made with a scentometer as manufactured by the Barneby-Cheney Company, or similar technique that will give equivalent results
   e. Reporting Requirement: none

II. Emission Point Level: CDTF Decontamination Incinerator

A. Particulate Matter

1. Applicable Requirements: Restriction of Emissions of Particulate Matter from Industrial Processes
   a. Regulatory Authority: 10 CSR 10-3.050

b. Emission Limitation: 5.78 pounds per hour. The incinerator emissions are expected to be approximately 0.73 pounds per hour, which will be in compliance with this rule.
c. Recordkeeping Requirement: none
d. Monitoring Requirement: none
e. Reporting Requirement: none

B. Sulfur Dioxide
1. Applicable Requirements: Restriction of Emission of Sulfur Compounds
a. Regulatory Authority: 10 CSR 10-3.100
b. Emission Limitation: Gases emitted from the incinerator shall not contain sulfur compounds in concentrations in excess of 500 parts per million by volume (ppmv). The incinerator exhaust gas is expected to have a sulfur concentration of 14.8 ppmv, which will be in compliance with this rule.
c. Recordkeeping Requirement: none
d. Monitoring Requirement: none
e. Reporting Requirement: none

III. Emission Point Level: Standby Package Boiler
A. Particulate Matter
1. Applicable Requirements: Maximum Allowable Emissions of Particulate Matter From Fuel Burning Equipment Used for Indirect Heating
a. Regulatory Authority: 10 CSR 10-3.060
b. Emission Limitation: 3.75 pounds per hour. The boiler emissions are expected to be approximately 0.3 pounds per hour, which will be in compliance with this rule.
c. Recordkeeping Requirement: none
d. Monitoring Requirement: none
e. Reporting Requirement: none

B. Sulfur Dioxide
1. Applicable Requirements: Restriction of Emissions of Sulfur Compounds From Indirect Heating Sources
a. Regulatory Authority: 10 CSR 10-3.150
b. Emission Limitation: 8 lbs/MMBTU, equivalent to 250 pounds per hour of sulfur dioxide. The boiler emissions are expected to be 0.3 pounds per hour, which will be in compliance with this rule.
c. Recordkeeping Requirement: none
d. Monitoring Requirement: none
e. Reporting Requirement: none

IV. Emission Point Level: 600 kW Standby Generator
A. Sulfur Dioxide
1. Applicable Requirements: Restriction of Emission of Sulfur Compounds

a. Regulatory Authority: 10 CSR 10-3.100
b. Emission Limitation: Gases emitted from the generator shall not contain sulfur compounds in concentrations in excess of 500 parts per million by volume (ppmv). The generator exhaust gas is expected to have a sulfur concentration of 18 ppmv, which will be in compliance with this rule.
c. Recordkeeping Requirement: none
d. Monitoring Requirement: none
e. Reporting Requirement: none

AMBIENT AIR QUALITY IMPACT ANALYSIS

Because of the nature of the mission of this facility, ambient air quality modeling was performed. The model chosen is a highly conservative model, meaning that it tends to overestimate actual ambient impacts. Ambient impacts are given as 1-hour averages. Modeling results are detailed in the following table.

CDTF Decontamination Facility				
Pollutant	Ambient Impact ($\mu g/m^3$)		Ambient Standard ($\mu g/m^3$)	
PM_{10}	0.58	24-hr	150.00	24-hr
Sulfur Dioxide	8.82	1-hr	1300.00	3-hr
Nitrogen Oxides	17.36	24-hr	100.00	annual
Carbon Monoxide	18.13	1-hr	40000.00	1-hr
Volatile Organic Compounds	1.88	1-hr	235.00	1-hr
Lead	0.0100	1-hr	1.50	quarterly

CDTF Decontamination Facility				
Pollutant	Ambient Impact ($\mu g/m^3$)		Acceptable Ambient Level ($\mu g/m^3$)	
Antimony	0.0046	1-hr	6.67	8-hr
Arsenic	0.0001	1-hr	0.03	8-hr
Beryllium	0.000004	1-hr	30.00	8-hr
Cadmium	0.0020	1-hr	50.00	8-hr
Chromium	0.0003	1-hr	1.36	24-hr
Manganese	0.0002	1-hr	0.89	8-hr
Mercury	0.0027	8-hr	0.01	8-hr
Nickel	0.0002	8-hr	1.33	8-hr
Hydrogen Fluoride	0.0033	24-hr	0.68	24-hr

CDTF Decontamination Facility				
Pollutant	Ambient Impact ($\mu g/m^3$)		Acceptable Ambient Level ($\mu g/m^3$)	
Chlorine	0.0024	1-hr	3.95	24-hr
TCDD	0.00000040	1-hr	no standard	
HxCDD	0.00000001	1-hr	no standard	
HpCDD	0.00000001	1-hr	no standard	
OCDD	0.00000001	1-hr	no standard	
Total CDD	0.00003700	1-hr	no standard	
TCDF	0.00000260	1-hr	no standard	
PcCDF	0.00000001	1-hr	no standard	
HxCDF	0.00000001	1-hr	no standard	
HpCDF	0.00000001	1-hr	no standard	
OCDF	0.00000003	1-hr	no standard	
Total CDF	0.00002600	1-hr	no standard	

The modeled values in the table above are taken at the point of highest impact, just under 300 meters downwind of the facility. All ambient impacts are below the applicable impact standards; where the table states "no standard," this simply means that acceptable ambient levels have not been determined by this program - it does not mean that these compounds are non-hazardous.

STAFF RECOMMENDATION

On the basis of this review conducted in accordance with Section (5), Missouri State Rule 10 CSR 10-6.060, *Construction Permits Required*, approval of this permit, with conditions, is recommended.

Michael J. Stansfield, P.E.
Environmental Engineer

31 March 95
Date

Daniel D. Carney
Environmental Engineer

31 March 95
Date

ATTACHMENTS

EMISSIONS CALCULATIONS

600kW Standby Generator

This generator is designed to keep the hot area ventilation system and the incinerator system in operation in the event of a power failure. Emission factors for calculating the emissions from this standby generator are from Section 3.4 of AP-42, *Large Stationary Diesel and All Stationary Dual Fuel Engines.* This section covers those engines larger than 600hp. The Source Classification Code (SCC) used is 20200401 for large bore internal combustion diesel engines. Emissions are estimated to be:

600kW Standby Generator			
Pollutant	Emission Factor (lb/MMBTU)	Hourly Emissions (lbs/hr)	Annual Emission (tons/yr)
PM_{10}	0.0496	0.1	0.4
Sulfur Dioxide	0.51	1	4.3
Nitrogen Oxides	3.1	6	26.2
Carbon Monoxide	0.81	1.6	6.9
Volatile Organic Compounds	0.1	0.2	0.9

Standby Package Boiler

Emissions factors for calculating the emissions from this standby package boiler are from Section 1.3 of AP-42, *Fuel Oil Combustion.* The maximum design heat input rate for this boiler is 6.25 MMBTU/hr. Emissions are estimated to be:

Standby Package Boiler			
Pollutant	Emission Factor ($lb/10^3$ gallon)	Hourly Emissions (lbs/hr)	Annual Emission (tons/yr)
PM_{10}	2	0.1	0.4
Sulfur Dioxide	7.1	0.3	1.4
Nitrogen Oxides	20	0.9	3.9
Carbon Monoxide	5	0.2	1
Volatile Organic Compounds	0.34	0.02	0.1

Decontamination Incinerator

The incinerator is a Pyrobatch System two chamber design, and will burn Type 0 (solid) and Type 5 (liquid) wastes. It is a batch type incinerator, using a forced, induced draft. The primary chamber volume is 378 cubic feet, and is fitted with a 2.594 MMBTU/hr burner. The secondary chamber volume is 1010 cubic feet, and is fitted with a 25.778 MMBTU/hr burner. The army

estimates that approximately 250,000 pounds per year of Type 0 waste, and 6,225,000 pounds of Type 5 waste will be incinerated annually. A typical daily load to the incinerator, from army records at the Fort McClellan site, will include:

Typical Daily Incinerator Loading			
Description	# of bags	Weight (lbs)	Volume (ft^3)
Wet sludge in plastic lined fiber drums	1	180	3.5
Chemistry Lab Trash	1	25	5
Training Bay Trash	4	100	20
Medical Lab Trash	1	15	5
Laundry Trash	1	15	5
Office & Classroom Trash	4	60	20
Grounds Trash	1	25	5
Carbon Filters in PVC bags	2	448.4	18
Extra PVC bags	5	20	5
Hoods, Boots & Gloves	1	6	1
Overgarments (Hoods, Boots & Gloves)	1	8	1
Overgarments	6	80	30
Gas Mask Filters	1	18	1
Totals	29	1000.4	122.5

A further description of each of the above categories is given below:

Garbage Composition	Details
Wet Sludge	95% water, 2% solids, 3% drumpaper + PVC bag
Chemistry Lab Trash	20% glass, 10% metal, 20% rags, 50% paper + PVC bags
Training Bay Trash	10% glass, 10% metal, 40% rags, 40% paper + PVC bags
Medical Lab Trash	40% plastic, 30% paper, 30% rags + PVC bags
Laundry Trash	50% cloth, 50% paper + PVC bags
Office & Classroom Trash	100% paper + PVC bags
Grounds Trash	30% paper, 30% plastic, 20% glass, 20% metal + PVC bags
Carbon Filters in PVC bags	28% water, 35% metal, 39% carbon + PVC bags
PVC bags	100% PVC
Hoods, Boots & Gloves	100% rubberized material + PVC bags
Hoods, Boots & Gloves from Overgarments	100% rubberized material + PVC bags
Overgarments	100% rubberized material + PVC bags

Gas Mask Filters	inerts 30%, 30% carbon, 20% metal, 20% plastic + PVC bags

The gas mask filters canisters which may be charged to the incinerator do not include the old C2 filter canister, stock number 4240-01-119-2315, which is no longer in production; the Army estimates that its existing stocks of this item will be exhausted by October 1995. This gas mask filter canister has been replaced by the C2A1 filter canister, stock number 4240-01-361-1319. While the C2A1 filter canister is currently in the supply system, it will not be issued until the residual supply of C2 canisters is exhausted from the supply system.

Solid wastes are introduced into the primary chamber at a maximum rate of 125 pounds per hour. Liquid wastes are introduced into the secondary chamber, identified on process flow diagram as a rich fume reactor, at a maximum rate of 3,130 pounds per hour. The emissions from the incinerator are ducted through a venturi scrubber and packed tower scrubber connected in series. Control efficiencies claimed in the application are 94.95% for TSP and lead, 90.96% for PM_{10}, and 84.5% for sulfur dioxide, nitrogen oxides and carbon monoxide. The incinerator is expected to operate 8 hours per day, 250 days year. The incinerator has associated with it an external combustion boiler with a rated heat input of 34.6 MMBTU/hr, and fired with distillate oil at the rate of 247 gallons per hour. Acid gas concentrations of hydrogen chloride (HCl) and sulfur dioxide (SO_2) in the exhaust gas stream are directly related to the chlorine and sulfur content of the waste. Most of the chlorine will be converted to HCl. The packed tower is categorized as a medium-energy scrubber, and relies on impingement to facilitate removal of either particulate matter or acid gases. The venturi scrubber is categorized as a high-energy system, and is used primarily for control of particulate matter. The design outlet concentration for particulate matter is 0.09 grains/ascf. Parameters monitors by instrumentation affixed to the incinerator will include carbon monoxide, primary and secondary chamber temperatures, pH and flow of scrubbing brine, liquid waste feed rate, combustion gas velocity, and exhaust gas CO concentration in ppm.

The emissions factors chosen are from Sections 1.3 and 2.6 of AP-42, *Fuel Oil Combustion* and *Medical Waste Incineration.* Section 2.6 was chosen as being most representative of the types of wastes to be disposed of in the incinerator. While it is recognized that there will be little or no pathological wastes disposed of through the incinerator, the wastes which will be processed will be high in chlorine content, and will contain quantities of wastewater and cleaning materials including masks, gloves, suits, and boots, which are also present in medical wastes. For purposes of estimating emissions from the incinerator, only the weight of solid wastes are considered, since the wastewater is almost exclusively water contaminated with bleach and the nerve agents. While the nerve agents are toxic, they also decompose very rapidly at the temperatures encountered in the incinerator.

CDTF Thermal Treatment Waste Heat Boiler			
Pollutant	Emission Factor ($lb/10^3$ gallon)	Hourly Emissions (lbs/hr)	Annual Emission (tons/yr)
PM_{10}	2	0.05	0.2
Sulfur Dioxide	7.1	0.27	1.2
Nitrogen Oxides	20	0.77	3.4
Carbon Monoxide	5	1.2	5.4
Volatile Organic Compounds	0.34	0.1	0.4

CDTF Incinerator			
Pollutant	Emission Factor (lb/ton)	Hourly Emissions (lbs/hr)	Annual Emission (tons/yr)
PM_{10}	4.67	0.03	0.12
Sulfur Dioxide	2.17	0.02	0.09
Nitrogen Oxides	4.95	0.05	0.21
Carbon Monoxide	3.86	0.24	1.06
Volatile Organic Compounds	0.299	0.02	0.08
Lead	0.073	0.004563	0.019984
Hydrochloric Acid	3.35	0.032453	0.142145
Total PCB	0.0000465	0.000000	0.000002
Antimony	0.0128	0.000800	0.003504
Arsenic	0.000242	0.000015	0.000066
Beryllium	0.00000625	0.000000	0.000002
Cadmium	0.00548	0.000343	0.001500
Chromium	0.000775	0.000048	0.000212
Manganese	0.000567	0.000035	0.000155
Mercury	0.107	0.006688	0.029291
Nickel	0.00059	0.000037	0.000162
Hydrogen Fluoride	0.149	0.001443	0.006322
Chlorine	0.105	0.001017	0.004455
TCDD	0.000001	0.00000006	0.00000027

CDTF Incinerator			
Pollutant	Emission Factor (lb/ton)	Hourly Emissions (lbs/hr)	Annual Emission (tons/yr)
HxCDD	0.000000002	0.0000000001	0.0000000005
HpCDD	0.000000005	0.0000000003	0.0000000014
OCDD	0.000000022	0.0000000014	0.0000000060
Total CDD	0.0000213	0.00000133	0.00000583
TCDF	0.00000721	0.00000045	0.00000197
PcCDF	0.000000003	0.0000000002	0.0000000008
HxCDF	0.000000017	0.0000000011	0.0000000047
HpCDF	0.00000002	0.0000000013	0.0000000055
OCDF	0.000000074	0.0000000046	0.0000000203
Total CDF	0.0000715	0.00000447	0.00001957

The Birmingham Post-Herald
April 13, 1994

Sierra: Permit pace is too fast

By Thomas Hargrove
Post-Herald Washington Bureau

WASHINGTON — Missouri environmentalists have been complaining that the plans to move the Army's chemical weapons defense training program there from Alabama are unfolding too quickly to allow study of safety issues.

Members of the Sierra Club reacted with anger yesterday when they learned that the Missouri Department of Natural Resources has already granted a permit for construction of a chemical decontamination training facility at Fort Leonard Wood.

They objected that the action — necessary to meet the Army's June 22 deadline for all permits necessary to close Anniston's Fort McClellan — was taken without public hearings.

"I'm outraged that this permit was issued without a public comment, period. I thought the siting of any incinerators for hazardous materials requires public comment. All this defies logic," said Kathy Grandfield, chairwoman of the Missouri Toxics Committee for the environmental group.

But the director of the state environmental department, David A. Shorr, said such hearings were not necessary for a construction permit after he decided the amount of chemical weapons involved are so small that the Army does not need a chemical waste disposal permit.

Shorr also said state officials have not received significant opposition to relocating the program and its annual payroll worth $138 million. "We have not, to date, seen any coalescing of opposition to this project," he said when announcing the permits Tuesday.

The environmentalists agreed that no major group has formally objected to the plan, yet.

"This whole thing took us by surprise," Ms. Grandfield said.

"We have been gathering information now for only the last few weeks. But we have some serious questions about the relocation of this facility to Missouri."

The Army originally had not planned the close all of Fort McClellan when preparing its list of military bases to be slashed in budget realignments. But Pentagon officials changed their recommendation in the final days before issuing their Feb. 28 recommendations after learning the only way to save money at the Anniston facility was to close it completely.

The Army first asked for Missouri Gov. Mel Carnahan's help in obtaining necessary environmental permits in mid-February, allowing only four months for a process that can take two years. Carnahan promised to put the process "on a fast track."

"We can see how they are rushed with that June 22 deadline," Ms. Grandfield said. "But the regulatory process must be followed, even by the governor's office. We can't set aside that process for special cases."

The Ozark chapter of the Sierra Club recommended that the Army increase the amount of storm water discharge monitoring conducted at Fort Leonard Wood because of an oil-based spray used to simulate battlefield conditions during part of the training.

The state agreed with the recommendation, and placed directions for increased monitoring in a second permit issued this week for the relocation plan.

But environmentalists complained the basic issue of whether it is safe to incinerate clothing and other materials contaminated with chemical weapons has not been settled.

"This is going to be a classic case of environmental injustice," said Bill Redding, the midwestern representative at the Sierra Club's headquarters in Madison, Wis.

"Most of the people living next to that base are poor. And if the Army starts out with chemical weapons training, the fear is that this will escalate somehow."

Neither the Sierra Club nor any other environmental group has taken legal action to slow Missouri's pace in granting permits for the program. "But we want to know a lot more information," Ms. Grandfield said.

"We also asked for an extension of time on the comment period in all of this. Apparently, our request was not granted," she said.

Troy Gordon's testimony before the DNR hearing Friday, May 12 —

Don't know his title — I assume he's just a member -

He used to live near the Font (Wood) on the Little Pinery River, I hear —

Ken Midkiff
Program Director
1005 Belleview Ct.
Columbia, MO 6520.

Ozark Chapter / Sierra Club

Troy Gordon → 314-442-7411
4442

My name is Troy Gordon, representing the Ozark Chapter Sierra Club. We have members that live in this area, and many others which use this area for recreation, including camping and hiking, and canoeing, fishing and swimming in the rivers and streams which would be affected by this proposed facility. I also used to live just west of Newburg, directly down wind of this proposed facility.

The Ozark Chapter Sierra Club is strongly opposed to the relocation of the Chemical Warfare Training Unit to Fort Leonard Wood. We believe that the proposed facility will be environmentally damaging to the area, and the existing facility at Fort McClellen in Alabama is equally damaging. The U.S. Army should reassess the entire training process to find less objectionable methods of conducting such training.

We are concerned that there has been no Environmental Impact Statement prepared by the U.S. Army for the transfer of the Chemical Warfare Training facility to Fort Leonard Wood. The entire facility as proposed would have major environmental impacts and can be construed to be a major federal action requiring the preparation of an Environmental Impact Statement under the provision of the National Environmental Policy Act. No air permits can be applied for or issued without such an Environmental Impact Statement.

We are extremely concerned about the "fast track" process that has been used to attempt to permit the facility prior to the June 22, 1995. The environmental review process has been designed to allow the regulatory agencies and the public to gather complete information about a proposed permit and make an informed decision. In this case, adequate information has not been available, and the Missouri Department of Natural Resources has attempted to set permit parameters without full information on what limits and monitoring parameters should be included. Further, in an attempt to avoid the lengthy process of applying for a RCRA permit for the incinerator, the inadequate "Thermal Treatment Unit" has been proposed, despite David Shorr's comments in 1993 that indicate a RCRA permit would be necessary.

Regarding the specific air permit for the fog-oil obscurant, we are completely opposed to the issuance of this permit for any reason. The U.S. Army's own documentation states that "All of the smokes field-tested exerted varying degrees of lethal, physiological, and mutagenic effects...." (emphasis added). "Direct effects found include decreased fertility, changes in energy production, and decreased survivability in both plants and animals, increased genotoxic damage in plants, and increased genotoxic damage in animals" (Source: "Preliminary Study of Effects of

Military Obscurant Smokes on Flora and Fauna during Field and Laboratory Exposures - Final Report", dated Dec. 1986 by Schaeffer et al - USA-CERL Technical Report N-86/22). Issuing this permit and allowing this fog would damage the Roubidoux Creek and the Big Piney River, threaten the health of local residents, and harm the federally Endangered Gray and Indiana bats, all while driving away tourism dollars from the region. The fog-oil obscurant would also violate the Missouri Clean Air opacity requirements, far exceeding the allowed 20% opacity limits for new sources.

We also oppose the permit for the proposed Thermal Treatment Unit. It is apparent from the proposed waste streams that the incinerator should be categorized as a Hazardous Waste Incinerator and the applicant should be required to apply for a RCRA permit. It is evident from a review of the permit application that the waste streams have been carefully crafted to attempt to avoid the necessity of applying for a RCRA permit. Nor does the application take into account the eventual need for changes in the waste stream as technology and materials change, or the training regime increases. As proposed, the permit would allow the incineration of chlorinated lime in the wet scrubber sludge, which would produce dioxins upon incineration. The waste stream as proposed also would be approximately 17% metals, or 170 pounds per day. Neither is listed in the emissions calculations. Even if chlorine and metals were not to be incinerated, to allow full flexibility and prevent a costly rebuilding or retrofitting of the facility when the Thermal Treatment Unit is found to be inadequate, it is far preferable to meet the requirements and apply for a RCRA permit at this time.

Finally, we recommend that environmental degradations not be condoned in the name of "economic development". Damage to ecological systems is extremely expensive to rectify, far outweighing any localized, short-lived profits. The economic benefits of a healthy environment have been demonstrated conclusively. While the communities surrounding Ft. Leonard Wood may receive short term economic benefits, the damages to the local environment will be extremely costly. Outdoor recreationists do not use areas that are or have been degraded. The cost from the loss of tourism and long term environmental damages may far outweigh any benefits to local retail outlets.

The statutory responsibility of the Department of Natural Resources is to protect the environment and the public health and safety, not to expedite permits for economic development purposes or at the request of the governor. The Missouri Department of Natural Resources should live up to its mandate and deny both of the proposed permits.

The Birmingham News
April 28, 1995

Group fights Missouri OK of chem unit

JEFFERSON CITY, Mo. (AP) — An environmental group filed petitions with the state Thursday seeking to slow down the process of approving a plan to relocate the Army's only chemical defense training base to Fort Leonard Wood.

The petitions filed with the Department of Natural Resources allege the Army has "not accurately and truthfully described" the operations of an incinerator that would burn chemically decontaminated clothing and other materials.

The Coalition for the Environment is appealing a state permit issued April 17, giving the Army the go-ahead for the incinerator. Environmentalists want the permit overturned until a public hearing is held.

The petitions also seek to delay state approval of a waiver allowing the Army to spray a white oil-based fog into the air as part of its training for soldiers.

Approval of both permits is vital to move the Army's chemical defense training base from Fort McClellan, Ala., to Fort Leonard Wood, military officials said.

The federal Base Closure and Realignment Commission plans to make its final recommendations to President Clinton by July 1.

If the commission doesn't have the state permits approved by June 22, "they cannot consider the recommended move," said Fort Leonard Wood spokesman Brad Rose.

During a meeting Thursday with state environmental officials, Army officials stressed the need for quick action on their requests.

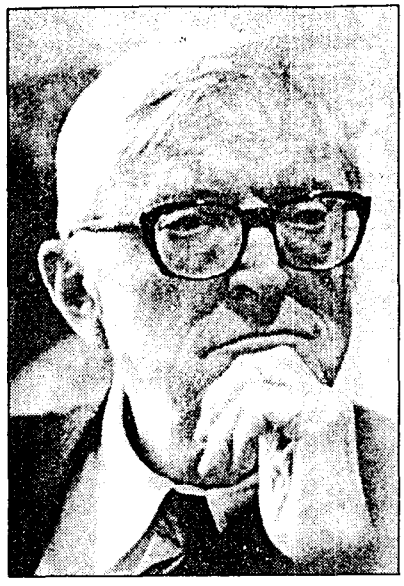
"This is essential for the defense of the country and it does need to be done," said Scott Murrell, the Army's environmental chief at Fort Leonard Wood.

But environmentalists and some nearby residents fear the new mission could spew tons of contaminants. Among the chemicals used in Army training is Sarin, the gas that recently killed 10 people and injured hundreds more in Tokyo.

Army officials said the fears are unwarranted.

Neither the thick fog, the potentially fatal chemicals nor the incinerator pose any danger to nearby residents, Murrell said.

He said Sarin and other nerve gases only are produced in small quantities and are kept inside at all times. Furthermore, polluted materials are decontaminated and incinerated, Murrell said.



Lewis Green
Enviromental attorney.

"This is serious business. We're talking about nerve gases, biological agents and chemicals," environmental attorney Lewis Green said in a session with three members of the Air Conservation Commission.

"We're not trying to stop the darn thing. We're trying to get information out to the public," he said.

Jefferson City Post-Tribune

VOL. 130, NO. 56 JEFFERSON CITY, MISSOURI FRIDAY AFTERNOON, APRIL 28, 1995

Environmentalists fight plan to move chemical training to Fort Wood

The Associated Press

Rebecca Gibbs worries that a thick, white oil-based fog might some day float through the air and into her back yard from nearby Fort Leonard Wood.

"What I hear is that it coats things when it settles to the earth – the grass, the trees, the streams, the bugs, my kids," Ms. Gibbs said. "I have no idea what the potential effects could be."

So Ms. Gibbs contacted an environmental attorney to try to delay a plan to move the Army's only chemical defense training base from Fort McClellan, Ala., to Fort Leonard Wood in southern Missouri.

On Thursday, Gibbs and an environmental group filed petitions with the Department of Natural Resources alleging that the Army failed to assess the "potential threat to health" posed by the fog used in its training.

Army officials said those concerns have no validity.

As for the oil-fog sprayed from jeep-bound canisters: "I've observed it, I've walked through it, and it has no effect at all," said Fort Leonard Wood environmental chief Scott Murrell.

The Coalition for the Environment also is appealing a state permit issued April 17, giving the Army the go-ahead to build and operate an incinerator that would burn chemically decontaminated materials. Environmentalists want the permit overturned until a public hearing is held.

Approval of both permits is vital to proceed with moving the Army's chemical school to Missouri. The federal Base Closure and Realignment Commission plans to make its final recommendations to President Clinton by July 1.

If the commission doesn't have the state permits approved by June 22, "they cannot consider the recommended move," said Fort Leonard Wood spokesman Brad Rose.

During a meeting Thursday with state environmental officials, Army officials stressed the need for quick action on their requests.

"This is essential for the defense of the country and it does need to be done," Murrell said.

St. Louis environmental lawyer Lewis Green presses his case to the Air Conservation Commission. AP

The base relocation would bring an additional 4,200 soldiers yearly to Fort Leonard Wood, plus 1,800 permanent jobs and 400 civilian jobs, Rose said. It also could pump up to $150 million in salaries and construction contracts into the state economy, he said.

But environmentalists and nearby residents fear the new mission could spew tons of contaminants.

Among the chemicals used in Army training is Sarin, the colorless vapor that recently killed 10 people and injured hundreds more on a Tokyo train.

Army officials said concerns about a similar disaster in Missouri are unwarranted.

Murrell said Sarin and other nerve gases only are produced in small quantities and are kept inside at all times. Furthermore, polluted materials are decontaminated before being incinerated, he said.

The petitions filed Thursday allege that the Army underestimated the incinerator's potential sulfur emissions, failed to identify some waste products to be burned and overlooked the oil-fog's potential effect on endangered species, such as the bald eagle and Indiana bat.

See FT. WOOD, page 8

☆Ft. Wood

From page one

"This is serious business. We're talking about nerve gases, biological agents and chemicals," environmental attorney Lewis Green said in a session with three members of the Missouri Air Conservation Commission. A formal hearing before the commission was canceled Thursday because four of its seven members were absent.

"We're not trying to stop the darn thing. We're trying to get information out to the public," Green said.

Commission chairman Harriet Beard said the panel will "take the concerns under advisement" and try to reach some decision by June.

Officials at the Department of Natural Resources, which grants the permits, said they already had done a thorough job of evaluating the permit applications.

"Some of the stuff they brought up we've already talked about with our staff. It's not an issue," said Roger Randolph, director of DNR's air pollution control program.

Commissioners and DNR employees plan to hear public comments about the oil-fog training on May 12 in Waynesville, near Fort Leonard Wood. A hearing about the state waiver is set for May 25 in Kansas City.

In response to the petitions, an appeal hearing also must be held on the incinerator permit. No hearing date has been set.

Ecologists Oppose

By Terry Ganey
Post-Dispatch Jefferson City Bureau Chief

JEFFERSON CITY — Environmental groups have challenged U.S. Army plans to operate a chemical decontamination facility and smoke screen training program at Fort Leonard Wood.

The critics contend the operations would endanger people and wildlife living near the fort.

Lewis Green, a lawyer in St. Louis, and Roger Pryor, the head of the Coalition for the Environment, said the state Department of Natural Resources had been too quick to issue permits.

On Thursday, they filed appeals challenging the permits now before the state Air Conservation Commission. Because the commission lacked a quorum, it took no action.

"These permits are being processed with the most extraordinary haste," Green told the commissioners. He said the Army's application was "totally defective."

"They are not giving the Department of Natural Resources' staff all of the information it needs to make a decision," said Green, a former member of the commission.

Incinerator At Fort Leonard Wood

Shorr emphasized that the Natural Resources Department had thoroughly reviewed the Army's plans and found them safe.

Natural Resources Department Director David Shorr said the challenges were expected. The permit approval process was on a "fast track," he said. Shorr emphasized that the department thoroughly had reviewed the Army's plans and found them safe.

"We haven't compromised our review standards for this matter and we never will," Shorr said. "The permits are protective of the public health and protective of the environment."

Both Army operations are part of the U.S. Army Chemical School being transferred from Fort McClellan, Alabama.

The Army plans to operate an incinerator at Fort Leonard Wood to destroy nerve agents, mustard gas and other toxic materials used in training exercises on the post. Earlier this month, the state approved a construction permit for the facility.

The department also approved a waiver from rules limiting smoke. That will allow the Army to use oil-burning generators that produce smoke screens during training exercises.

The appeals challenge both decisions, saying the Army's plans endanger the health of people and wildlife. The incinerator also could release toxic fumes into the atmosphere, the documents say.

Green argued that no studies had been done on the effect of smoke on endangered wildlife in the Ozarks, such as the Indiana and Grey bats and the Bald Eagle.

Shorr replied that the Department of Natural Resources has been studying the Alabama's operations since 1993. "We haven't just started this thing," Shorr said. "People should give us a little credit that we are smart enough to know what's coming at us."

ST.LOUIS POST DISPATCH
ST. LOUIS, MO.
C. 600,000
DATE: 28APRIL95

Boone County
Journal
The voice of southern Boone County since 1969

Volume 26, Number 37 • Price: 50 cents • Thursday, May 4, 1995

Citizens protest nerve gas at Leonard Wood

by R.C. Adams
Journal Staff Writer

Ashland residents were irritated when the Missouri Department of Natural Resources (DNR) refused to allow the city to discharge treated sewage into Nichols Creek.

Now, DNR has given quick approval to a request from the U.S. Army to produce, store, and discharge the treated waste of deadly nerve gases at Fort Leonard Wood, less than 75 miles south of Ashland/Hartsburg.

The permits are necessary, the Army says, to relocate its Chemical Defense Training Facility from Fort McClellan, AL to Fort Leonard Wood, MO.

Aside from the signals DNR's hasty action sends to residents of Missouri, the possible production and controlled use of some of the world's most deadly chemical weapons unnerves many people.

▲ A quick permit

Odie Dickens of Hartsburg, a spokesperson for the non-profit group, People for Enforcing Environmental Regulations, said the permits were issued in "absolutely record time."

David Shorr, Director of DNR, said there's no question that the response time to two of the three applications "is somewhat out of character."

Responding to suggestions that DNR has been influenced by federal or state authorities to bypass regular procedures, Shorr said, "There's been no pressure whatsoever in regards to our permits."

Mrs. Dickens and Shorr agree that the permits allow the Army to produce the deadly nerve gas, Sarin, and VX, another chemcial even more lethal, at Fort Leonard Wood. Sarin was the chemical used in the recent terrorist attacks in Japan's subways.

Shorr said DNR's decision permits the waste activity at the location as it was described in the Army's application. DNR "doesn't decide if chemical weapons are good or bad," he added.

"The Army's told us, 'Don't worry,'" Mrs. Dickens said. "They said there will be no more than one liter," of Sarin on the base at one time.

"That sounds reassuring -- until you realize that a droplet that fits on the head of a pin can kill you."

Dickens worked for DNR from 1977 to 1981. She said another cause for her concern is that the Army has claimed no hazardous wastes will be created, but has also filed for a hazardous waste permit.

▲43 days

On April 11, DNR granted the U.S. Army two of the three permits it will need to relocate the training facilities.

"No public comment was necessary," regarding the permits Shorr said, because state statutes don't require hearings concerning a "permit to construct."

▲ Continued on page 16

Book page

Nerve gas

▲ Continued from page 1

A former Director of Environmental Quality for the State of Missouri, Bob Schreiber, disagrees.

"In order to protect the environment in Missouri, Fort Leonard Wood and DNR need to conduct a more thorough investigation of the site and the proposed operations and facilities," he said.

Shorr said the actual review process "was not compromised," however. He said a 1995 budget increase was a major expedient in the quick processing of the Army request because it allowed more people to review the applications for more hours.

Both permits are in an appeal process, which ends before May 12.

One of the approved permits allows the Army to produce, store, and use live nerve gas in training exercises.

Mrs. Dickens and Shorr described the typical training procedure: Lethal doses of nerve gas are first created by combining two inert re-agents together. Then the chemical is placed at sites in an insulated setting, even on the suits of the trainees, who locate the nerve gas.

After the exercise, everything is sprayed with another chemical designed to make the Sarin non-toxic. The water and residue from the exercise is kept in a holding facility, where remaining Sarin meets more of its detoxifying agent, "like bleach, but not bleach," Shorr explained.

The protective suits and material in the training room are then incinerated, Mrs. Dickens and Shorr said.

The second permit allows the Army to discharge waste water from the base, presumably water from the holding facilities containing the treated waste of deadly nerve gases.

The third application, still under review, requires public comment, which will be received until May 12.

That application seeks permission to conduct "fog oil" exercises, where a heavy oil is heated, then sprayed into the air to create a thick, battle-condition fog. According to the Army's application, 63,000 gallons of fog oil will be used annually, all of which goes into the atmosphere.

Residents near Fort McClellan, AL, where the Chemical Defense Training Facility was located, have complained of stinging eyes, and report that farm animals congregated on the farthest ends of pastures from the fort.

St. Louis Post-Dispatch
May 21, 1995

Army's Plans Need Thorough Airing

If the Army's chemical training school is to move to Fort Leonard Wood in Missouri from Fort McClellan in Alabama and create 2,000 new jobs, Missouri state officials must make several decisions on public health and safety by June 22. That is the deadline set by the U.S. Base Realignment and Closing Commission, which makes recommendations to the president about reducing the number of military bases and posts around the country.

This looming deadline raises two key questions: Will the Army provide accurate, up-to-date information about its use of smoke screens, chemical training and incinerators? Can the Missouri Department of Natural Resources, which must issue permits for the Army's activities, act in the public interest, even if that may mean delays, the loss of the training school and the positive impact of 2,000 jobs in a part of the state that always needs jobs?

Roger Pryor, executive director of the Coalition for the Environment, put the issue this way: "We're not convinced this project is dangerous, but it should go through the whole review process just like anything else."

The process may be rushed, but Department of Natural Resources officials say they would make sure all emissions meet state and federal laws or are covered by reasonable waivers. Some people believe that since the move could be considered a major federal action, the Army should follow the National Environmental Policy Act. It should prepare an environmental impact statement assessing potential damage to air, wildlife and vegetation of the activities at the center.

The Army would be incinerating low-level radioactive materials, as well as chemicals and clothing contaminated during training in a sealed building. The incinerator would be attached to the training building. Outdoor training could include exercises with an oil-based smoke; department officials say those exercises would only be allowed under the best wind and climatic conditions.

Mr. Pryor and others are right to question publicly the alleged benefits and costs of Fort Leonard Wood's becoming the Army's chemical warfare training center.

BEFORE THE MISSOURI
AIR CONSERVATION COMMISSION

IN THE MATTER OF:

WILLIAM A. GIBBS, REBECCA I. GIBBS, AND THE COALITION FOR THE ENVIRONMENT

Petitioners,

vs.

MISSOURI DEPARTMENT OF NATURAL RESOURCES,

Respondent.

NOTICE OF APPEAL OF THE MISSOURI DEPARTMENT OF NATURAL RESOURCES' APPROVAL OF APPLICATION TO CONSTRUCT CHEMICAL DECONTAMINATION FACILITY THERMAL TREATMENT UNIT

Come Now Petitioners, by and through their attorneys, and pursuant to § 643.075(6) RSMo., appeal the decision of the Missouri Department of Natural Resources ("MDNR") to issue Permit Number 0495-013 to the U.S. Army Engineering Center and Fort Leonard Wood for the construction and subsequent operation of a Chemical Decontamination Facility and Thermal Treatment Unit (hereafter the "CDTF"). In support thereof, Petitioners state as follows:

1. Petitioners William A. Gibbs and Rebecca I. Gibbs (hereinafter "the Gibbs") are residents of Newberg, Missouri and own real property near Fort Leonard Wood. The Gibbs and their minor children use for recreational purposes the streams and national forest areas adjacent to Fort Leonard Wood and live and recreate within the potential impact area of the proposed CDTF incinerator site. The Gibbs from time to time visit Fort Leonard Wood and are present on the premises. They will be adversely

affected by the emissions resulting from the proposed incinerator.

2. The Missouri Coalition for the Environment ("Coalition") is a corporation organized and existing under the not-for-profit corporation laws, qualified to do business in Missouri, with its principal office located in St. Louis County, Missouri. The Coalition exists for the purpose of protecting and preserving environmental values in Missouri, and has for years been actively concerned with protecting air quality throughout the state. The Coalition has thousands of members, many of whom seek recreation in floating the Big Piney River, which flows through Fort Leonard Wood, and the Gasconade River, which flows within approximately three miles of the fort, and also in hiking and camping in the Mark Twain National Forest, which surrounds the fort on three sides. The Coalition's interest in protecting and enhancing the quality of the ambient air throughout the state will be adversely affected if the permit is upheld. The Coalition members will be adversely affected by the emissions from the incinerator which is the subject of this appeal, if the permit is upheld. The Coalition files this appeal on its own behalf and on behalf of its members.

3. The Gibbs and the Coalition are "aggrieved persons" within the meaning of § 643.075(6) in that each Petitioner has a specific and legally cognizable interest in the subject matter of this administrative action, and the decision of the Commission will have a direct and substantial impact on that interest.

4. On or about March 1, 1995, the Army submitted to MDNR

for approval an Application For Authority to Construct a Thermal Treatment Unit to treat waste generated from a Chemical Decontamination Training Facility ("CDTF") at Fort Leonard Wood in Pulaski County, Missouri. The Army intends to conduct nerve agent training at the proposed facility. Army personnel will identify and decontaminate vehicles and equipment tainted with nerve agents. A copy of Fort Leonard Wood's original application is appended hereto as Exhibit "A".

5. The Army intends to manufacture and use at the CDTF the following nerve agents: GB, VX, and HD. All of these agents are highly toxic and, if mishandled, pose a threat to human health and the environment. Agent GB (Sarin) is a colorless liquid which, when vaporized, is readily absorbed through the skin. It is the same substance implicated in the recent tragedy of the Tokyo subway system, resulting in the death and injuries to hundreds of people. While Agent VX does not volatize as rapidly as agent GB, it is estimated to be 100 times more toxic. Exposure to agents VX and GB can result in death within 15 minutes after exposure to a lethal dose. Agent HD (mustard gas) is a known carcinogen and, when heated, releases toxic fumes. Exposure to lethal doses of HD can result in death within 4 to 6 hours.

6. The operations conducted at CDTF will include identification and decontamination of live nerve agents. The decontamination wastes and potentially contaminated materials include clothing, gas mask filters, laboratory wastes, medical and infectious wastes, air filters and washdown water. Debris

from the training, laboratory and CDTF will be burned in the incinerator.

7. According to the Permit Application, emissions from the incineration process will produce VOCs, carbon monoxide (CO), NOx, sulfur dioxide, particulate matter and toxic substances including Sarin. Through the proposed combustion of the on-site wastes, dioxins and furans will also be emitted. The incinerator will operate 8 hours per day, 250 days per year.

8. The Permit Application is based on 1983 design and on data collected in 1983 and 1985 from operations at Fort McClellan, Alabama, where the Army's CDTF is sited currently. Upon information and belief, the current operations at Fort McClellan differ in many material respects from those described in the Permit Application for Fort Leonard Wood, yet the Army does not intend to change its CDTF operation to revert back to practice that may have been in effect more than a decade ago. The Permit Application is defective in many material respects as it does not accurately and truthfully describe the conditions under which the CDTF will operate at Fort Leonard Wood and, therefore, it needs to be revised and resubmitted. The Permit Application contains incomplete and missing data, lacks sufficient detail and supportive documentation, contains incorrect calculations and omits critical information necessary for the proper construction and operation of an incinerator. The Permit Application is defective and deviates from actual practice at Fort McClellan in at least the following material respects:

(a) inaccurately depicts maximum sulfur emissions from the

Thermal Treatment Unit, the generators and the boilers;

(b) fails to identify infectious waste, blood products drawn at the conclusion of the training period, as being incinerated in the Thermal Treatment Unit;

(c) omits from its supporting diagram a 20 x 10 x 10 foot secondary chamber and two (2) autoclave which treat personal protection equipment ("PPE") contaminated during the nerve gas training;

(d) proposes to use an incinerator designed in 1983 which does not represent the technology currently in use at the CDTF in Fort McClellan, which is what is proposed by the Army for use at Fort Leonard Wood; and

(e) fails to identify hazardous wastes which will be incinerated in the Thermal Treatment Unit.

Numerous other defects are contained in the Application, as will be developed during the hearing of this case.

9. Upon information and belief, the CDTF has the potential of emitting more than 100 tons of pollutants a year.

10. MDNR incorrectly classified the Permit Application as being a "de minimis permit" for which no public hearing requirements are required. In addition, "de minimis permits" are exempt from most regulatory requirements.

11. On March 28, 1995, MDNR staff reviewed the Army's permit application and recommended approval.

12. On April 10, 1995, MDNR approved the Army's application and issued the permit to construct and subsequently operate the CDTF facility. A copy of the Permit to Construct is appended

hereto as Exhibit "B".

13. Had the Fort Leonard Wood Permit Application been accurate, complete and truthful, as required by law, MDNR would have been required to hold a public hearing and would and should have taken different action with respect to the Permit, at the very least requiring a RCRA Part B permit for the incinerator and imposing other special conditions not in the Permit as issued. Because the underlying Permit Application is inaccurate and incomplete, the Permit is invalid.

14. In approving the permit application, MDNR imposed certain Special Conditions including, inter alia, that no hazardous waste be burned in the Thermal Treatment Unit and that emissions from the facility not exceed limits set forth in the approved Permit. Specifically, no detectable limits of GB (Sarin) or VX may be emitted or released from the facility and the Army is prohibited from incinerating gas mask filters containing chromium, a listed hazardous waste under 40 CFR Part 261. Missouri has adopted and incorporated by reference the federal RCRA regulations. See 10 CSR 25-3.260.

15. Some of the materials the Army proposes to incinerate, and which the permit allows the Army to incinerate, are hazardous wastes. Specifically, agent VX is a sulfide bearing material and is a D003 reactive hazardous waste within the meaning of 40 CFR § 261.23(a)(5). Agent VX is absorbed into carbon filters which are then incinerated in the Thermal Treatment Unit. The incineration of these filters account for nearly half of the CDTF's total weight of solid wastes.

16. Upon information and belief, during the course of training Army personnel use nerve agent detectors which utilize pads containing silver nitrate which are then incinerated along which other wastes. Silver is a characteristic listed hazardous waste under 40 CFR Part 261. Upon information and belief, laboratory analysis of pads used at Fort McClellan indicate that the material in question exhibits the characteristic of toxicity using the Toxicity Characteristic Leaching Procedure ("TCLP").

17. In addition, upon information and belief, the Army uses in the CDTF laboratories non-halogenated solvents which are listed hazardous wastes under 40 CFR §261.33. These solvents are then incinerated in the Thermal Treatment Unit.

18. MDNR failed to impose Special Conditions on the use of the nerve agent HD.

19. By manufacturing live nerve agents at the CDTF, the installation is a "chemical process plant" within the meaning of 10 CSR 10-6.020(3)(B)(20), Table 2.

20. Pursuant to 10 CSR 10-6.020(8) (hereinafter "Section 8"), Table 2 installations which have the potential to emit one hundred tons or more of any pollutant are considered major sources of emissions and as such must comply with the requirements of Section 8 and the procedures for public participation set forth in 10 CSR 10-6.060(12) ("Section 12, Appendix B").

21. Section 8 requires, inter alia, pre-application modeling and monitoring, analysis of visibility and air quality impacts projected for the area as a result of general commercial,

residential, and industrial growth, as well as growth associated with the installation and conduct a fisheries and wildlife review.

22. In addition, Section 8 permits must comply with the procedures for public participation which include holding a public hearing prior to issuance of the permit. At such a hearing, any interested party may submit information or materials in opposition to the application.

23. Prior to approving the Permit Application, MDNR failed to hold a public hearing as required by law.

24. Each of the petitioners oppose MDNR's issuance of the Permit To Construct on grounds that they have private rights and/or property interests that will be damaged by the operations at the proposed incinerator site. The injuries that Petitioners presently suffer or may in the future incur as a result of the approval of the Permit and the subsequent construction and operation of the facility including diminished property value, diminished quality of life, detrimental effects upon health, detrimental effect upon quality of the environment and reduced marketability of property.

25. In issuing the Permit, MDNR has failed to (1) properly categorize the installation as requiring an Attainment and Classification Area Permit pursuant to 10 CSR 10-6.060(8); (2) require in the Permit Application monitoring, modeling, visibility analysis, and air quality impact analysis; (3) hold a public hearing as required by Section 12; and (4) determine that the Permit Application submitted by Fort Leonard Wood was

defective, incomplete, inaccurate and deviated from current CDTF operations.

WHEREFORE, for all the foregoing reasons, Petitioners respectfully request the Commission to:

(a) Grant a full evidentiary hearing as required by law, at which time Petitioners may present evidence regarding their appeal.

(b) Enter its Order that the Permit to Construct be denied;

(c) Enter its Order expediting the appeal process to allow this Commission to enter an order prior to June 20, 1995, or alternatively, immediately staying the effectiveness of the Permit and all conditions thereof pending final resolution of this appeal; and

(d) For such other and further relief as the Commission deems just and proper.

GREEN, HENNINGS & HENRY

By: _____

LEWIS C. GREEN
314 North Broadway, Suite 1830
St. Louis Missouri 63102-2097
(314) 231-4181

Attorney for Petitioners

TECHNICAL COMMENTS FOR PERMIT ISSUES ASSOCIATED WITH THE PROPOSED MOVE OF THE U.S. ARMY CHEMICAL SCHOOL FROM FORT McCLELLAN, ALABAMA TO FORT LEONARD WOOD, MISSOURI

May 12, 1995

PREPARED FOR:

WILLIAM A. GIBBS, REBECCA I. GIBBS, WENDY PELTON AND MISSOURI COALITION FOR THE ENVIRONMENT

PREPARED BY:

SCHREIBER, GRANA & YONLEY, INC.
271 WOLFNER DRIVE
ST. LOUIS, MISSOURI 63026

CHEMICAL DEFENSE TRAINING FACILITY ("CDTF")

Chemical nerve agents are manufactured and used by the U.S. Army Chemical School to train students in the proper techniques to detect and decontaminate/deactivate the live nerve agents. The CDTF has been in operation at Fort McClellan, Alabama, since February of 1987. Permitting and construction for that facility took seven years. Several substantive modifications have been made to that facility since it was initially permitted in 1983. The Fort McClellan facility consists of several integrated buildings with specific purposes.

The administrative building houses the offices for the instructors for the facility. Classrooms are also located in the administrative building. Students are instructed on proper detection and decontamination procedures, and on various chemicals used for decontamination. They also receive training on the use of protective equipment to protect themselves from the nerve agents. Before being allowed to train using live nerve agents, they receive training using simulants. That training is performed on various pieces of U.S. Army equipment placed on concrete training pads located outside the buildings.

The live nerve agent training is conducted in a building which contains the laboratory used to manufacture the nerve agents, equipment used to monitor the building for contaminant release, and the actual training bays. The training bays are where students locate, identify and decontaminate pieces of equipment contaminated with the live nerve agents.

One building houses the incinerator used to destroy all of the waste materials generated from the laboratory, trash from the training building, contaminated personnel protection equipment, and any other potentially contaminated materials that may have been exposed to live nerve agents. Construction on the incinerator at Fort McClellan began in late 1983, and after lengthy trial and test burns, it began full operation on February 19, 1987.

Another building houses the other ancillary equipment used to operate the facility, including the maintenance shops used to support the facility. Adjacent to the maintenance building is the storage tank for the decontamination waste waters that are incinerated.

PREVENTION OF SIGNIFICANT DETERIORATION

Permitting Requirements

The Federal Clean Air Act requires that major sources of air contaminant emissions obtain construction permits prior to commencing construction on proposed major modifications to a location which would result in significant net increases in air emissions. In areas of the country where the National Ambient Air Quality Standards are being met (attainment areas), the construction permits and the permit review process are referred to as prevention of significant deterioration ("PSD") of air quality. The U.S. Environmental Protection Agency ("EPA") has granted authority to most states to administer their own PSD construction permit programs. The federal requirements for state administered PSD programs are codified at 40 CFR § 51.166. The requirements for PSD construction permits for facilities in Missouri are detailed in the Missouri Code of State Regulations at 10 CSR 10-6.060(8).

There are several core components which must be included in PSD permit application submissions. These components are:

- An analysis of the ambient air quality in the area that the modified source would affect;
- A review of potential emissions control technologies and selection of the Best Available Control Technology ("BACT");
- An analysis of the impact of the proposed modification on the ambient air quality in the area where the facility is located;

- An analysis of the effects of the proposed source on soils, vegetation, and visibility; and
- Public participation in the permit review process before final action is taken on the permit application.

Fort Leonard Wood is classified as a major stationary source of air emissions. The relocation of the U.S. Army Chemical School to Fort Leonard Wood would result in an increase in air contaminant emissions due to the addition of the following emission sources:

- Obscurant smoke/fog oil training, which has potential emissions of over 250 tons per year of particulate matter ("PM_{10}"), volatile organic compounds ("VOCs"), and the emission of hazardous air pollutants ("HAPs").
- Chemical Defense Training Facility ("CDTF"), which includes emissions from: the facility's ventilation system; an incinerator for disposal of the live nerve agent contaminated solid wastes, wastewater, and infectious wastes; live nerve agent (VX/GB) synthesis; autoclaves for sterilizing contaminated personnel protective equipment and clothing; and a boiler for space and water heating.
- Radiological Training, which has potential emissions of radionucleides.
- Flame Expedient Training.

For the purpose of a PSD construction permit, the proposed major modification (defined as either a "physical change or a change in the method of operation of a major stationary source") is the relocation, construction, and operation of all the emissions sources (listed above) which are components of the U.S. Army Chemical School. The net increase in emissions from all emissions sources associated with the major modification must be considered when evaluating whether the increase in emissions exceeds "significance" levels. Applicable significance levels for the PSD permit in question are potential increases in emissions of 15 tons per year of

particulate matter less than 10 microns in size (PM_{10}), 40 tons per year of VOCs, or any emissions of radionucleides. The PSD permit application and the permitting agency's review must consider all new emission sources which contribute to the net emission increase exceeding significance levels, for each regulated pollutant, for which the affected area is in attainment. Therefore, a single PSD construction permit application must be prepared which addresses all emission sources associated with the major modification.

Fort Leonard Wood should have prepared and submitted their air construction permit application as one package for all their proposed new air emissions sources. However, the emission units (three different stacks) associated with the CDTF were handled in a separate permit application from the emission sources used for the fog oil/smoke obscurant training. The "splitting" of the air construction permit applications for the major modification into separate air permit application packages violates both federal PSD regulatory provisions (40 CFR 51.166(j)(3) and USEPA guidance (New Source Review Workshop Manual, OAQPS, October 1990). The effect of illegally splitting the air construction permit applications into two separate permit applications means that none of the CDTF-associated emission units have met the regulatory requirements for PSD construction permits.

A brief discussion of each of the PSD construction permit requirements follows:

Best Available Control Technology Review

An analysis of potential control technologies must be conducted to ensure the application of BACT at each proposed emission source from which there will be a net increase in emissions of the pollutant for which the overall major modification exceeds significance levels. Based on maximum usage quantities specified in Fort Leonard Wood's CDTF air permit application, it is calculated that PM_{10}, VOC, radionucleide and HAP emissions will exceed significance levels for the Fort Leonard Wood modification. The "top down" control technology analysis required

by applicable air regulations must include the following steps: identify all practical potential control options; eliminate the technically infeasible options; rank the remaining control technologies by control effectiveness (including energy, environmental, and economic impacts); evaluate the most effective controls and document the results; and select the BACT for each proposed emissions source emitting the affected pollutant. BACT should have been evaluated for all four types of emissions (PM_{10}, VOC, HAP and radionucleides) for the CDTF, but it was not.

In the permit applications and agency reviews for the proposed major modification at Fort Leonard Wood, the only BACT analysis which was done was for the fog oil training. HAP emissions were not considered, although they should have been as previously discussed. Even then, the BACT analysis for the fog oil training was cursory at best, and appeared to omit several of the required steps. In addition, nothing was done to evaluate the other emissions sources with the net emissions increases of VOC, PM_{10}, HAP and radionucleides.

Source Impact Analysis and Air Quality Analysis

The PSD permit application is also required to contain an air quality analysis of the ambient air impacts associated with construction and operation of the proposed major modification. The main purpose of the air quality analysis is to demonstrate that new emissions from the proposed modification, in conjunction with other applicable emissions from existing sources, will not cause or contribute to a violation of any applicable national ambient air quality standard. The analysis must also demonstrate that new emissions from the proposed major modification will not violate any PSD increment (defined as the maximum allowable increase in ambient air pollutant concentration above a baseline level). The PSD increment for PM_{10} is 30 micrograms per cubic meter, based on a 24-hour average. These demonstrations are based on air quality monitoring conducted in accordance with EPA's *Ambient Monitoring Guidelines*

for Prevention of Significant Deterioration, and on air qualify modeling based on EPA's *Guideline on Air Quality Model (Revised)*. The applicable Missouri regulations [10 CSR 10-6.060(8)(C)] require the PSD permit application to contain at least four months of air monitoring data. However, no air monitoring data for PM_{10} or HAP were included in the CDTF air permit application.

Additional Impact Analysis

All PSD permit applications must also contain additional analyses which assess the impacts of air, ground, and water pollution on soils, vegetation, and visibility caused by an increase in emissions of any regulated pollutant from the proposed major modification; and from commercial, residential, industrial or other growth associated with that modification.

The CDTF air construction permit application did not include any analysis of the impact of projected emissions from the proposed major modification on the local soils and vegetation. A brief statement regarding the lack of simple procedures for estimating the impacts of VOC and PM_{10} emissions on soils and vegetation was included in MDNR's permit application review on the fog oil training, but the required analyses for other regulated pollutants and other emissions units/sources was not addressed.

In addition, the required growth analysis which was contained in MDNR's permit application review on fog oil training was inadequate. MDNR acknowledged that the increase in local population due to the proposed major modification will be nearly 8,000 persons, but they provided no estimate of the air contaminant emissions expected as a result of the industrial, commercial, and residential growth associated with this population increase.

BEFORE THE MISSOURI
AIR CONSERVATION COMMISSION

IN THE MATTER OF:	)
	)
WILLIAM A. GIBBS, REBECCA I. GIBBS, AND THE COALITION FOR THE ENVIRONMENT	)
	)
Petitioners,	)
vs.	)
	)
MISSOURI DEPARTMENT OF NATURAL RESOURCES,	)
	)
Respondent.	)

MOTION TO EXPEDITE OR, IN THE ALTERNATIVE, FOR AN INTERLOCUTORY ORDER STAYING PERMIT TO CONSTRUCT CHEMICAL DECONTAMINATION FACILITY AND THERMAL TREATMENT UNIT

Come Now Petitioners, by and through their attorneys, and respectfully request this Commission to direct the Missouri Department of Natural Resource's ("MDNR") staff and the hearing officer assigned to this appeal to expedite a hearing on the merits of Petitioners' Appeal so as to allow this Commission to determine the matter finally before June 22, 1995. As grounds therefor, Petitioners state as follows:

1. As part of the base closure and realignment process, Fort Leonard Wood seeks to relocate the United States Army's Chemical Decontamination Facility and Thermal Treatment Unit ("CDTF") from its present location in Fort McClellan, Alabama to Fort Leonard Wood, Missouri. Approval of such a move by the BRAC Commission is contingent upon the Army obtaining all necessary environmental permits from MDNR prior to June 22, 1995.

2. Accordingly, on or about March 1, 1995, the Army submitted to MDNR for approval an Application For Authority to

Construct a Thermal Treatment Unit to treat waste generated from a Chemical Decontamination Training Facility. The Army intends to conduct nerve agent training at the proposed facility, as more fully described in Petitioners' Notice of Appeal.

3. On April 11, 1995, MDNR approved the Army's application and issued the permit to construct and subsequently operate the CDTF facility (Permit No. 0495-013).

4. A public hearing was not held prior to MDNR issuing its approval.

5. As set forth more fully in their Notice of Appeal, Petitioners object to MDNR's issuance of the Permit To Construct in that the issuance of the Permit was based upon erroneous and incomplete data submitted by Fort Leonard Wood and was not in compliance with specific requirements of Missouri regulations controlling the permitting of such facilities.

6. On June 21, 1995, the BRAC Commission begins its final evaluation and deliberations and must submit its final recommendation of base closures and realignments to the President by July 1, 1995.

7. So that the BRAC Commission may base its final evaluation and deliberations upon a complete and accurate record as to the status of Fort Leonard Wood's Application and Permit to Construct, Petitioners respectfully request an expedited hearing. Since MDNR has already approved the Permit Application, neither MDNR nor the Army are prejudiced by such a request.

8. Alternatively, Petitioners request that the Commission issue its interlocutory Order staying the effectiveness of Permit

No. 0495-013 until such time as the Commission enters its final Order on this Appeal. Since neither the BRAC Commission nor the President have approved the Army's request to relocate the CDTF, MDNR and the Army would not be prejudiced by such an interlocutory Order.

9. Petitioners and the public at large on the other hand would be severely prejudiced if it is found, as Petitioners contend, that the permit was improperly issued without public hearing and was based on incomplete and inaccurate data. In such an event the BRAC Commission's determination may be final and could result in an imminent and substantial endangerment to human health of the Petitioners and the environment of the citizens of the State of Missouri.

WHEREFORE, for all the foregoing reasons, Petitioners respectfully request that the Commission: (a) direct MDNR to appoint a hearing officer forthwith to determine their appeal; (b) direct the hearing officer to allow expedited discovery, an expedited hearing, and to report his recommendations to the Commission prior to June 20, 1995, or on such other date to allow this Commission to issue its Order on or before June 20, 1995; and (c) issue such other orders or directions as may be required to expedite this Appeal. In the alternative, Petitioners request the Commission to enter its interlocutory Order staying Permit No. 0495-013 until such time as Petitioners' Appeal may be heard.

Respectfully submitted,

GREEN, HENNINGS & HENRY

By: _____

LEWIS C. GREEN
314 North Broadway, Suite 1830
St. Louis Missouri 63102-2097
(314) 231-4181

Attorney for Petitioners

BEFORE THE MISSOURI
AIR CONSERVATION COMMISSION

IN THE MATTER OF:	)	
	)	
WILLIAM A. GIBBS, REBECCA GIBBS, WENDY PELTON, AND THE COALITION FOR THE ENVIRONMENT,	)	
	)	
Petitioners,	)	No. 95-11-P
	)	
v.	)	
	)	
UNITED STATES DEPARTMENT OF THE ARMY, FORT LEONARD WOOD, MISSOURI	)	
	)	
Applicant,	)	
	)	
AND, THE MISSOURI DEPARTMENT OF NATURAL RESOURCES,	)	
	)	
Respondents.	)	

MISSOURI DEPARTMENT OF NATURAL RESOURCES' RESPONSE IN OPPOSITION TO PETITIONERS' MOTION FOR CONTINUANCE, TO CONSOLIDATE, TO APPOINT A HEARING OFFICER, AND TO ENTER PETITIONERS' PROPOSED DISCOVERY SCHEDULE

Comes now the Missouri Department of Natural Resources ("MDNR"), by and through counsel, and requests this Commission to deny petitioners William A. Gibbs, Rebecca Gibbs, Wendy Pelton, and the Coalition for the Environment's ("petitioners") Motion to Reset the May 25, 1995, hearing on petitioners' opposition to the United States Department of the Army, Fort Leonard Wood's ("Fort Leonard Wood") request for a variance to 10 C.S.R. 10-3.080

"Restrictions of Emissions of Visible Air Contaminants," for the operation of an obscurant (smoke) training school ("the variance"), and petitioners' Motion to Consolidate the variance hearing with petitioners' appeal of the construction permit MDNR issue to Fort Leonard Wood regarding a chemical decontamination facility thermal treatment unit ("the construction permit"). MDNR further requests that the Commission deny petitioners' Motion to Appoint a Hearing Officer and Set a Hearing Date for a consolidated hearing on the variance and the appeal of the construction permit. Finally, MDNR requests the Commission not adopt the discovery schedule proposed by petitioners. MDNR, however, has no objection to the Commission setting a discovery schedule for the variance hearing or a hearing date on petitioners' appeal of the construction permit separately from the May 25, 1995, variance hearing.

Suggestions

Petitioners have requested the Commission consolidate the variance hearing and the construction permit appeal hearing, and then, because the consolidated matters will be complex and require lengthy discovery and a week long hearing, continue the May 25, 1995, hearing date to June 8 through June 14, 1995. MDNR requests that the variance hearing and the construction permit appeal not be consolidated as these two matters are not substantially similar and do not require any significant amount of similar evidence.

Section 643.110 RSMo provides when the director of MDNR recommends to the Commission that a variance to the Air Conservation Laws be granted, any person aggrieved by the granting of a variance may have a hearing prior to the Commission's decision. Section 643.110.1 RSMo further provides that the Commission may grant a variance whenever it finds:

> upon adequate proof, that compliance with any provision of this chapter [643] or any rule, requirement or order of the commission

> or direction will result in ... the closing and elimination of any lawful ... activity, without sufficient corresponding benefit or advantage to the people ....

Section 643.110.1 RSMo limits the Commission's authority to grant a variance in cases where the Commission finds that the effect of the variance will permit the continuance of a health hazard.

The issues at the variance hearing scheduled for May 25, 1995, will be limited to two questions. First, whether granting a variance to 10 C.S.R. 10-3.080 "Restriction of Emission of Visible Air Contaminants" will constitute a health hazard. If the Commission finds that it does, then the Commission cannot grant the variance request. Second, whether denying the variance will result in prohibition of a lawful activity without sufficient corresponding benefit or advantage to the people. The only regulation at question is 10 C.S.R. 10-3.080 which requires that any new source of air contaminants limit its opacity to 20%. The opacity from the Fort Leonard Wood training course will routinely be 100%. Not granting the variance will prohibit the training from occurring. Fort Leonard Wood contends that the training is necessary for national security reasons.

The appeal of the construction permit does not involve the same standard of proof nor the same issues. Although the statutes are silent on this point, MDNR believes it will have the burden of going forward to establish that all procedural steps required in the state statutes and regulations were met. The burden of proof that MDNR wrongly issued that permit falls upon petitioner as they are appealing the decision to grant the permit. In the variance hearing, Fort Leonard Wood will have the burden of proof for its request for a variance from the regulation. Combining the two actions will, therefore, be confusing and will not promote judicial economy.

The appeal of the construction permit involves a wide variety of issues which are primarily set out in paragraph 8 of petitioners' Notice of Appeal. Their challenge goes to the technical aspect of both the chemical decontamination facility thermal treatment unit and the permit. Their challenge does not include a restriction of visible air contaminants issue which is the only issue for the variance hearing.

Limiting the May 25, 1995, hearing to the variance on 10 C.S.R. 10-3.080 will not prejudice petitioners as they will still have the right to appeal the permit for the Fort Leonard Wood smoke training course should MDNR issue that permit. Should MDNR deny the permit, the variance will necessarily fail. MDNR concedes that a permit appeal often involves many issues which require lengthy preparation and a lengthy hearing. That is not the case with a variance hearing which is limited to one regulation and has the parameters of the hearing set by statute.

Since MDNR opposes consolidating the variance hearing with the construction permit hearing for the reasons set out above, it also opposes appointing a hearing officer, setting a hearing date, and the proposed discovery schedule for a consolidated hearing as being unnecessary.

MDNR believes that the discovery necessary to be prepared for the variance hearing can be done, provided the parties cooperate with each other, prior to May 25, 1995. MDNR was willing to begin depositions of its staff on Friday, May 5, 1995. MDNR will cooperate in expediting discovery, but requests that any discovery schedule entered into have the input of all three parties, and require that petitioner's provide their expert who will testify at the May 25, 1995, hearing for deposition on or before May 22, 1995.

Respectfully submitted,

JEREMIAH W. (JAY) NIXON
Attorney General

Deborah Neff

DEBORAH NEFF
Assistant Attorney General

MBE #31381
P. O. Box 899
Jefferson City, MO 65102-0176
Telephone (314) 751-3321
TELEPAX No. (314) 751-8464

CERTIFICATE OF SERVICE

I hereby certify that a true and correct copy of the foregoing was mailed, postage prepaid, by United States mail, this 5th day of May, 1995, to:

Lewis C. Green
Green, Hennings & Henry
314 North Broadway, Suite 1830
St. Louis, Missouri 63102-2097

Attorneys for Petitioners

Kevin Hebl
Department of the Army
Fort Leonard Wood, Missouri 65473-6600

Attorney for Applicant

Deborah Neff
Deborah Neff

TECHNICAL COMMENTS FOR PERMIT ISSUES ASSOCIATED WITH THE PROPOSED MOVE OF THE U.S. ARMY CHEMICAL SCHOOL FROM FORT McCLELLAN, ALABAMA TO FORT LEONARD WOOD, MISSOURI

May 12, 1995

PREPARED FOR:

WILLIAM A. GIBBS, REBECCA I. GIBBS, WENDY PELTON AND MISSOURI COALITION FOR THE ENVIRONMENT

PREPARED BY:

SCHREIBER, GRANA & YONLEY, INC.
271 WOLFNER DRIVE
ST. LOUIS, MISSOURI 63026

ADDITIONAL CDTF AIR PERMIT DEFICIENCIES

Fort Leonard Wood's air permit application for the CDTF contains major omissions and deficiencies which serve to also make MDNR's permit defective. In fact, the permit application and, therefore, the permit itself omits major aspects of the CDTF presently in operation at Fort McClellan. Some of the more glaring deficiencies are described below.

Fuel Analysis

A fuel analysis was not included in Fort Leonard Wood's application for an air permit to construct the CDTF. Typical analysis for #2 fuel oil contained in their permit application indicates an average level of sulfur of 0.5%, not 0.05% as indicated in the application. Consequently, the potential uncontrolled emissions at this higher sulfur content will be about 17 tons per year, which was not properly evaluated by MDNR.

Application Description

The Permit to Construct issued by MDNR indicates that the Application for Authority to Construct was made for a Chemical Decontamination Training Facility and Thermal Treatment Unit. In fact, the Application for Authority to Construct submitted by Fort Leonard Wood to MDNR on March 1, 1995, was for a Thermal Treatment Unit to Treat Waste from a Chemical Decontamination Training Facility, which also provided information on the Ventilation System Stack, the 600 KW Standby Generator and the Standby Package Boiler. However, the air permit issued by MDNR for the CDTF does not mention this auxiliary equipment and provides no operating conditions for that equipment.

CDTF Standby Package Boiler Potential Emissions

Fort Leonard Wood's CDTF air permit application included a standby package boiler with a rated heat input capacity of 6.25 million BTU/hr. Using AP-42 emission factors, potential emissions of formaldehyde (HCOH) from that standby package boiler will be 45.6 tons

per year. Formaldehyde is classified as a volatile organic compound ("VOC"). Major modifications at major stationary air emission sources which have 40 tons per year or more of potential VOC emissions are required to go through PSD air construction permit application and review procedures. However, neither the permit application submitted by Fort Leonard Wood, nor the review conducted by MDNR meet the applicable PSD regulatory requirements.

ACAMS Versus MINICAMS for Monitoring

The CDTF at Fort McClellan is no longer using the ACAMS monitoring equipment included in the permit application and in the permit issued by MDNR for the CDTF to be constructed at Fort Leonard Wood. The ACAMS have been replaced with a more modern MINICAMS unit which has improved the facility's monitoring and detection capabilities for nerve agents. The MINICAM monitors use a silver nitrate impregnated pad, which is disposed of by being burned in the CDTF incinerator.

Size of the CDTF

The current building and ancillary facilities which are part of the CDTF complex (i.e. everything within the fence) necessary for live nerve agent training at Fort McClellan encompass seventeen acres. Despite numerous public statements and assurances by Fort Leonard Wood personnel that the planned CDTF in Missouri will be "bigger and better" than the one at Fort McClellan, only eight acres were specified for the CDTF in Fort Leonard Wood's permit application and incorporated in MDNR's permit.

Cost of the CDTF

The permit application submitted by Fort Leonard Wood and incorporated in the air permit issued by MDNR specifies an estimated cost of $43 million for the thermal treatment unit (i.e. the incinerator) and its associated air pollution control equipment. However, the final "DD Form 1391 and Supporting Documentation" for the CDTF dated May 16, 1995, prepared by

Harland Bartholomew & Associates, Inc., St. Louis, Missouri, estimates the total cost of the entire CDTF (i.e. everything within the fence) at $30.5 million. The cost of the incinerator is specified as only $2.8 million. Because the Army has provided no information on the relationship between Harland Bartholomew's cost estimates and the specifications in the air permit issued by MDNR, there is no assurance that the cost managers are providing for procurement of the same kind of CDTF incinerator required by the state's permit.

CDTF Operating Rate/Schedules

The information contained in Form 2.0 of Fort Leonard Wood's permit application (See Tab M, page 5) is incorrect. The data presented is twelve years old and does not represent current or future pollutant discharge rates from the CDTF incinerator at Fort McClellan as shown below:

- Quarterly operational percentages are not equal throughout the year. Training at the Chemical School and the CDTF ebbs and flows (e.g. sinusoidal); therefore, it is impossible to have equal quarterly production rates.
- Fort McClellan's incinerator operates one week per month for 24 hours per day, not 8 hours per day for 5 days per week as shown in the permit application.
- Both boilers at Fort McClellan do not run simultaneously.
- The filtration system for the CDTF training building is activated carbon. That system also operates continuously (24 hours per day, 365 days per year).
- The 600 KW generator will run more than one hour per day for one day per week. Fort Leonard Wood failed to take into account maintenance and power outages due to storms.
- No tertiary generator is included in Fort Leonard Wood's permit application. This equipment was added to Fort McClellan's CDTF in the past year, but was

not taken into account by Fort Leonard Wood.

The very basis for the issuance of an air construction permit is the potential emission of pollutants. A permit for bogus discharges to the environment, as specified in Fort Leonard Wood's permit application, cannot be properly and legally issued by a state permitting agency, as MDNR has done in this case.

OTHER CDTF PERMIT ISSUES

Several other state permit requirements appear to have been overlooked by MDNR in their rush to issue the CDTF construction permit. Brief comments on these permit requirements as they apply to the CDTF are shown below.

Solid Waste Processing Facility Permit

The CDTF incinerator is a solid waste processing facility, based on the definition of solid waste processing facility contained in Missouri's environmental regulations at 10 CSR 80-2.010(76). A conditional exemption from that permit requirement is provided at 10 CSR 80-2.020(9)(A)2. The permit exemption is for "any on-site solid waste processing facility which processes solid waste from an individual household, single building or institution, provided the facility is located on-site where the refuse originates." That conditional exemption applies only if pollution, a public nuisance or a health hazard is not created. Since the CDTF incinerator will result in pollution and will create a potential health hazard due to the materials which are burned, that conditional exemption should not apply. Solid wastes to be processed in the incinerator will be generated in more than one building. In addition, it is questionable whether a military training facility would be considered an "institution." Generally, the intent of the word "institution" was to include hospitals and other medical facilities. Consequently, a solid waste processing facility permit should be required for Fort Leonard Wood's CDTF incinerator.

Infectious Waste Processing Facility Permit

At Fort McClellan, the CDTF incinerator is used to burn infectious waste (i.e. sharps and blood extracted from troops during live nerve agent training exercises). If this will also occur at Fort Leonard Wood, Missouri State Regulation 10 CSR 80-7.010 applies to this incinerator. The regulation provides an exemption from this permitting requirement at 10 CSR 80-7.010(1)(C)4, which states: "a generator of infectious waste who operates a single site research facility for research and experimental activities as defined in Section 174 of the 1986 Internal Revenue Code, who generates such waste as a part of research and experimentation activities, who manages such waste on-site and who accepts no infectious waste from off-site is exempt from the infectious waste processing facility permit requirements of this rule." Fort Leonard Wood is not a research facility in accordance with Section 174 of the 1986 Internal Revenue Code; therefore, this exemption from permitting requirements does not apply. Consequently, an infectious waste processing facility permit will be necessary, if the sharps and blood from the CDTF's nerve gas training personnel monitoring process is to be burned in Fort Leonard Wood's CDTF incinerator.

Missouri Department of Natural Resources
Air Pollution Control Program
New Source Review Unit
P.O. Box 176, Jefferson City, MO 65102

RECEIVED
'95 MAR 1 PM 3
AIR POLLUTION CONTROL PGM

APPLICATION FOR AUTHORITY TO CONSTRUCT

APCP USE ONLY	
Filing Fee: 100 00	
Check No.: 40 4188	Check Rec'd: 3/1/95
Check Amount: $ 100 00	Check Date: 3/1/95
Project Number: 3860-0027	

NOTE: INSTRUCTIONS ON BACK OF THIS SHEET

NAME OF COMPANY/FACILITY TO RECEIVE PERMIT:
U.S. Army Engineer Center and Fort Leonard Wood

COMPANY/FACILITY STREET ADDRESS:
ATTN: ATZP-DPW-EP

COMPANY/FACILITY MAILING ADDRESS:
Same

COMPANY/FACILITY CITY:	STATE:	ZIP CODE:
Fort Leonard Wood	MO	65473

COUNTY:		Section:	Township:	Range:
Pulaski	NUMBER	21	36W	

WHAT MISSOURI SENATORIAL DISTRICT IS COMPANY/FACILITY IN?

WHAT MISSOURI REPRESENTATIVE DISTRICT IS COMPANY/FACILITY IN?

NAME OF PARENT COMPANY:
Department of Defence

PARENT COMPANY MAILING ADDRESS:

PARENT COMPANY CITY:	STATE:	ZIP CODE:

THIS APPLICATION IS FOR:
☐ MODIFICATION OR ADDITION TO AN EXISTING FACILITY ☒ NEW FACILITY

PROJECTED DATE TO COMMENCE CONSTRUCTION:	PROJECTED DATE OF STARTUP:

DESCRIPTION OF NEW OR MODIFIED PROCESSES/EQUIPMENT:
Static and mobile fog oil smoke training.

ESTIMATED COST OF BASIC EQUIPMENT:	ESTIMATED COST OF AIR POLLUTION CONTROL EQUIPMENT:
$	$

All Applications Must be Accompanied by a $100 Filing Fee. Processing Fees at the Rate of $50 per Hour of Staff Time will be Assessed at the End of the Review.

APPLICANT'S CERTIFICATION STATEMENT:
I certify that I have personally examined and am familiar with the information in this application and believe that the information submitted is accurate and complete. I am aware that making a false statement or misrepresentation in this application is grounds for denying or revoking the construction permit. I may also be guilty of a misdemeanor and upon conviction, may be punished by fine or imprisonment.

SIGNATURE OF RESPONSIBLE MEMBER OF THE COMPANY:	DATE:
Scott Murrell	3/1/95

TYPE OR PRINT NAME OF SIGNER:
Scott Murrell

OFFICIAL TITLE OF SIGNER:	TELEPHONE NUMBER:
Cheif, Environmental Division	314 596-0869

State of Missouri

Department of Natural Resources
Air Pollution Control Program
P.O. Box 176
Jefferson City, Missouri 65102

PERMIT APPLICATION RECEIVED

'95 MAR 1 PM 3 40

AIR POLLUTION CONTROL

Emissions Inventory Questionnaire (EIQ)

FORM 1.0 GENERAL PLANT INFORMATION

Facility Name	County No.	Plant No.	Year of Data
U.S. Army Engineer Center Fog Oil Smoke Generation	3860	0004	1995

Facility Street Address	County Name	Classification
ATZT-DPW-EE	Pulaski	

City	ZIP Code	Facility Phone Number
Fort Leonard Wood	65473	314 596-0840

Facility Mailing Address	Product/Principal Activity
USAEC & FLW ATTN: ATZT-DPW	Obscurant Training

City	ZIP Code	Number of Employees	Land in Acres
Fort Leonard Wood	65473		

Facility Contact Person	Title	Where to Send EIQ in Future (Check One)
Scott Murrell	Chief, Environmental	[x] Facility Mailing Address [ ] Parent Co. Mailing Address

	Latitude	Longitude	UTM Coordinates	CTSR Coordinates		
Degrees	37	92	Horizontal (Km) 579.9	Township	Section	Range
Minutes	45	5	Vertical (Km) 4180.1			
Seconds	59	40				

Parent Company Name	Contact Person	Phone Number

Mailing Address	City	State	ZIP Code

EMISSIONS STATEMENT

TOTAL PLANT EMISSIONS (TONS PER YEAR)

TSP	PM10	SOx	NOx	VOC	CO	LEAD	HAPs
				233.73			

The undersigned hereby certifies that they have personally examined and are familiar with the information and statements contained herein and further certifies that they believe this information and statements to be true, accurate and complete. The undersigned certifies that knowingly making a false statement or misrepresenting the facts presented in this document is a violation of state law.

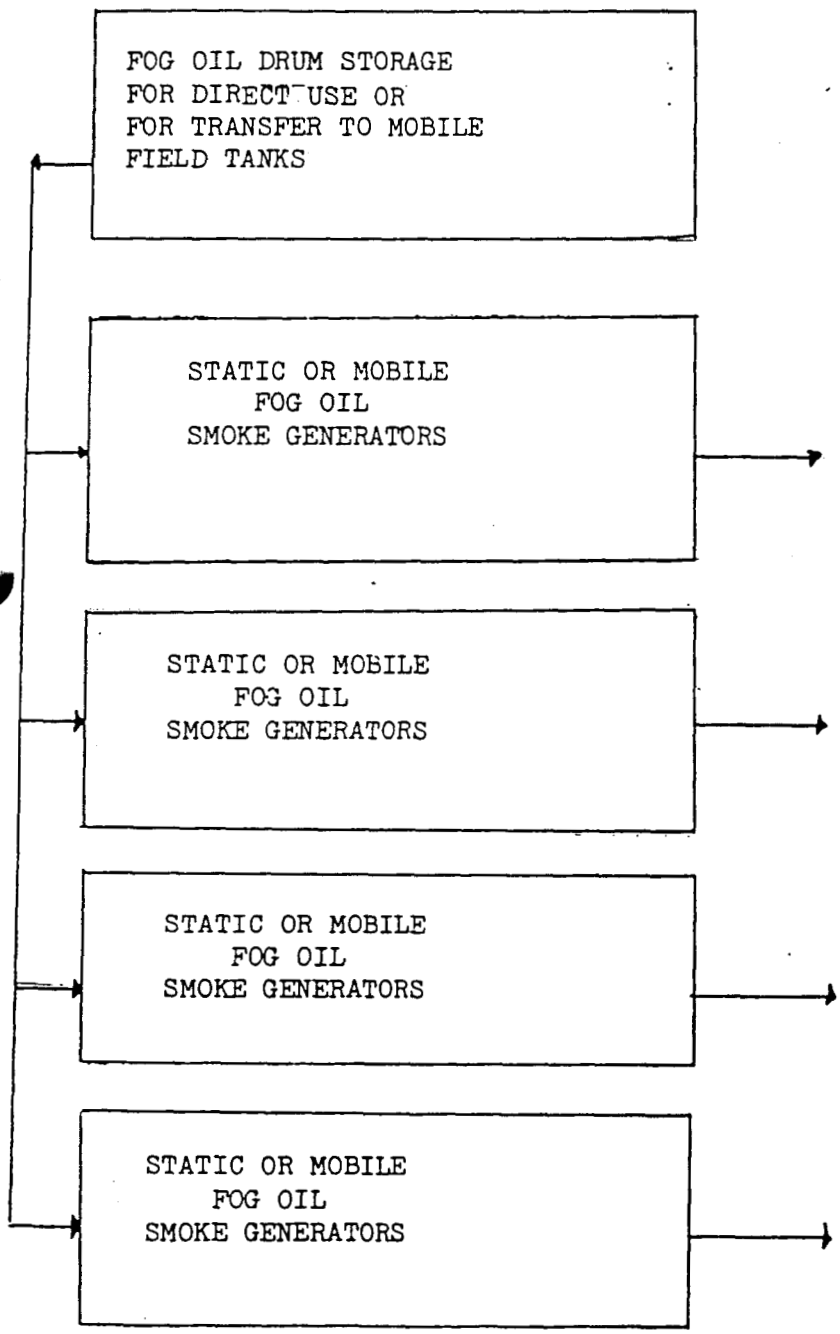
Name of Person Completing Form	Title	Signature	Date
Ray McCarthy	Environmental Engineer	Ray McCarthy	1 MAR 95
Name of Authorized Company Representative	Title	Signature	Date
Scott Murrell	Chief, Environmental Division	Scott Murrell	1 Mar 95

Form Number MO 780-1510 (11/94)

ORM 1.1 PROCESS FLOW DIAGRAM

Facility Name	County No.	Plant No.	Year of Data
S. Army Engineer Center	3860	0004	1995

Please use this page or a separate sheet to provide a Process Flow Diagram per the instructions for Form 1.1 in the Instruction Packet. Do not forget to include all processes used in your facility. Make sure to label each process and piece of equipment and provide an identification number for all emission points (including fugitive emissions) and air pollution control equipment.
MAKE SURE TO USE THE SAME IDENTIFICATION NUMBERS THROUGHOUT THE ENTIRE EIQ.



FORM 1.2 SUMMARY OF EMISSION POINTS

Facility Name	County No.	Plant No.	Year of Data
Army Engineer Center Fog Oil Smoke Generation	3860	0004	1995

[1] Total Number of Emission Points

1

[2] Point No.	[3] Point Description	[4] Worksheet(s) Used with Form 2.0
31	Static and Mobile Fog Oil Smoke Generation	2.3,1.1

Form 2.0 EMISSION POINT INFORMATION

Facility Name	County No.	Plant No.	Year of Data
[redacted] ARMY ENGINEER CENTER	3860	0004	1995

[1] POINT IDENTIFICATION

Point No.		SIC Code	Point Description
31			Fog Oil Smoke Training

Source Classification Code (SCC)	Emission Factor Unit	Number of SCCs Used with this Point	
	1000 Gallons		

SCC Description

[2] STACK/VENT PARAMETERS

Stack No.		Height (Ft)	Diameter (Ft)	For a non-circular stack: Diameter = (1.128A)^1/2 (A = Cross Sectional Area in sq. feet)

Temperature (F)	Velocity (Ft/Min)	Flow Rate (Cu Ft/Min)	List other points sharing this stack.

[3] AIR POLLUTION CONTROL EQUIPMENT

Device No.	Device Code	Description of Control Device	CONTROL DEVICE EFFICIENCY							
			TSP	PM10	SOx	NOx	VOC	CO	Lead	Toxics

[4] OPERATING RATE/SCHEDULE

[redacted] al Throughput	Units	Hours/Day	Jan-Mar (%)	Apr-Jun (%)
63	1000 Gallons	2	25.00	25.00
Maximum Hourly Design Rate	**Units**	**Days/Week**	**Jul-Sep (%)**	**Oct-Dec (%)**
.126	1000 Gallons	5	25.00	25.00
		Weeks/Year 50		

EMISSIONS CALCULATIONS

Source of Emission Factor (List below in [6]): 1 CEM, 2 Stack Test, 3 Mass Balance, 4 SCC Factor, 5 AP42, 6 Other

[5] List other worksheets used with this form.

Air Pollutant	[6] Source	[7] Emission Factor (Lbs/Unit)	[8] Ash or Sulfur (%)	[9] Control Efficiency (%)	[10] Actual Emissions (Tons/Yr)	Maximum Hourly (Lbs/Hr)	Potential Controlled (Tons/Yr)	Potential Uncontrolled (Tons/Yr)
TSP								
PM10								
SOx								
NOx								
VOC	3	7422.6			233.73			
CO								
Lead								
Toxics								

FORM 2.3 VOC PROCESS MASS-BALANCE WORKSHEET

Facility Name	County No.	Plant No.	Year of Data
U.S. Army Engineer Center	3860	0004	1995

Point No.	Source Classification Code (SCC)
31	

[1] TOTAL ANNUAL THROUGHPUT AND TOTAL POUNDS OF VOC

Application Method	Material Type	Annual Throughput (SCC Units/Yr)	% by Wt of VOC in Material	Density (Lbs/Gal)	Lbs of VOC Per Unit	Total VOC (Lbs/Yr)
Obscurant Training	Fog Oil	1000 Gallons	100	7.42	7422.6	467,460

TOTAL ANNUAL THROUGHPUT (SCC Units)	Total Lbs VOC
6	

Enter the total ANNUAL THROUGHPUT amount calculated above in Block 4 on Form 2.0, Emission Point Information.

[2] CALCULATION OF VOC RECOVERED

LBS OF VOC RECOVERED =
{Material Shipped as Hazardous Waste} x {% VOC Content of Waste}

Material Shipped as Hazardous Waste	% VOC Content of Waste	Lbs of VOC Recovered
		0

[3] CALCULATION OF VOC EMITTED PRIOR TO CONTROL

LBS OF VOC EMITTED PRIOR TO CONTROL EQUIPMENT =
{Total Lbs of VOC} - {Lbs of VOC Recovered}

Lbs of VOC Emitted Prior to Control

[4] BACK CALCULATION OF EMISSION FACTOR

EMISSION FACTOR =
{Lbs of VOC Emitted Prior to Control Equipment} / {Total Annual Throughput}
467,460/63

Emission Factor	Lbs/SCC Units
7422.6	7422.6

Enter the EMISSION FACTOR in VOC Box of Block 7 on Form 2.0, Emission Point Information.

roduced by: US Army CERL, Champaign, Illinois
oftware: GRASS

ITLE: (smoke.buff.11)
O ON: Fort Leonard Wood, Missouri

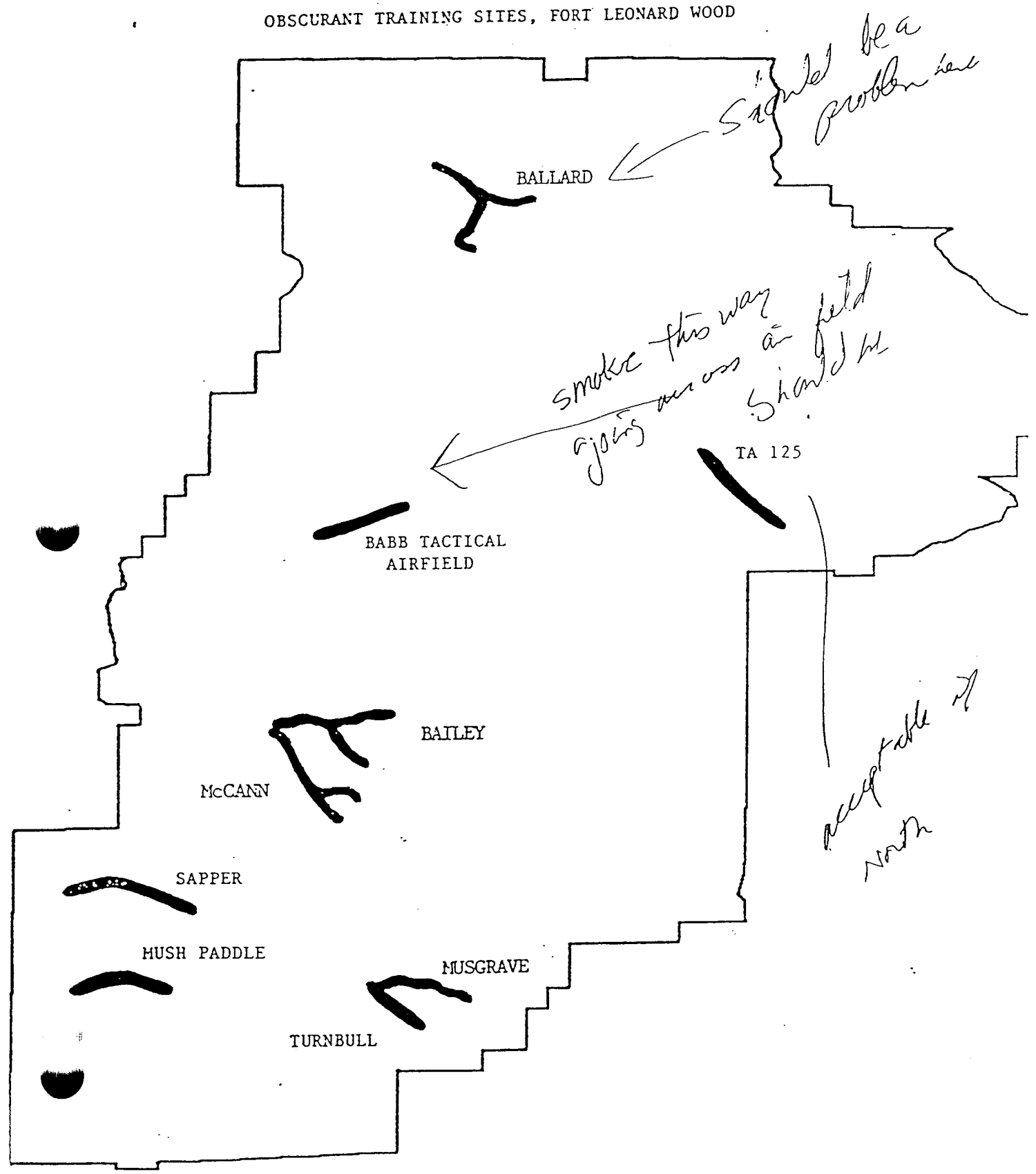


Table III

AIR QUALITY CONSTRAINTS*
FOR POTENTIAL SITES

Wind Direction	Acceptable Sites under any Meteorological Condition	Unacceptable Sites under any Meteorological Condition	Acceptable Sites under certain Meteorological Condition
N	McCann, Ballard, Bailey, Hurd, Smith, Wolf	Turnbull, TA125, Musgrave, Mush Paddle	Sapper - okay for wind speed under 8 m/s and A-E stability
NE	McCann, Bailey, TA125	Smith, Wolf, Musgrave, Mush Paddle, Sapper, Turnbull, Hurd	Ballard - wind speeds under 8 m/s and A-E stability
E	TA125, Musgrave, Turnbull	Hurd, McCann, Sapper, Mush Paddle, Smith, Wolf	Ballard, Bailey - wind speeds under 8 m/s and A-E stability,
SE	Musgrave, Turnbull, Bailey	Mush Paddle, Sapper Hurd, TA125, Smith, Wolf, Ballard	McCann - wind speed under 8 m/s and A-E stability
S	Turnbull, Musgrave, McCann, Bailey	Mush Paddle, Sapper, Ballard, TA125, Smith, Hurd	Wolf - wind speed under 8 m/s and A-E stability
SW	Turnbull, Musgrave, Mush Paddle, Sapper, Hurd, McCann, Bailey	Ballard	TA125, Wolf, Smith - wind speed under 8 m/s and A-E stability
W	Sapper, Mush Paddle, McCann, Bailey, Hurd	Musgrave, Turnbull, Ballard	Smith, Wolf, TA125 - wind speed under 8 m/s and A-E stability
NW	Smith, Hurd, Bailey, McCann	Musgrave, Turnbull, TA125, Ballard	Wolf, Mush Paddle, Sapper - wind speed under 8 m/s and A-E stability

*This table does not include any possible opacity restrictions.

NOT ON MAP

not on map

DOD Hazardous Materials Information System
DoD 6050.5-LR
AS OF MAY 1992
For U.S. Government Use Only

: 9150
N: 002617895
ufacturer's CAGE: 60226
t No. Indicator: A
t Number/Trade Name: FOG OIL

General Information

m Name: FOG OIL
ufacturer's Name: BATTENFELD GREASE AND OIL CORP OF NEW YORK INC
ufacturer's Street: 1174 ERIE AVE
ufacturer's P. O. Box: 728
ufacturer's City: NORTH TONAWANDA
ufacturer's State: NY
ufacturer's Country: US
ufacturer's Zip Code: 14120-3036
ufacturer's Emerg Ph #: 716-695-2100
ufacturer's Info Ph #: 716-695-2100
tributor/Vendor # 1:
tributor/Vendor # 1 Cage:
tributor/Vendor # 2:
tributor/Vendor # 2 Cage:
tributor/Vendor # 3:
tributor/Vendor # 3 Cage:
tributor/Vendor # 4:
utor/Vendor # 4 Cage:
ety Data Action Code:
ety Focal Point: D
ord No. For Safety Entry: 006
Safety Entries This Stk#: 012
tus: SE
e MSDS Prepared: 01JUL91
ety Data Review Date: 24JUL91
ply Item Manager: CX
S Preparer's Name: DENNIS KROL
parer's Company:
parer's St Or P. O. Box:
parer's City:
parer's State:
parer's Zip Code:
er MSDS Number:
S Serial Number: BKKJP
cification Number: MIL-F-12070
c Type, Grade, Class: TY SGF-2
ard Characteristic Code: N1
t Of Issue: DR
t Of Issue Container Qty: 55 GAL
e Of Container: DRUM
it Weight: 407.6 LBS
ate License Number: N/R
plosive Weight:
opellant Weight-Ammo: N/R
st Guard Ammunition Code:

Ingredients/Identity Information

[redacted]oprietary: NO
ngredient: HYDROTREATED HEAVY NAPHTHENIC DISTILLATE, PETROLEUM/MINERAL OIL
ngredient Sequence Number: 01
ercent: 100.0
ngredient Action Code:
ngredient Focal Point: D
IOSH (RTECS) Number: PY8035000
AS Number: 64742-52-5
SHA PEL: 5 MG/M3 AS OIL MIST
CGIH TLV: 5 MG/M3 AS OIL MIST
ther Recommended Limit: NONE SPECIFIED

Physical/Chemical Characteristics

ppearance And Odor: FLUID OIL- BLAND
oiling Point: 700F,371C
elting Point: -40F,-40C
apor Pressure (MM Hg/70 F): UNKNOWN
apor Density (Air=1): UNKNOWN
pecific Gravity: 0.89
ecomposition Temperature: UNKNOWN
vaporation Rate And Ref: UNKNOWN
olubility In Water: NIL
erc[redacted]t Volatiles By Volume: 0
is[redacted]ity:
H: N/R
adioactivity:
orm (Radioactive Matl):
agnetism (Milligauss):
orrosion Rate (IPY): UNKNOWN
utoignition Temperature: 370F

Fire and Explosion Hazard Data

lash Point: 330F,166C
lash Point Method: COC
ower Explosive Limit: UNKNOWN
pper Explosive Limit: UNKNOWN
xtinguishing Media: USE WATER FOG, CARBON DIOXIDE, FOAM, EARTH/SAND OR DRY CHEMICAL. WATER MAY CAUSE FROTHING.
pecial Fire Fighting Proc: WEAR FIRE FIGHTING PROTECTIVE EQUIPMENT AND A FULL FACED SELF CONTAINED BREATHING APPARATUS. EVACUATE AREA. COOL FIRE EXPOSED CONTAINERS WITH WATER SPRAY.
nusual Fire And Expl Hazrds: NONE

Reactivity Data

Sta[redacted]ity: YES
Co[redacted]o Avoid (Stability): HIGH HEAT, OPEN FLAMES
Mat[redacted]ials To Avoid: STRONG OXIDIZING AGENTS
Hazardous Decomp Products: CARBON MONOXIDE AND DIOXIDE
Hazardous Poly Occur: NO
Conditions To Avoid (Poly): NOT APPLICABLE

Health Hazard Data

[redacted]0-LC50 Mixture: LD50 (ORAL RAT) IS UNKNOWN
ıte Of Entry - Inhalation: YES
ıte Of Entry - Skin: YES
ıte Of Entry - Ingestion: NO
ılth Haz Acute And Chronic: ACUTE-EYES/SKIN:MILD IRRITATION.INHALATION: HARMFUL VAPORS EXCEPT AT HIGH TEMPERATURE.INGESTION:NOT GIVEN.CHRONIC-ɣE GIVEN.
:cinogenicity - NTP: NO
:cinogenicity - IARC: NO
:cinogenicity - OSHA: NO
ɔlanation Carcinogenicity:
ɡns/Symptoms Of Overexp: SEE HEALTH HAZARDS SECTION.
ɨ Cond Aggravated By Exp: NONE SPECIFIED BY MANUFACTURER.
ɜrgency/First Aid Proc: GET MEDICAL ATTENTION.INHALATION:MOVE TO FRESH R.EYES:IMMEDIATELY FLUSH WITH WATER FOR 15 MINUTES.SKIN:WASH AFFECTED EA WITH SOAP AND WATER.INGESTION:OBTAIN MEDICAL ATTENTION.

Precautions for Safe Handling and Use

eps If Matl Released/Spill: WEAR APPROPRIATE RESPIRATORY PROTECTION AND OTECTIVE CLOTHING.CONTAIN SPILL.ABSORB WITH CLAY, DIATOMACEOUS EARTH OR Y OTHER INERT ABSORBENT. SHOULD NOT CONTAMINATE DRAINAGE SYSTEMS, RIVER WATERWAYS.
utralizing Agent: NOT APPLICABLE.
ste Disposal Method: CONTROLLED BURNING OR DISPOSAL CONFORMING TO ALL P[redacted]BLE FEDERAL, STATE AND LOCAL LAWS AND REGULATIONS.
ec[redacted]ons-Handling/Storing: STORE IN A COOL,DRY PLACE AWAY FROM FLAMES D EXTREME HEAT.KEEP CONTAINER CLOSED.
her Precautions: AVOID CONTACT WITH EYES AND SKIN. WASH HANDS BEFORE TING OR DRINKING.

Control Measures

ɨspiratory Protection: AIR SUPPLIED BREATHING EQUIPMENT IF OIL MIST IS ɨNERATED.
ɨntilation: VENTILATE AS NEEDED TO COMPLY WITH EXPOSURE LIMIT.
ɨotective Gloves: NEOPRENE
ɣe Protection: GOGGLES IF OIL IS BEING SPRAYED/SPLASHED
ɨher Protective Equipment: EYE WASH STATION.LONG SLEEVE CLOTHING TO ɨNIMIZE SKIN CONTACT.
ɔrk Hygienic Practices: OBSERVE GOOD PERSONAL HYGIENE PRACTICES AND ɛCOMMENDED PROCEDURES. DO NOT WEAR CONTAMINATED CLOTHING OR FOOTWEAR.
ɯppl. Safety & Health Data:

Transportation Data

ɾansportation Action Code:
ɾansportation Focal Point: D
ɾans Data Review Date: 91205
ɔT Code: ZZZ
ɔT ɪ ɔper Shipping Name: NOT REGULATED FOR THIS MODE OF TRANSPORTATION
ɔI [redacted]ss: N/R
ɔT Label: N/R
ɪmited Quantity:

)T Mode Indicator:
lentification Number: N/R
[redacted]able Qty - Trans File:
)[redacted]D Exemption Number:
MO PSN Code: ZZZ
MO Proper Shipping Name: NOT REGULATED FOR THIS MODE OF TRANSPORTATION
MO Regulations Page Number: N/R
MO UN Number: N/R
MO UN Class: N/R
MO Subsidiary Risk Label: N/R
ATA PSN Code: ZZZ
ATA UN ID Number: N/R
ATA Proper Shipping Name: NOT REGULATED BY THIS MODE OF TRANSPORTATION
ATA UN Class: N/R
ATA Subsidiary Risk Class: N/R
ATA Label: N/R
FR 71-4 PSN Code: ZZZ
FR 71-4 Prop. Shipping Name: NOT REGULATED FOR THIS MODE OF
RANSPORTATION
FR 71-4 Class: N/R
FR 71-4 Label: N/R
FR 71-4 ID Number: N/R
F MMAC Code:
ech Entry NOS Shipping Name:
dditional Trans Data:

Disposal Data

)i[redacted]al Data Action Code:
)i[redacted]al Data Focal Point:
)isposal Data Review Date:
ec # For This Disp Entry:
ot Disp Entries This Stock#:
andfill Ban Item:
)isposal Supplemental Data:
st EPA Haz Wst Code UnUsed:
st EPA Haz Wst Name UnUsed:
st EPA Haz Wst Char UnUsed:
st EPA Acute Hazard UnUsed:
nd EPA Haz Wst Code UnUsed:
nd EPA Haz Wst Name UnUsed:
nd EPA Haz Wst Char UnUsed:
nd EPA Acute Hazard UnUsed:
rd EPA Haz Wst Code UnUsed:
rd EPA Haz Wst Name UnUsed:
rd EPA Haz Wst Char UnUsed:
rd EPA Acute Hazard UnUsed:

Label Data

abel Required: YES
)ate of Technical Review: 24JUL91
ab[redacted] Date: UNDATED
Man[redacted]acturer's Label No.: UNKNOWN
La[redacted] Status: D
Co[redacted]n Name of Product: FOG OIL
Chronic Hazard: N/K

gnal Word: CAUTION!
ute Health Hazard-None:
ute Health Hazard-Slight: X
ut[redacted]Health Hazard-Moderate:
ut[redacted]Health Hazard-Severe:
ntact Hazard-None:
ntact Hazard-Slight: X
ntact Hazard-Moderate:
ntact Hazard-Severe:
ire Hazard-None:
ire Hazard-Slight: X
ire Hazard-Moderate:
ire Hazard-Severe:
eactivity Hazard-None: X
eactivity Hazard-Slight:
eactivity Hazard-Moderate:
eactivity Hazard-Severe:
pecial Hazard Precautions: ACUTE-EYES/SKIN:MILD IRRITATION.INHALATION:NO
ARMFUL VAPORS EXCEPT AT HIGH TEMPERATURE.INGESTION:NOT GIVEN.CHRONIC-NONE
IVEN. STORAGE- STORE IN A COOL,DRY PLACE AWAY FROM FLAMES AND EXTREME
EAT.KEEP CONTAINER CLOSED. FIRST AID- GET MEDICAL ATTENTION.INHALATION:
OVE TO FRESH AIR.EYES:IMMEDIATELY FLUSH WITH WATER FOR 15 MINUTES.SKIN:
ASH AFFECTED AREA WITH SOAP AND WATER.INGESTION:OBTAIN MEDICAL ATTENTION.
rotect Eye: X
rotect Skin: X
rotect Respiratory:
fg's Name From Label: BATTENFELD GREASE AND OIL CORP OF NEW YORK
NC
fg's Street From Label: 1174 ERIE AVE
fg[redacted]P.O. Box From Label: 728
fg[redacted]City From Label: NORTH TONAWANDA
fg's State From Label: NY
fg's Zip Code From Label: 14120-3036
fg's Country From Label: US
mergency Ph. No. From Label: 716-695-2100
ear Procured: 1990

[redacted]

TO: GLENN CARLSON
MO DNR
AIR PROGRAM
PHONE 314 751-4817
FAX 314 751-2706

FROM: RORY MCCARTHY
FORT LEONARD WOOD MO
PHONE 314 596-0869
FAX 314 596-0882

PAGES 3 + HEADER

AL info

Fog oil omitted as PM-10 does not contain a VOC

APPENDIX S
FOG OIL GENERATORS

1. BACKGROUND

A mechanical generator system is the primary technique used for dispensing an oil smoke at Fort McClellan. This system vaporizes the petroleum distillate (fog oil) and disseminates it by means of a stationary fuel driven engine or by a mobile Vehicle Engine Exhaust Smoke System (VEESS). The VEESS diverts diesel fuel from its fuel tank and disseminates a vaporized smoke cloud with its exhaust.

The vaporized smoke cloud scatters light rays and is white in color. The droplets are produced as soon as the vaporized oil passes through the nozzle of a thermal generator and is cooled by the surrounding air. The air cools the oil vapor so quickly that only very small drops are formed. Since the oil vapor is ejected from the nozzle at high velocities, large volumes of air are drawn into the vapor stream. The resulting dilution and cooling produces an enormous number of condensation nuclei.

The materials primarily used in smoke generators to produce smoke are low viscosity petroleum distillates, referred to as fog oils and diesel fuels. Fog oils have two standard grades, SGF (standard grade fuel) No. 1 and SGF No. 2. Current Army usage consists mainly of SGF No. 2 for year-round smoke/obscuration use. Vehicles equipped with the VEESS system diverts diesel fuel from it's fuel tanks; therefore there is no quantified amount of diesel fuel used in the VEESS system.

The primary pollutants discharged by the generation of petroleum-based smokes (noncombusted) are particulates and hydrocarbons. The mechanical generator systems run on gasoline or diesel fuel. The emissions from the combustion of gasoline in these generators are described below. The emissions from the combustion of diesel fuel in the VEESS system were not calculated because the vehicles are mobile sources.

2. EMISSION CALCULATION METHOD

Gasoline was combusted by a single-cycle engine with a pulse jet. The heat of combustion was used to vaporize the fog oil and produce smoke. Emission factors from AP-42 Volume II (Reference 24), Section II-5 were used to calculate emissions. The emission factors for general utility engines (four-stroke miscellaneous engines) were chosen as the most representative factors for the fog oil generators. The emission factors were specified as grams of pollutant per gallon of fuel burned. Annual emissions were calculated by multiplying the emission factor by the annual fuel burned.

In 1992, 1,093 55-gallon drums of fog oil (7.4 lb/gal density) were used. Since the oil vapor is ejected from the nozzle below the flash point for SGF No. 2 (100°F), nearly all of the oil will be emitted as an aerosol particulate. Therefore it was assumed that 99 percent of the

fog oil was emitted as TSP/PM_{10} and 1 percent was emitted as VOC (to acknowledge that some volatilization would occur below the flash point).

3. SAMPLE CALCULATIONS

This sample calculation is for NO_x:

Gasoline Fuel Burned in 1992: 3300 gallons
NO_x Emission Factor: 31.2 grams/gallon

$$\frac{3300\ gal}{yr} \times \frac{31.2\ grams}{gal} \times \frac{1\ lb}{453.6\ g} = 227.0\ \frac{lb}{yr}\ NO_x$$

Fog Oil emissions:

$$1{,}093\ drums \times 55\frac{gal}{drum} \times 7.4\frac{lbs}{gal} \times 0.99\ PM = 440{,}402.5\ \frac{lb}{yr}\ PM$$

4. EMISSIONS SUMMARY

See Tables S-1, S-2 and S-3.

TABLE S-1. FOG OIL GENERATOR EMISSIONS ASSOCIATED WITH GASOLINE COMBUSTION (3000 gal/yr).

Pollutant	Emission Factor (gram/gal)	Emissions (lb/yr)	Emissions (tpy)
CO	1,571.00	11,429.2	5.71
NO_x	31.20	227.0	0.11
SO_2	2.45	17.8	0.01
TSP/PM_{10}	2.77	20.2	0.01
VOCs	95.50	694.8	0.35

TABLE S-2. FOG OIL GENERATOR EMISSIONS ASSOCIATED WITH FOG OIL (60,115 gal/yr).

Pollutant	Emissions (lb/yr)	Emissions (tpy)
TSP/PM_{10}	440,402.5	220.20
VOCs	4,448.3	2.22

TABLE S-3. TOTAL FOG OIL GENERATOR EMISSIONS.

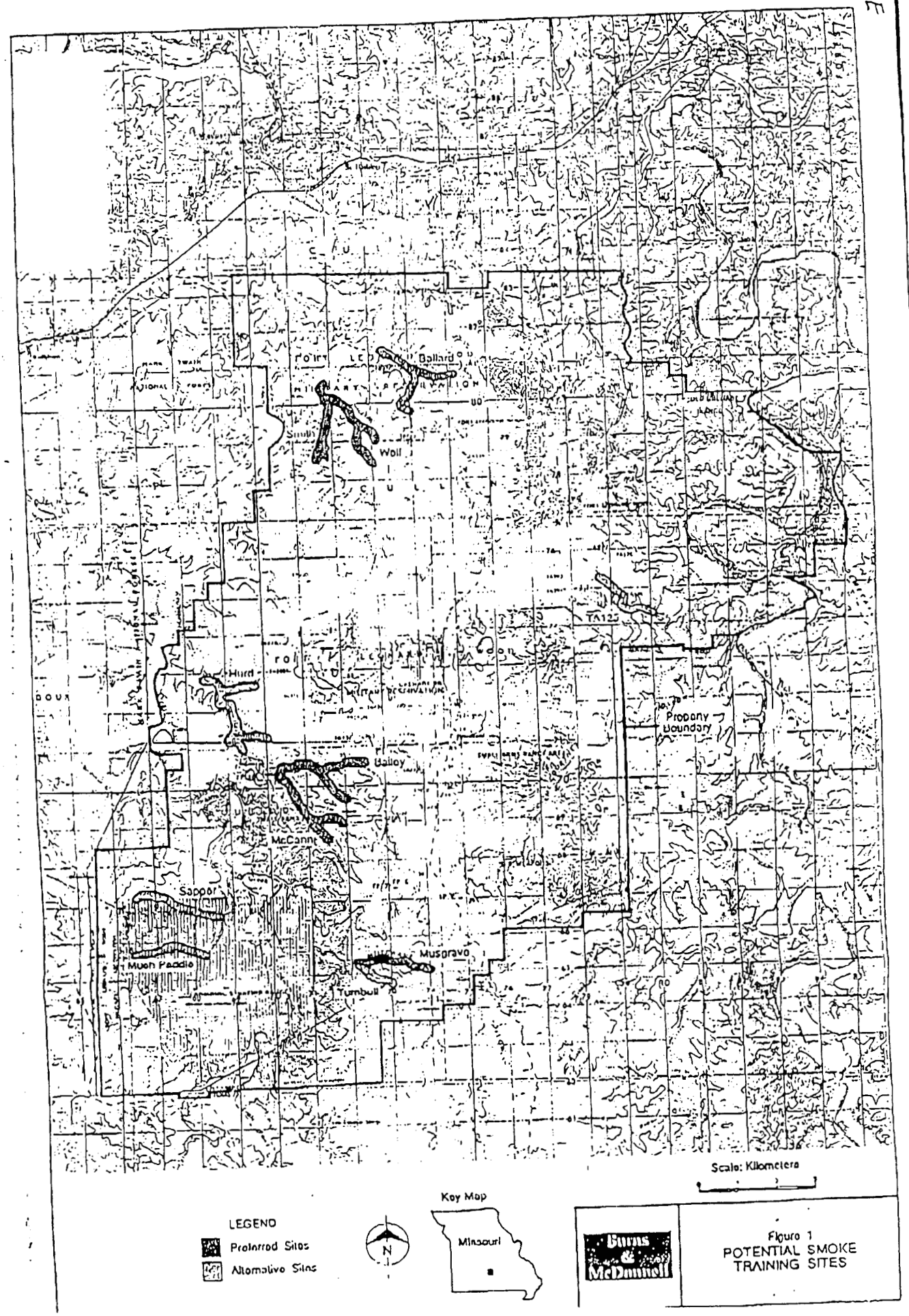
Pollutant	Emissions (lb/yr)	Emissions (tpy)
CO	11,429.2	5.71
NO_x	227.0	0.11
SO_2	17.8	0.01
TSP/PM_{10}	440,422.7	220.21
VOCs	5,143.3	2.57

TRAINING LOADS AND EQUIPMENT USED FOR SMOKE TRAINING (FROM THE BLUE BOOK)

CLASS	LENGTH WEEKS	IN CLASS HOURS	CLASS/YR	STUDENTS/CLASS	TOTAL	1059's	M3A3/A4's
54B10 OSUT	20	11862	12	200	2400	8	100
BNCOC	11.2	1308	13	32	416	18	18
BNCOC-R	12.4	1418	8	32	256	8	18
ANCOC	11.8	1025	8	32	256	1	16
COBC	19.2	2784	11	42	462	7	30
COAC	20	3878	6	30	180	3	2
COAC-RC	6		2	60	120	1	0
TOTAL					4090		

TYPES AND CONSUMPTION RATES OF FOG OIL EQUIPMENT (FROM BLUE BOOK)

DESIGNATION	PLATFORM	FOG OIL CONSUMPTION	GAS CONSUMP	COMMENTS
M3A3	STAND ALONE	40GAL/HR	3.5 GAL/HR	4 PERSON CARRIED FIELD OR STATIC UNIT WITH PULSE JET MOTOR PRESSURIZER REMOTE
M3A4	STAND ALONE	40GAL/HR	3.5 GAL/HR	4 PERSON CARRIED FIELD OR STATIC UNIT WITH PULSE JET MOTOR PRESSURIZER MOUNTED ON UNIT
M157	STAND ALONE	40GAL/HR	3.5 GAL/HR	FULLY AUTOMATED PRESSURIZER AND IGNITION SYSTEM
M1057	HMMWV	40GAL/HR	3.5 GAL/HR	FULLY AUTOMATED PRESSURIZER AND IGNITION SYSTEM M157 UNIT MOUNTED ON "HUMVEE"
M1059	APC	40GAL/HR	3.5 GAL/HR	FULLY AUTOMATED PRESSURIZER AND IGNITION SYSTEM M157 UNIT MOUNTED ON A M113 APC


Ballard
Wolf
Hurd
Balloy
McConnell
Sapper
Much Paddle
Musgrave
Turnbull
Property Boundary
Scale: Kilometers
Key Map
Missouri
LEGEND
Preferred Sites
Alternative Sites
N
Burns & McDonnell
Figure 1
POTENTIAL SMOKE TRAINING SITES

SUPPLEMENTARY INFORMATION FOR THE OBSCURANT TRAINING PERMIT APPLICATION SUBMITTED MARCH 1, 1995

The permit application is made for the generation of fog oil obscurant training on Fort Leonard Wood. The training takes place to teach soldiers of the U.S. Army to become proficient in the actual, mechanical generation of the fog and it's tactical use for battlefield operations.

The oil that was chosen to do the obscurant training, SGF2, was chosen because of its properties to block visible light. It is a light grade mineral oil which is vaporized by a fog generator and then condensed as it exits the generator stack. The oil particles that condense, together with condensed moisture in the air, are of a particle size close to the wavelength of visible light, making this the oil of choice for obscurant training.

Because the oil is finely dispersed, after deposition on surfaces, it will normally volatilize. Because it volatilizes, the most reasonable target emission for monitoring the effect on the environment would be ozone. The generator produces "particulate" for which monitoring may also be done. Because conditions may rapidly volitilize the fog oil, monitoring for particulate may be difficult.

Usage rates for oil will be 63,000 gallons per year and 6300 gallons of regular unleaded gasoline to fuel the generators.

(8) Attainment and Unclassified Area Permits.

(A) Applicability.

1. Applicants for permits for construction or major modification of installations which are in a category named in 10 CSR 10-6.020(3)(B), Table 2, and have the potential to emit one hundred (100) tons or more of any pollutant shall adhere to the requirements of this section, in addition to the requirements of section (6) of this rule.

2. Applicants for permits for construction or modification with the potential to emit one hundred (100) tons or more of any pollutant at an installation in a category named in 10 CSR 10-6.020(3)(B), Table 2 shall comply with the requirements of this section, in addition to the requirements of section (6) of this rule.

3. Applicants for permits for construction or major modification of installations with the potential to emit two hundred and fifty (250) tons or more of any pollutant shall comply with the requirements of this section, in addition to the requirements of section (6); unless the potential to emit would be less than two hundred and fifty (250) tons if fugitive emissions were not counted in calculating the potential to emit and the

installation is not in a category named in 10 CSR 10-6.020(3)(B), Table 2.

4. Applicants for permits for construction or modification with the potential to emit two hundred and fifty (250) tons or more of any pollutant shall comply with the requirements of this section, in addition to the requirements of section (6), unless the potential to emit would be less than two hundred and fifty (250) tons if fugitive emissions were not counted in calculating the potential to emit and the installation is not in a category named in 10 CSR 10-6.020(3)(B), Table 2.

(B) Control Technology.

1. An installation to which this section applies shall apply BACT for each pollutant that it would emit in a significant amount.

The operational concept for the use of fog oil abscurants is to help the commander to meet the imperatives of the battle. Fog oil obscurants do this by:

1. Degrading the enemy's ability to see.
2. Disrupting the enemy's ability to communicate.
3. Concealing friendly forces.
4. Deceiving enemy forces.
5. Providing a means to identify and signal.
6. Degrading or defeating directed energy weapons.
7. Enhancing friendly weapon system effectiveness.

Fort Leonard Wood will train for these operational concepts by conducting obscurant exercises on targets that simulate bridge crossings, landing strips, troop concentrations and other tactical scenarios.

The object of this training is to produce a obscurant fog or smoke. Application of BACT would negate the object of the training.

2. The requirement for BACT in the case of a major modification shall apply to the physical change(s) or change(s) in the method of operation contained in the permit application that brings the installation's net emissions increase to the significant level.

3. For phased construction projects, the determination of BACT shall be reviewed and modified as appropriate at the latest reasonable time prior to commencement of construction of each independent phase of construction.

4. An owner or operator of an installation to which this subsection applies may employ a system of innovative control technology, if the procedures specified in subsection (12)(E) of this rule are followed.

(C) Air Quality Impacts.

1. Preapplication modeling and monitoring.

A. Each application shall contain an analysis of ambient air quality or ambient concentrations in the significantly impacted area of the installation for each pollutant specified in 10 CSR 10-6.020(3)(A), Table 1, which the installation would emit in significant amounts. The analysis shall follow the guidelines of subsection (12)(F).

Preconstruction Modeling was performed during trial obscurant operations in May 1993. This modeling is available in a report titled Fort Leonard Wood Smoke Training Air Quality Impact, June 1993, Burns and McDonnell Project Number 93-805-4-002.

B. The analysis required under this paragraph shall include continuous air quality monitoring data for any pollutant, except VOC, emitted by the installation, for which an ambient air quality standard exists. The owner or operator of a proposed installation or major modification emitting VOC who satisfies all the conditions of 40 CFR part 51, Appendix S, section IV.A may provide post-construction monitoring data for ozone in lieu of providing preconstruction data for ozone.

Post construction monitoring for ozone will be provided.

C. The continuous ~~air monitoring data required~~ in this paragraph shall relate to, and shall have been gathered over, a period of one (1) year and shall be representative of the year preceding receipt of the complete application, unless the permitting authority determines that a complete and adequate analysis may be accomplished in a shorter period (but not less than four (4) months). Continuous, as used in this subparagraph, refers to frequency of monitoring operation as required by 40 CFR part 58, Appendix B.

D. For pollutants emitted in a significant amount for which no ambient air quality standards exist, the analysis required under this paragraph shall contain whatever air quality monitoring data the permitting authority determines is necessary to assess ambient air quality for that pollutant in any area that the emissions of that pollutant would affect.

2. Operation of monitoring stations. The owner or operator shall meet the requirements of 40 CFR part 58, Appendix B during the operation of monitoring stations for the purposes of paragraphs (8)(C)1. or 7. of this rule at the time the station is put into operation.

3. Modeling. The owner or operator of the installation to which this section applies shall provide modeling data, following the requirements of subsection (12)(F), to demonstrate

that potential and secondary emission increases from the installation, in conjunction with all other applicable emissions increases or reductions in the baseline area since the baseline date, will not cause or contribute to ambient air concentrations in excess of any ambient air quality standard or any applicable maximum allowable increase over the baseline concentration in any area, in the amounts listed in subsection (11)(A), Table 1 of this rule. The permitting authority will track the consumption of allowable increment in accordance with subsection (12)(G) of this rule.

4. Emission reductions. The applicant must show that it has obtained emission reductions of a comparable air quality impact for the nonattainment pollutant if its planned emissions of the pollutant will affect a nonattainment area in excess of the air quality impact for that pollutant listed in subsection (11)(D), Table 4 of this rule. These reductions shall be obtained through binding agreement prior to the commencement of operations of the installation or major modification and shall be subject to the offset conditions set forth in subsection (12)(C), Appendix C of this rule.

5. Impact on visibility. The owner or operator shall provide an analysis of the impairment to visibility, soils and vegetation that would occur as a result of the installation or major modification and general commercial, residential, industrial and other growth associated with the installation or major modification. The owner or operator need not provide an analysis of the impact on vegetation having no significant commercial or recreational value.

According to EPA 450/2-81-078, titled A Screening Procedure for the Impacts of Air Pollution Sources on Plants, Soils, and Animals, there is no procedure for estimating the impacts of ozone, the regulated pollutant for this installation. PM10 is not one of the regulated pollutants for which screening is done in the EPA screening guidance.

6. Projected air quality impacts. The owner or operator shall provide, following the requirements of subsection (12)(F), Appendix F of this rule, an analysis of the air quality impact projected for the area as a result of general commercial, residential and industrial growth, as well as growth associated with the installation or major modification.

The Fort Leonard Wood day time population will increase by 7900 persons. This includes civilian/permanent party military increase of 1600 and a trainee increase of 6300. All of the permanent party and military trainees will be served by facilities on post. Increases in emissions would come mostly from increased fuel use for space heating. The Post now uses natural gas which will have the smallest impact on the air quality. In general, growth in commercial, residential, and industrial areas is heavily influenced by growth at Fort Leonard Wood.

(I) The screening technique set forth in Guidelines for Air Quality Maintenance and Planning Analysis Vol. III (Revised); Procedures for Evaluating Air Quality Impact of New Stationary Sources (United States EPA, Office of Air Quality Planning and Standards, Research Triangle Park, NC 27711); or

(II) A more sophisticated modeling technique as indicated in subsection(12)(F).

(D) Modifications in Class I Areas. Any construction or modification that will impact a federal Class I area shall be subject to the provisions of subsection (12)(H).

(E) Offsets. Applicants must obtain emission reductions, obtained through binding agreement prior to commencing operations and subject to subsection (12)(C), Appendix C of this rule, equal to and of a comparable air quality impact to the new or increased, emissions in the following circumstances when the:

1. Area has no increment available; or

2. Proposal will consume more increment than is available.

7. Post-construction monitoring. After construction of the installation or major modification, the applicant shall conduct ambient monitoring as the permitting authority determines may be necessary to determine the effect emissions from the installation or major modification may have, or are having, on air quality in any area.

Post construction monitoring will be conducted for PM10 and ozone once per month for one year following commencement of operation. Sampling period will be such that ambient air quality levels can be monitored before, during, and after the exercise. During periods when training is not taking place, ambient air monitoring will still be conducted once per month.

8. Exemptions.

A. The requirements of subsection (8)(C) shall not apply unless otherwise determined to be needed by the permitting authority, if--

(I) The increase in potential emissions of that pollutant from the installation would impact no Class I area and no area where an applicable increment is known to be violated; and

(II) The duration of the emissions of the pollutant will not exceed two (2) years.

B. The requirements of subsection (8)(C) as they relate to any maximum allowable increase for a Class II area shall not apply unless otherwise determined to be needed by the permitting authority, if--

(I) The application is for a major modification of an installation which was in existence on March 1, 1978;

(II) Any such increase would cause or contribute to no exceedance of any ambient air quality standard; and

(III) The new increase in allowable emissions of each air pollutant after the application of BACT would be less than fifty (50) tons per year.

C. The requirements of subsection (8)(C) shall not apply, if the ambient air quality effect is less than the air quality impact of subsection (11)(B), Table 2, or if the pollutant is not listed in subsection (11)(B), Table 2, unless otherwise determined to be needed by the permitting authority. The ambient air quality impact must be determined using either of the following methods:

TABLE I
HAZARDOUS AIR POLLUTANT DETERMINATION

Attached is a list of compounds identified in SGF-2. These compounds were compared to the list of Hazardous Air Pollutants (HAP) listed in Clean Air Act Amendment Section 112. None of the compounds identified in SGF-2 were found in the HAP list.

TABLE 3. COMPOUNDS IDENTIFIED IN SGF-2
(ALIPHATICS 43 TO 58%, AROMATICS 40 TO 50%)
BY HIGH RESOLUTION GC OF THE INDICATED FRACTIONS
(from Katz et al., 1980[5])

Aliphatic Fraction

$C_{14}H_{30}$ n-tetradecane
$C_{16}H_{34}$ n-hexadecane
$C_{17}H_{36}$ branched alkane
$C_{17}H_{36}$ n-heptadecane
$C_{18}H_{38}$ n-octadecane
$C_{19}H_{40}$ n-nonadecane
$C_{20}H_{42}$ n-eicosane
$C_{21}H_{44}$ branched alkane
$C_{21}H_{44}$ n-henicosane
$C_{22}H_{46}$ branched alkane

First Aromatic Fraction

$C_{12}H_{16}$ 2,6-dimethyl-1,2,3,4-tetrahydronaphthalene
$C_{13}H_{14}$ + $C_{14}H_{20}$ + $C_{15}H_{24}$
$C_{13}H_{16}$
$C_{13}H_{16}O$ or $C_{14}H_{20}$
$C_{14}H_{16}$
$C_{15}H_{18}$ dimethylisopropylnaphthalene
$C_{15}H_{22}$
$C_{16}H_{18}$
$C_{20}H_{24}$ 3,6,9,9,10,10-hexamethyl-9,10-dihydrophenanthrene
$C_{20}H_{32}$

Middle Aromatic Fraction

$C_{14}H_{10}$ phenanthrene or anthracene
$C_{14}H_{12}$ methylfluorene
$C_{15}H_{12}$ methylanthracene
$C_{15}H_{12}$ methylphenanthrene
$C_{15}H_{14}$ dimethylfluorene
$C_{15}H_{16}$ dimethylbenzylbenzene plus $C_{14}H_{14}$ dimethylbiphenyl
$C_{15}H_{12}O$ 9-methoxyanthracene
$C_{15}H_{12}O$ 9-methoxyanthracene or $C_{18}H_{16}$
$C_{15}H_{24}O$ methyl-di-tert-butylphenol
$C_{16}H_{34}$ n-hexadecane
$C_{16}H_{14}$ dimethylphenanthrene
$C_{17}H_{16}$ trimethylphenanthrene
$C_{18}H_{8}$ alkylphenanthrene
$C_{18}H_{18}$ 1-methyl-7-isopropylphenanthrene
$C_{20}H_{32}$ n-butyl-n-hexyl-tetrahydronaphthalene

Heavy Aromatic Fraction

$C_{12}H_{12}$ dimethylnaphthalene
$C_{12}H_{8}$ acenaphthalene
$C_{13}H_{14}$ trimethylnaphthalene
$C_{13}H_{10}$ fluorene or phenalene
$C_{14}H_{12}$ 1-methyl fluorene
$C_{14}H_{16}$ C_4-alkylnaphthalene
$C_{14}H_{10}$ anthracene or phenanthrene
$C_{15}H_{14}$ dimethylfluorene
$C_{15}H_{14}$ alkenyl dibenzene
$C_{15}H_{12}$ methylphenanthrene or methylanthracene
$C_{15}H_{12}O$ methoxyanthracene or $C_{16}H_{16}$ isomer
$C_{15}H_{24}O$ 2,6-di-t-butyl-4-methylphenol (ionol)
$C_{16}H_{14}$ dimethylphenanthrene
$C_{16}H_{14}$ ethyl or dimethylanthracene
$C_{18}H_{18}$ C_4-alkylphenanthrene or C_4-alkylanthracene
$C_{19}H_{30}$ 2-n-butyl-5-hexylindan

Nitrogen Base Fraction

$C_{10}H_9N$ methylquinoline
$C_{11}H_{11}N$ dimethylquinoline
$C_{12}H_{13}N$ trimethylquinoline
$C_{13}H_{15}N$ tetramethylquinoline (?)
$C_{14}H_{17}N$ pentamethylquinoline (?)
$C_{15}H_{19}N$ hexamethylquinoline (?)
$C_{15}H_{19}N$ C6-alkylquinoline (?)
$C_{15}H_{15}N$ dimethyl-9,10-dimethyl benzoquinoline (?)
$C_{15}H_{13}N$ methylphenylindole or dimethylbenzoquinoline
$C_{16}H_{15}N$ or $C_{15}H_{11}NO$

Visual Effects Screening Analysis for
Source: ft wood
Class I Area: Hercules Glade

*** Level-1 Screening ***

Input Emissions for

Particulates	6500.00	LB /HR
NOx (as NO2)	.00	LB /HR
Primary NO2	.00	LB /HR
Soot	.00	LB /HR
Primary SO4	.00	LB /HR

**** Default Particle Characteristics Assumed

Transport Scenario Specifications:

Background Ozone:	.04 ppm
Background Visual Range:	25.00 km
Source-Observer Distance:	120.00 km
Min. Source-Class I Distance:	120.00 km
Max. Source-Class I Distance:	140.00 km
Plume-Source-Observer Angle:	11.25 degrees
Stability:	6
Wind Speed:	1.00 m/s

R E S U L T S

Asterisks (*) indicate plume impacts that exceed screening criteria

Maximum Visual Impacts INSIDE Class I Area
Screening Criteria ARE NOT Exceeded

					Delta E		Contrast	
Backgrnd	Theta	Azi	Distance	Alpha	Crit	Plume	Crit	Plume
SKY	10.	84.	120.0	84.	2.00	1.455	.05	.015
SKY	140.	84.	120.0	84.	2.00	.149	.05	-.006
TERRAIN	10.	84.	120.0	84.	2.00	.060	.05	.000
TERRAIN	140.	84.	120.0	84.	2.00	.017	.05	.000

Maximum Visual Impacts OUTSIDE Class I Area
Screening Criteria ARE NOT Exceeded

					Delta E		Contrast	
Backgrnd	Theta	Azi	Distance	Alpha	Crit	Plume	Crit	Plume
SKY	10.	75.	116.2	94.	2.00	1.493	.05	.016
S	140.	75.	116.2	94.	2.00	.153	.05	-.006
TN	10.	65.	112.0	104.	2.00	.084	.05	.001
AIN	140.	65.	112.0	104.	2.00	.024	.05	.001

PB82-189572

United States
Environmental Protection
Agency

Office of Air Quality
Planning and Standards
Research Triangle Park, NC 27711

EPA 450/2-81-078
December 12, 1980

Air

EPA

A Screening Procedure for the Impacts of Air Pollution Sources on Plants, Soils, and Animals

Final Report

good deal of controversy among experts. In addition, this procedure is based upon a simplistic view of extremely complex systems in which single value estimates are not possible and in which the number of variables is extremely large. Many simplifying assumptions have been involved in developing the procedure and are discussed in Sec. 3.

Ideally, the screening procedure should address the impacts of all the pollutants currently regulated under the Clean Air Act, but as shown in Table 2.1, screening concentrations were found for only half the regulated pollutants. Ozone and TSP are discussed in Sec. 3.1. Of the remaining substances for which screening concentrations were not found, methyl mercaptan, dimethyl sulfide, dimethyl disulfide, carbon disulfide, and carbonyl sulfide are regulated because of their odor potentials. Odor is an air quality related value and Sec. 52.21 (b)(23)(i) of the PSD regulations[4] gives "de minimis" emission levels for reduced sulfur (RS) and total reduced sulfur

Table 2.1 Regulated Pollutants

Screening Concentrations	
Available	Not Available
CO	TSP[a]
NO_2	Arsenic
SO_2	Sulfuric Acid Mist
O_3[b]	Vinyl chloride
Lead	Methyl Mercaptan[c]
Mercury	Dimethyl Sulfide[c]
Beryllium	Dimethyl Disulfide[c]
Fluoride	Carbon Disulfide[c]
Hydrogen Sulfide	Carbonyl Sulfide[c]

[a]Fraction of TSP present as trace elements treated through deposition and uptake by plants.

[b]Screening concentration available but no simple procedure for estimating the ozone impact of a single source is currently available.

[c]Regulated indirectly as constituents of reduced sulfur or total reduced sulfur.

TECHNICAL COMMENTS FOR PERMIT ISSUES ASSOCIATED WITH THE PROPOSED MOVE OF THE U.S. ARMY CHEMICAL SCHOOL FROM FORT McCLELLAN, ALABAMA TO FORT LEONARD WOOD, MISSOURI

May 12, 1995

PREPARED FOR:

WILLIAM A. GIBBS, REBECCA I. GIBBS, WENDY PELTON AND MISSOURI COALITION FOR THE ENVIRONMENT

PREPARED BY:

SCHREIBER, GRANA & YONLEY, INC.
271 WOLFNER DRIVE
ST. LOUIS, MISSOURI 63026

DESCRIPTION OF FOG OIL SMOKE/OBSCURANT TRAINING

The U.S. Army employs smokes/obscurants principally to obscure or screen the movement of troops and vehicles. The ideal smoke screen will hug the ground and remain low to conceal the location and movement of troops. Smokes and obscurants have critical importance in neutralizing enemy sensors and hiding friendly forces and materials. This is accomplished by denying the enemy information, reducing effectiveness of enemy target acquisition means, and by creating conditions to deceive and surprise the enemy. Smoke screens can also be used offensively for immobilizing enemy troops by obscuring their vision.

The U.S. Army Chemical School's smoke and obscurant training utilizes several different materials for producing the simulated smoke screens. These materials include fog oil, hexachloroethane smoke pots, white/red phosphorus, dye colored smoke grenades, infrared and millimeter wave obscurants, and infrared smoke grenades. All of these obscurants are part of the current training program conducted by the Chemical School at Fort McClellan, Alabama.

Fog Oil

The smoke generators currently used by the Army use petroleum distillates similar to SAE 20 weight motor oil without additives known as "fog oil." Petroleum distillates are not a specific chemical compound but are a blend or mixture of hydrocarbons having specific viscosities and other physical parameters. These distillates must be used because current infrared (IR) smokes are much less effective in the visible range of the electromagnetic spectrum. Fog oil smoke can be generated easily from existing munitions and both static and mobile generators, effectively creating a white smoke that screens and obscures the visible spectrum.

Hexachloroethane Smoke

Hexachloroethane ("HC") smoke has been used in pots, grenades and artillery rounds since World War II. Research studies conducted to date indicate that HC smoke and its combustion products pose significant health hazards to both manufacturing personnel and troops. HC is a pyrotechnic smoke-producing composition of grained aluminum, zinc oxide, and hexachloroethane employed in certain smoke munitions. HC is also employed in floating smoke pots, which produce large volumes of smoke for extended periods of time on land and water.

U.S. Army Guidelines specify the following protection and mitigation procedures when using HC smoke:

- Enforcing the U.S. Army Directive to wear respiratory protection face masks whenever troops are in the presence of HC smoke.
- Closely regulating the deployment of HC smoke on all the U.S. Army's installations.
- Restricting HC deployment to areas of Army installations as far away as practicable from inhabited cantonments and other populated areas.
- Taking special precautions to protect high risk individuals such as the highly allergic, children, and the aged from coming into contact with HC smoke.
- Under no circumstances should HC smoke be employed indoors or in confined quarters.

Phosphorus

White phosphorus has been used as a smoke-producing material in munitions since World War I. There are five basic systems for disseminating phosphorus smoke: artillery, tank guns, mortars, grenades and aerial smoke systems. White phosphorus forms a dense cloud of white smoke consisting primarily of phosphorus oxides. These oxides react with water vapor to form

various phosphoric acids. When munitions containing white phosphorus are used, the phosphorus breaks up into minute particles which are dispersed over a large area. Subsequent rapid oxidation of the small particles generates a large quantity of heat which directs the smoke upward.

Red phosphorus is also used by the military for smoke munitions. It is a reddish solid that can be a finely powdered or a massively formed material. Red phosphorus is much less reactive with air than white phosphorus and is also very insoluble in water.

Dye Colored Smoke

Colored smokes/dyes have been used extensively in the past to provide signaling and communication needs of the Armed Forces, and they will continue to be used as vital elements in our national defense. Associated with the need for colored smoke is the concern for potential carcinogenicity and mutagenicity, toxicity to handling and user personnel, and adverse impacts on the environment. The standard smokes used by the military are pyrotechnic mixes of fuel-oxidizer and a dye, or dye combinations with a cooling agent sometimes added to prevent excessive decomposition of the dye, which is evidenced by decoloring or flaming. When ignited, the mixtures burn and produce red, violet, green, and yellow colored clouds, which provide good visibility and unmistakable identity.

Infrared Obscurants

These grenades contain brass flakes to enhance resistance to penetrating enemy radar. This allows the military to operate within a smoke cloud without being detected. Limited information is available on this type of obscurant due to the military's need to preserve secrecy about these types of materials and their capabilities.

March 23, 1995

Special Assistant to the Commandant

Subject: Request Under the Freedom of Information Act

Mr. John A. Young
State of Missouri Department of Natural Resources
Division of Environmental Quality
Post Office Box 176
Jefferson City, Missouri 65102

Dear Mr. Young,

This letter is in reference to your request regarding fog oil use at Fort McClellan, Alabama. The military stock number of fog oil is 9150-00-261-7895. Other data helpful for identification is Fog Oil: 55 gallon drum (81349) MILF12070 Type SGF-2.

year (gallons of fog oil) (variance due to US Army Reserve training flux)

1994 (93,800) 1993 (116,350) 1992 (56,400) 1991 (54,970) 1990 (65, 860)

If this request is the basis for determining air emission calculations, you should be aware of other types of fuel and obscurants used on Fort McClellan. Smoke generators use gasoline to aerosolize fog oil droplets. The consumption rate is 3 1/2 gallons of gasoline per 55 gallons of fog oil.

Other sources include hexachloroethane smoke pots, colored dye smoke grenades, infrared defeating obscurant grenades (brass flakes) and large area infrared defeating obscurants (graphite powder). Millimeter wave obscurants (similar to radar chaff) are expected to be available for use in the next two years. Environmental assessment information for some of these items are enclosed. The "potential to emit" with 20 mobilizing chemical units, would roughly double the gasoline and fog oil totals per year.

Sincerely,

Edward W. Newing
Lieutenant Colonel, U.S. Army
Special Assistant to the Commandant

Enclosures
Environmental Assessments for Red, White, Plasticized White Phosphorus; Dye Colored Smokes; Hexachloroethane (HC) Smoke

95-36
A: 13 Mar 95

STATE OF MISSOURI
Mel Carnahan, Governor • David A. Shorr, Director
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL QUALITY
P.O. Box 176 Jefferson City, MO 65102-0176

FEB 22 1995

Commander
USACML&MPCEN&FM
ATTN: Ms. Koonce
ATZN-IM
Ft. McClellan, AL 36205-5000

RE: Request Under the Freedom of Information Act

Dear Ms. Koonce:

I am requesting information regarding the use of fog oil at Ft. McClellan. Specifically, I am asking for the amount of fog oil actually expended in conducting smoke training operations for the Chemical School by stock number and type. The time period I am interested in is from 1990 through and including 1994. Please indicate the amount used in each calendar year. Please forward this information as soon as possible.

For any costs involved in retrieving this information, please submit an invoice for payment to me at the above address. If you have any questions regarding this request, please contact Mr. David L. Walker at (314) 751-3176. Thank you for your consideration in this matter.

Sincerely,

DIVISION OF ENVIRONMENTAL QUALITY

John A. Young

John A. Young
Director

JAY:dwjs

Rec'd Mgt Records
3/28/95

3860-0004-015

U. S. Army Engineer Center and Fort Leonard Wood

Department of Defense

U. S. Army Engineer Center and Fort Leonard Wood

ATTN: ATZT-DPW-EE; Ft. Leonard Wood, MO 65473

Pulaski County, All or parts of T33, 34, 35N, R10, 11, 12W

**** Permission to construct a static and mobile fog oil smoke training facility. This review was conducted in accordance with Section (8), Missouri State Rule 10 CSR 10-6.060, "Construction Permits Required." ****

Proposed Draft Air Permit
Ft. Leonard Wood Smoke Training
April 11, 1995

Emissions Limitations

1. *Annual Throughput*. Fort Leonard Wood (the "Permittee") shall process no more than 65,000 gallons of SGF-2 fog oil during any 12-month period. This total shall include the fog oil used in the mobile (valley) operations and the static (introductory) operations.

2. *Daily Throughput*. The Permittee shall process no more than 3700 pounds of SGF-2 fog oil during any 24-hour period. This total shall include the fog oil used in the mobile (valley) operations and the static (introductory) operations.

3. *Emissions Limitation*. The Permittee shall not emit PM_{10} at a rate in excess of 2600 pounds per hour. This rate corresponds to processing fog oil at 3700 pounds per hour with a particulate conversion factor of 70%.

4. *Recordkeeping*. The Permittee shall record the amount of fog oil processed by the smoke generators during the previous month and the previous twelve months. During any month in which smoke training occurs, the Permittee shall record daily and hourly consumption of fog oil. The Permittee shall maintain said records and provide them to APCP personnel on request.

5. *Reporting of Violations*. The Permittee shall report to the Enforcement Section, Air Pollution Control Program (APCP), no later than ten days after the end of each month during which the preceding 12-month cumulative total of fog oil processed exceeds 65,000 gallons of fog oil (Condition Number 1).

6. *Reporting of Violations*. The Permittee shall report to the Enforcement Section, APCP, no later than ten days after an

exceedance of the 3700 pound daily limit of fog oil (Condition 2).

Ambient Air Monitoring

7. *Quality Assurance Project Plan*. The Permittee shall file two copies of a Quality Assurance Project Plan (QAPP) within 90 days of issuance of this permit for approval by the Staff Director, APCP. The QAPP shall describe the method and manner for collecting air quality monitoring data for PM_{10} and ozone required by this permit.

8. *Pre-Startup Monitoring*. The Permittee shall collect at least one year of continuous air quality monitoring data for PM_{10} and ozone at locations to be determined by the APCP beginning as soon as possible after this permit is issued. Collection of monitoring data shall begin no later than eighteen months immediately prior to the beginning of smoke training. Ozone monitoring is only required from April 1 through October 31.

9. *Reporting*. The Permittee shall submit to the APCP no less frequently than quarterly the air quality monitoring data collected pursuant to Condition 8.

10. *Post-Startup Monitoring*. The Permittee shall collect at least two years of continuous air quality monitoring data for PM_{10} and ozone at locations to be determined by the APCP beginning after smoke training begins. Ozone monitoring is only required from April 1 through October 31.

11. *Reporting*. The Permittee shall submit to the APCP no less frequently than quarterly the air quality monitoring data collected pursuant to Condition 10.

Meteorological Monitoring

12. *Observers*. At all times during the operation of the smoke generators, a network of observers shall be stationed at locations from which they can observe whether smoke crosses the Fort Leonard Wood property boundary. The observers shall maintain continuous electronic or visual communications with the smoke generator operators.

13. *Meteorological Monitoring*. For the entire period beginning no less than one hour prior to generating smoke and ending no less than one hour after ceasing generating smoke, the Permittee shall measure and record no less frequently than hourly (including the beginning and ending conditions) on-site meteorological data including ambient air temperature, atmospheric pressure, relative humidity, atmospheric stability, mixing height, and wind speed and direction.

14. *Limitations on Operations*. Smoke training shall only be conducted at the locations and under the meteorological conditions as outlined in Attachment A.

15. *Forecasting Acceptable Conditions*. Smoke training may take place only if the Permittee forecasts no earlier than two hours prior to commencement of smoke training that the meteorological conditions of Attachment A will exist during smoke.

16. *Prohibitions*. Generation of smoke shall cease if:

    a) Meteorological conditions are not within the conditions approved for smoke training as described in Attachment A, or

    b) Visible smoke drifts beyond the Fort Leonard Wood

property boundary, or

c) Under other conditions as may be determined by the Director.

Soil and Vegetation Sampling

17. *Soil and Vegetation Sampling Plan (SVSP)*. Within 180 days of the issuance of this permit, the Permittee shall submit two copies of a SVSP to the APCP for review and approval. The SVSP shall describe the method and manner of collecting and analyzing soil and vegetation samples and of monitoring the impact of smoke training activities on soils and vegetation.

18. *Pre-Startup Sampling*. For no less than one year prior to the commencement of smoke training, the Permittee shall collect and analyze soil and vegetation samples no less frequently than quarterly at each location described in Attachment A. The Permittee shall comply with the sampling and monitoring conditions of Missouri State Operating Permit No. MO-0117251 granted by the Missouri Department of Natural Resources, Missouri Clean Water Commission.

19. *Reporting*. The Permittee shall report the results of the sampling and analysis required by Condition 18 to the APCP within 60 days of the date the samples are collected.

20. *Post-Startup Sampling*. Upon commencement of smoke training, the Permittee shall collect and analyze soil and vegetation samples no less frequently than monthly at each location described in Attachment A. After two years of sampling, the Permittee may petition the Director, APCP, for modification of the sampling schedule and frequency.

21. *Reporting*. The Permittee shall report to the APCP no less frequently than quarterly the soil and vegetation sampling data collected pursuant to Condition 20.

Other Special Conditions

22. *Record Retention*. All records required by this permit shall be maintained and available for inspection by MDNR personnel for no less than five years from the date the record is created.

23. *Public Information*. The Permittee shall cooperate with the APCP in presenting the air quality monitoring data of Condition 8 to the public at an informational meeting to be convened by the APCP. If the data does not substantially conform with the assumptions and conclusions of air quality modelling or if the smoke training is shown to cause or contribute to a violation of National Ambient Air Quality Standards (NAAQS), the Director may require the Permittee to take corrective action or may revoke the permit.

24. *Corrective Action*. If in the opinion of the Director, APCP, the presence of PM_{10} in the ambient air exists in quantities and durations that directly or proximately cause or contribute to injury to human, plant, or animal life or health, or to property, or that unreasonably interferes with the enjoyment of life or the use of property, the Director, APCP, may require the Permittee to submit a corrective action plan adequate to timely and significantly mitigate the emission of PM_{10}. The Permittee shall implement any such plan immediately upon its approval by the Director, APCP. Failure to either submit or implement such a plan shall be a violation of the permit.

Attachment A
Wind Directions during Smoke Training*

Site	A Stability	B Stability	C Stability	D Stability	E* Stability
Musgrave	130 - 220	150 - 220	160 - 215	170-215(1)	150 - 225
Ballard	340 - 35	340 - 35	340 - 35	350 - 35	340 - 35
Mush Paddle	195 - 275	195 - 275	195 - 270	195 - 240(2)	195 - 270
Bailey	All direction except 120 deg.	340 - 40 175 - 325	340 - 40 175 - 325	None	230 -240

(1) 45 minute limit for wind directions 190 - 210 degrees
(2) 45 minute limit for wind directions 220 - 240 degrees
+ A 3 minute exclusion is requested
* A-D stabilities are not restricted based on wind speed, however, E stability is limited to wind speeds of 4 m/s and greater.

DEPARTMENT OF THE ARMY
U.S. ARMY CHEMICAL SCHOOL
FORT MCCLELLAN, ALABAMA 36205-5020

REPLY TO ATTENTION OF

ATZN-CM-SAC 16 May 95

MEMORANDUM FOR MAJ TELLER, HQDA, OSJA, ENVIRONMENTAL OFFICE

SUBJECT: Review of Draft Air Permit, Fort Leonard Wood Smoke Training

1. The purpose of this memorandum is to provide comments on the subject document per your request. More detailed comments are found at the enclosure.

2. The State of Missouri smoke permit restrictions, if implemented, will create **overwhelming degradation to Chemical Mission readiness**. The restrictions will cut back the minimum amount of annual fog oil use by 30%. The daily allowance for smoke training time will be cut by 75%. After suffering these unacceptable losses, it further limits our Joint forces to smoke operations during weather conditions which may exist only 60% of the year. The smoke permit virtually eliminates more than one smoke event per day. The impact would be violations (subject to fines) for 92 days when two events are trained, another 56 days when three events are trained, and another 21 days when four separate events are underway at one time. If allowed to stand, the Missouri smoke permit allows us to conduct roughly 25% of training to standards, these **restrictions would kill both the US Army and US Air Force smoke training.**

3. During the Chemical Functional Area Analysis on 31 Oct 94, the Vice Chief of Staff challenged the Army to "take the lead on proactive involvement with agencies drafting environmental regulatory requirements that impact on chemical training on Army ranges. Focus on leading towards the least restrictive measures that provide the maximum training opportunities. (Action ODCSOPS)"

4. Under Base Realignment and Closure actions, Fort Leonard Wood, unfortunately without coordination with the Chemical School, applied for a smoke permit and variance. The Missouri smoke permit restrictions will inadvertently squash the VCSA's goal and tragically cripple the capability to conduct smoke training. One of the most stunning restrictions of this permit is the loss of capability to train with smoke hand grenades, vehicular smoke grenades, smoke pots, infrared defeating grenades, riot control agents, and large area infrared obscurants. The Reserve Component smoke training at the Chemical School would also be a casualty.

5. If you have questions regarding this quick assessment of the smoke and obscurants issue, please call me, DSN 865-6228 or commercial 205-848-6228 or Fax 865-6786.

Encl

EDWARD W. NEWING
LTC, CM
Special Assistant to the Commandant

COMMENTS ON DRAFT AIR PERMIT, FORT LEONARD WOOD SMOKE TRAINING, 11 APRIL 1995

1. pg 1, title Fort Wood provided you a draft air permit. Since the issue is now at the variance hearing stage, where is the "final"? Considering the impact this has on Chemical Mission Area training, we need to see the real thing.

2. pg 1, title The basis for permission is to "construct a static and mobile fog oil smoke *training facility*. This nomenclature is not descriptive of what the Army proposes to do. Could it be that Missouri Clean Air laws do not cover field military training and ranges? The only "facility" being constructed is a storage area for fog oil drums. Fort Wood will blaze road networks through some wetland areas and possibly construct some observation towers throughout the maneuver area which is already dedicated to other types of training. This curious interpolation of a smoke training area to a "facility" deceives the public as to what the purpose of the permit is for. Since the permit was gained without public comment, it would be difficult for people to know what this is. Since the variance does require comment, perhaps they will understand smoke will not occur in what could reasonably called a fixed facility.

3. pg 1, title If Missouri has authority for Title V of the Clean Air Act, it would seem prudent to mention the Federal statutes, beyond their laws. They still must comply with federal standards and ensure these activities, especially since it is a Federal installation, meet standards. This legal footing is important and not just a cosmetic touch.

4. pg 2, para 1, The annual throughput of only 65,000 gallons is unacceptable. We do not know how this figure was calculated, but it appears to be an average of sort. Forgot the averages over a five year period. We calculate training requirements on operational tempo, current and projected. The projected consumption needs to be at least 95,000 gallons per year which includes both the Army and Air Force course loads and training plans. Additionally, all US Army Chemical units (70% of the Chemical Corps) are required to mobilize at the Chemical School. The potential to emit must be written into the permit, which as was explained to DNR previously would roughly double the emissions.

5. pg 2, para 2, The limit of 3,700 lbs during a 24 hour period is unacceptable. The Army and Air Force need more than one hour per day on many occasions. As stated in the cover letter the number of two, three, and four events per day is critical to training loads. If not adjusted, this limitation will cut out 75% of our training capability. Additionally, there is no mention of other types of obscurants used by the Chemical School. Smoke hand grenades (various colors), vehicle grenades (red phosphorus and brass flakes), HC smoke pots, safer smoke pots (teraphalic acid), and large area infrared obscurant materials are essential portions of training and qualifying chemical soldiers. This permit excludes this type smoke.

6. pg 2, para 3 The PM10 less than 2,600 lbs per hour cannot ever be met. Even though droplet sizes average about one micron, we would violate this limit every time we turn a generator on, drive through dust, or use infrared obscurants (by design greater than 10-14 microns in size). IR obscuration is a critical skill to countermeasure enemy IR target acquisition devices. It is not possible to simulate this sensor/obscuration phenomenon at this time. It is a learned behavior at the institutional level.

7. pg 2, para 5 Reporting of violations appears to be too slow. A lot of damage could ensue unless a more rapid methodology is adopted. This permit needs to adjust threshold limits beyond 65,000 gallons per year to at least the combined total of current and projected training loads (we could live with a bare bones of 95,000 gal/yr). Scaling back training by 30% is unacceptable to readiness

8. pg 3, para 7 How will the QAPP plan effect the "users" the Chemical School and Air Force Disaster Preparedness Technical Training? The QA plan must be coordinated with potential users.

9. pg 3, para 8 Someone needs to calculate the voluminous record keeping costs. Who is the Permitee: Fort Wood personnel or the Chemical School? How is Fort Wood going to implement this? Why is only fog oil record keeping necessary? Other obscurants need to be tallied and contribute to the entire atmospheric load. The emissions from the diesel engines of HMWWVs and APCs as well as the MOGAS powering the smoke generators are sources. Does this add to the poundage allowed per day? Other military vehicular training, automobiles, electrical generators, construction equipment, railroad activities, on Fort Wood apparently need to be part of the daily total as well.

9. pg 4, para 13 What equipment should be used or is available for MET data? Who collects it? If soldiers and airmen are to do this who certifies them and when, how often? Calculation of mixing height is of particular concern, from where is it measured and how does it apply to each site and length of plume.

10. pg 4, para 14 Limitations on Operations. How often (per month) do these conditions exist? Need to go back at least 5 years to see if we are handcuffed by artificial restraints. This has the potential, when synergistically combined with reduction in annual gallons allowable and only one hour per day could absolutely shut down smoke training.

11. pg 4, para 15 I do not understand how a state agency can dictate the forecasting lead times. They establish a standard and now want to tell the Army how to suck eggs. This State agency is really beyond their authority to tell us *how* to manage compliance with standards.

12. pg 4, para 16 Does this mean MET conditions (air stability and wind direction) are to be continuously monitored/measured or just before the event. Need to evaluate the percent of time wind directions and speeds are unfavorable. Quick reference indicates unfavorable conditions exist around 35% of the time. The only available wind rose is twenty years old.

13. pg 5, para 16c If the Director is meant to be the Director of DNR, this presents an interesting legal situation for the Army. This blanket authority seems to be a catch-all phrase which allows the Director to unilaterally terminate Army smoke operations. This is absurd. If permit violations occur, enforce it, but the Director should have no legal basis terminate smoke for "to be determined" reasons. Perhaps this is the place where an insert can state the Director might be overruled by the EPA or other Federal Agencies. These mysterious powers of the Director place the Army at risk and should be eliminated.

14. pg 6, para 23 We would be automatically in violation if tried to maintain current training levels. The air quality modeling standards need to be addressed in this document. Air models used by the EPA are not as specific for cloud dynamics and concentration as the ones established by the Army (formally the Atmospheric Sciences Laboratory). EPA models use industrial chemical stack emissions and translate that to smoke generator sources, some of which are mobile. No known EPA model is an accurate representation. The Combined Obscurant Model for Battlefield Induced Contaminants (COMBIC) is the worlds best model and should be used, especially since it is possible to model all types of obscurants, not just fog oil. Other sources are the Joint Technical Group for Munitions Effectiveness-Smoke and Aerosols Group assessment reports which have tailored smoke munitions and generators for the past ten years. If we are going to use models, we should do it correctly.

15. pg 6, para 24 Injury to plants and animal life have not been thoroughly documented. Sierra Club and others note (quite accurately) the Army analyses are subjective and most are inconclusive. The Army cannot avoid the challenge that specific tests have not been done at Fort Wood or Fort McClellan. Army references cite known studies which treat flora and fauna with about 5,000 times the amount that might be expected from Army fog oil operations. I intuitively believe it is safe, one cannot measure the downwind deposition, but it is hard to avoid the criticism that it has to go somewhere. The worst case is a challenge of fog oil spillage at the generator sites. Fort Wood will mitigate this with their Installation Spill Contingency Plan. It is difficult to attribute direct or approximate damage to plants and animals if no base line is available. How does the other obscurants affect plants and animals? DNR has the Army assessment data, but chose not to allow these in the air permit. What is different about fog oil? Unreasonable enjoyment of life is another nebulous term. Smoke by its very nature may be considered a nuisance and IR obscurants are defined as nuisance dust. I see big problems here. It is a legal tarpit which places the entire art of smoke generation for the survival of fighting forces at tremendous risk.

16. pg 7, Attachment A These four sites have not been measured. The only data which exists at Fort Wood is measured from the airfield. Historical wind data is ancient. Considering the relation of specificity required to comply with this permit, microclimatic studies should be performed at each of these sites. As stated in Fort McClellan's 1993 Smoke Report (but rejected by Fort Wood) seasonal wind patterns and speeds limit smoke training at these sites because of the potential for offpost migration or interference with other post activities. Conservative estimates are that between 25-50% of the time, smoke operations will be limited. Since we use smoke 250 days of the year, further erosion of training opportunities are certain. Exclude the non trafficable terrain, avoidance of endangered species areas, small ponds, wetlands, impact areas, the infamous million dollar hole area, cantonment area, standoff distances between the installation boundary and smoke areas, the major thoroughfare bisecting the installation, the bombing range and there is less space than it appears. The bottomline is that weather is one of the most limiting factors of all. We can schedule classes, ranges, locations, but we cannot schedule Mother Nature. From someone with over twenty years of smoke generator experience I am telling you this smoke permit is a disaster for the future of the Army's smoke program.

ANNISTON STAR

Missouri Sierra Club opposes all smoke training

By Eric Larson
Star Military Writer

The Missouri chapter of the Sierra Club announced Friday it not only opposes the state permit that would allow the Army's chemical school to move from Fort McClellan to Missouri, but is going a step further in encouraging the government to halt the training in Calhoun County as well.

"We are convinced that this type of abuse is not suitable anywhere," said a news release from the environmental group.

The State of Missouri is reviewing the Army's application to conduct smoke obscurant training at Fort Leonard Wood. A public comment period on the permit application culminates May 12 in a public hearing in Waynesville, Mo., a town near the base.

Sierra Club representatives plan to be at the meeting to argue against the permit, citing an Army study they say proves the training would harm plants and animals near the training grounds, including the Indiana bat and the gray bat, which are listed as endangered species.

While the Army says its numerous studies on obscurant smokes have been inconclusive, Sierra Club members who have seen portions of one study believe the evidence is clear:

"I don't think there's any question that plants and animals will be damaged," said Ken Midkiff, program director of the Missouri chapter. "We don't see how you could spray 65,000 gallons of oil in the course of a year and not do any damage."

"I don't think there's any question that plants and animals will be damaged."

Ken Midkiff, program director, Missouri Sierra Club

The document Midkiff cites, "Preliminary Study of Effects of Military Obscurant Smokes on Flora and Fauna during Field and Laboratory Exposures" is the final report of a study conducted by the Army in 1986.

Fog oil was one of three smokes tested on living cells, plants and rodents. The study found that each of the smokes "exerted varying degrees of physiological and mutagenic effects" on the subjects.

The executive summary of the study says that plants and animals could take years or decades to show the effects of exposure to obscurant smokes, and that by the time symptoms appear, "the system may be damaged beyond repair."

The smoke permit is the only environmental permit the Army lacks before it can move the chemical school. The Army has already received permission from Missouri's Department of Natural Resources to build a live-agent training facility at Leonard Wood like the one at McClellan.

The Defense Base Closure and Realignment Commission, which has the final word on whether the school would move, has said the Army must receive all the permits it needs by June 22. The commission must make its final recommendations to Congress by July 1.

Smoke training has been done at McClellan's Pelham Range since 1951, except from 1973 to 1979 when the school was relocated to a base in Maryland. The practice has the tacit approval of the Alabama Department of Environmental Management.

The smoke is actually a white vapor produced by heating fog oil, which is similar to 20-weight motor oil without additives. Soldiers learn to use the smoke to cloak the movement of troops.

Some neighbors of Pelham Range have complained of burning eyes resulting from smoke that strays beyond the boundary of the range. They're concerned about the long-term health effects.

Midkiff said he is more worried about the effect of the smoke on the ecosystem of Mark Twain National Forest, which surrounds Fort Leonard Wood on three sides. Canoeists and bass and trout fisherman use rivers and streams in the area for recreation. The bats feed on insects Midkiff believes will be affected by the smoke.

Not all environmentalists oppose moving the smoke training, however.

"It's the greatest thing to happen to Fort Leonard Wood since Fort Leonard Wood was a fort," said G.A. Maxwell, president of the Roubidoux Fly Fishers Association and an employee at the base.

While the transfer of McClellan's chemical and military police schools would drain Calhoun County of vital jobs and income, it would bring $10 million worth of construction and more than 2,000 new jobs to the Missouri base.

"The environmental groups are working to whip up a lather around this. We know it's safe for the people and the environment," said Keith Prichard, head of a booster group for Leonard Wood. "Where better than to check this than around Anniston. Do you see desolate forests around there?"

Midkiff does not think ADEM or the Army has monitored the effect of the smoke on the ecosystem of Pelham Range, which encompasses more than 20,000 acres. He also says differing weather conditions at the two bases could mean that what may be safe for McClellan may not be safe for Leonard Wood.

Troy Gordon's testimony before the DNR hearing Friday, May 12 —

Don't know his title — I assume he's just a member -

He used to live near the Fort (Wood) on the Little Piney River, I hear —

Ken Midkiff
Program Director
1005 Belleview Ct.
Columbia, MO 6520.

Ozark Chapter / Sierra Club

Troy Gordon → 314-442-7411
4pp2

My name is Troy Gordon, representing the Ozark Chapter Sierra Club. We have members that live in this area, and many others which use this area for recreation, including camping and hiking, and canoeing, fishing and swimming in the rivers and streams which would be affected by this proposed facility. I also used to live just west of Newburg, directly down wind of this proposed facility.

The Ozark Chapter Sierra Club is strongly opposed to the relocation of the Chemical Warfare Training Unit to Fort Leonard Wood. We believe that the proposed facility will be environmentally damaging to the area, and the existing facility at Fort McClellan in Alabama is equally damaging. The U.S. Army should reassess the entire training process to find less objectionable methods of conducting such training.

We are concerned that there has been no Environmental Impact Statement prepared by the U.S. Army for the transfer of the Chemical Warfare Training facility to Fort Leonard Wood. The entire facility as proposed would have major environmental impacts and can be construed to be a major federal action requiring the preparation of an Environmental Impact Statement under the provision of the National Environmental Policy Act. No air permits can be applied for or issued without such an Environmental Impact Statement.

We are extremely concerned about the "fast track" process that has been used to attempt to permit the facility prior to the June 22, 1995. The environmental review process has been designed to allow the regulatory agencies and the public to gather complete information about a proposed permit and make an informed decision. In this case, adequate information has not been available, and the Missouri Department of Natural Resources has attempted to set permit parameters without full information on what limits and monitoring parameters should be included. Further, in an attempt to avoid the lengthy process of applying for a RCRA permit for the incinerator, the inadequate "Thermal Treatment Unit" has been proposed, despite David Shorr's comments in 1993 that indicate a RCRA permit would be necessary.

Regarding the specific air permit for the fog-oil obscurant, we are completely opposed to the issuance of this permit for any reason. The U.S. Army's own documentation states that "All of the smokes field-tested exerted varying degrees of lethal, **physiological, and mutagenic effects....**" (emphasis added). "Direct effects found include decreased fertility, changes in energy production, and decreased survivability in both plants and animals, increased genotoxic damage in plants, and increased genotoxic damage in animals" (Source: "Preliminary Study of Effects of

Military Obscurant Smokes on Flora and Fauna during Field and Laboratory Exposures - Final Report", dated Dec. 1986 by Schaeffer et al - USA-CERL Technical Report N-86/22). Issuing this permit and allowing this fog would damage the Roubidoux Creek and the Big Piney River, threaten the health of local residents, and harm the federally Endangered Gray and Indiana bats, all while driving away tourism dollars from the region. The fog-oil obscurant would also violate the Missouri Clean Air opacity requirements, far exceeding the allowed 20% opacity limits for new sources.

We also oppose the permit for the proposed Thermal Treatment Unit. It is apparent from the proposed waste streams that the incinerator should be categorized as a Hazardous Waste Incinerator and the applicant should be required to apply for a RCRA permit. It is evident from a review of the permit application that the waste streams have been carefully crafted to attempt to avoid the necessity of applying for a RCRA permit. Nor does the application take into account the eventual need for changes in the waste stream as technology and materials change, or the training regime increases. As proposed, the permit would allow the incineration of chlorinated lime in the wet scrubber sludge, which would produce dioxins upon incineration. The waste stream as proposed also would be approximately 17% metals, or 170 pounds per day. Neither is listed in the emissions calculations. Even if chlorine and metals were not to be incinerated, to allow full flexibility and prevent a costly rebuilding or retrofitting of the facility when the Thermal Treatment Unit is found to be inadequate, it is far preferable to meet the requirements and apply for a RCRA permit at this time.

Finally, we recommend that environmental degradations not be condoned in the name of "economic development". Damage to ecological systems is extremely expensive to rectify, far outweighing any localized, short-lived profits. The economic benefits of a healthy environment have been demonstrated conclusively. While the communities surrounding Ft. Leonard Wood may receive short term economic benefits, the damages to the local environment will be extremely costly. Outdoor recreationists do not use areas that are or have been degraded. The cost from the loss of tourism and long term environmental damages may far outweigh any benefits to local retail outlets.

The statutory responsibility of the Department of Natural Resources is to protect the environment and the public health and safety, not to expedite permits for economic development purposes or at the request of the governor. The Missouri Department of Natural Resources should live up to its mandate and deny both of the proposed permits.

TECHNICAL COMMENTS FOR PERMIT ISSUES ASSOCIATED WITH THE PROPOSED MOVE OF THE U.S. ARMY CHEMICAL SCHOOL FROM FORT McCLELLAN, ALABAMA TO FORT LEONARD WOOD, MISSOURI

May 12, 1995

PREPARED FOR:

WILLIAM A. GIBBS, REBECCA I. GIBBS, WENDY PELTON AND
MISSOURI COALITION FOR THE ENVIRONMENT

PREPARED BY:

SCHREIBER, GRANA & YONLEY, INC.
271 WOLFNER DRIVE
ST. LOUIS, MISSOURI 63026

TECHNICAL COMMENTS ON MDNR's FOG OIL SMOKE DRAFT PERMIT

Following are comments regarding various issues presented by MDNR's draft permit for the Army Chemical School's proposed fog oil training at Fort Leonard Wood, Missouri. Because of the recent issuance of the final permit on June 7, 1995, these comments have not yet been revised to reflect any changes which MDNR might have incorporated in the final permit.

Hazardous Air Pollutants Omission

The fog oil air permit application did not identify that fog oil contains polycyclic organic matter and that its use as an obscurant would result in emissions of hazardous air pollutants ("HAPs). Because this issue was not clearly identified in Fort Leonard Wood's permit application, it was not recognized in MDNR's draft permit application review. Therefore, it was incorrectly concluded that fog oil was Best Available Control Technology ("BACT"). In accordance with Missouri's air regulations, (See 10 CSR 10-6.020(2)(H)1) HAPs are defined as any of the air pollutants listed in subsection (3)(C) of 10 CSR 10-6.020. Subsection (3)(C) lists "polycyclic organic matter," which includes organic compounds with more than one benzene ring and which have a boiling point equal to or greater than 100°C.

Included as supplementary information in Fort Leonard Wood's fog oil air permit application filed with MDNR on March 16, 1995, was "Table 2 - Compounds Identified in SGF-2," which lists the components of SGF-2 Fog Oil Used for Obscurant Training. Almost all of the compounds listed in Table 2 under First Aromatic Fraction, Middle Aromatic Fraction, heavy Aromatic Fraction and Nitrogen Based Fraction are polycyclic organic matter as defined in 10 CSR 10-6.020(3)(C). The fog oil air permit application lists the aromatics concentration in SGF-2 fog oil to be 40% to 50%. Consequently, the use of fog oil will result in the emission of a significant amount (i.e. at least 40% of the amount of fog oil which is used) of polycyclic organic matter, which is a HAP category according to MDNR's regulation at 10 CSR 10-6.020(3)(C). Based on the maximum permitted usage of 65,000 gallons of fog oil per year in Condition 1 contained in the draft fog oil permit issued by

MDNR, annual HAP emissions of polycyclic organic matter are calculated to range from 96.2 tons/year to 120.3 tons/year [65,000 gallons x 7.4 lbs/gallon x 40% to 50% ÷ 2,000 lbs/ton]. Based on the definition of "significant" in 10 CSR 10-6.020(2)(S)10., these levels of HAP emissions are significant, because they exceed the *de minimis* emission levels specified in 10 CSR 10-6.020 (3)(A), Table 1, for individual HAP emissions of 10 tons/year and the sum of HAP emissions of 25 tons/year.

Air Quality Impact

MDNR correctly concluded that 10 CSR 10-6.060(8) is applicable to Fort Leonard Wood's fog oil air permit application. Section (8)(C)1.A states: "Each application shall contain an analysis of ambient air quality or ambient concentrations in the significantly impacted area of installation for each pollutant specified in 10 CSR 10-6.020(3)(A), Table 1, which the installation would emit in significant amounts." The fog oil air permit application did not contain the required information regarding the ambient air for PM_{10} or polycyclic organic matter. The only exception from that requirement is for VOCs as provided in 10 CSR 10-6.020(8)(C)B. Therefore, the application which Fort Leonard Wood submitted to MDNR was incomplete in the absence of the information pertaining to existing ambient air quality for the pollutants identified as PM_{10} and polycyclic organic matter.

Continuous Air Monitoring

Missouri Air Regulation 10 CSR 10-6.060(8)(C)1.C requires continuous air monitoring data gathered over a minimum period of four months and also requires that data to be representative of the year preceding receipt of the complete application. No such data was provided in the fog oil air permit application; therefore, Fort Leonard Wood's permit application was incomplete.

PM_{10} Emission Rates

Based on the operating restrictions placed in the draft permit issued by MDNR, the fog oil training described in Fort Leonard Wood's air permit application would result in the violation of 10 CSR 10-3.050(4)(A). That regulation states: "This rule applies to any operation, process or activity

except the burning of fuel for indirect heating in which products of combustion do not come into direct contact with process materials, and except the burning of refuse, and except the processing of salvageable material by burning." Generation of fog oil smoke is an operation, process and/or activity which does not involve burning of refuse or processing of salvageable material by burning. In addition, none of the exemptions provided in 10 CSR 10-3.050(5) are applicable to the process used by the Army to generate fog oil smoke. Consequently, 10 CSR 10-3.050(4)(A) applies to the generation of fog oil smoke. Condition 3 in the draft air permit issued by MDNR allows processing of 3,700 pounds of fog oil per hour, and Condition 7 allows PM_{10} emissions of 2,600 pounds per hour. Based on 10 CSR 10-3.050(4)(A), the allowable particulate emission level is calculated from the equation $E = 4.10 \times P^{0.67}$, where P = the amount of processed material in tons. Using 3,700 pounds per hour, the allowable particulate emission level should be $E = 4.10 \times (3700/2000)^{0.67} = 6.19$ pounds per hour. To be in compliance, permit Condition 3 should have been revised to change the emission limitation of particulates from 2,600 pounds per hour to 6.19 pounds per hour.

Opacity Exceedance

The fog oil training operation will result in emissions into the ambient air exceeding 20% opacity (Number 1 on the Ringleman Chart), which is a violation of 10 CSR 10-3.080(4). Fort Leonard Wood's fog oil training operation is not exempt from this state regulatory requirement, since it is not listed in 10 CSR 10-3.080(5). Ambient air as defined by 10 CSR 10-6.020(2)(A)24. means all space outside of buildings, stacks, or exterior ducts. The locations for generation of fog oil which were proposed in Fort Leonard Wood's air permit application would be considered ambient air.

BACT Analysis Omissions

BACT analysis performed during MDNR's draft permit application review was based on an erroneous conclusion that fog oil SGF-2 does not contain any HAPs. Based on the reasoning provided in MDNR's preliminary decision on the permit application, use of fog oil should not be considered as

BACT, since it will result in the emission of HAPs (i.e. polycyclic organic matter). The definition of BACT contained at 10 CSR 10-6.020(2)(B)(5). states: "In no event shall application of BACT result in emissions of any pollutant which would exceed the emissions allowed by any applicable emission control regulation." Consequently, Fort Leonard Wood's proposed use of fog oil will exceed the emission control regulations of 10 CSR 10-3.050(4)(A) and 10 CSR 10-3.080(4).

Training Site Omissions

Fort Leonard Wood's fog oil permit application included a map sketch showing locations for various obscurant training sites on Fort Leonard Wood's property and a summary of the acceptability of the proposed sites under certain meteorological conditions. However, the permit application failed to indicate the actual wind conditions at Fort Leonard Wood. Additionally, three of the proposed smoke training sites, specifically Wolf, Smith and Hurd, were not included on the map sketch. Without that necessary data, the actual training site cannot be selected nor can the calculations be made to determine the air impacts of the fog oil training on the local region. The permit application also did not discuss the potential effects of the use of fog oil on any endangered species or plant life. Both the Missouri Department of Conservation and the U.S. Fish and Wildlife Service should have been consulted in order to determine any such potential impacts from the smoke training.

PSD Considerations

PSD review was attempted only for the proposed fog oil training portion of the Army Chemical School. Additional training which should have also been included in the PSD review are the CDTF, Radiological Training and Flame Expedient Training. The CDTF air permit was issued without conducting a PSD review. EPA's draft document entitled, "New Source Review Workshop Manual" dated October, 1990, states: "A deliberate decision to split an otherwise 'significant' project into two or more smaller projects to avoid PSD review would be viewed as circumvention and would subject

the entire project to enforcement action if construction on any of the small projects commences without a valid PSD permit." Because of the multiple types of Army training proposed to be moved to Fort Leonard Wood as necessary components of the Chemical School, MDNR should have considered the entire move as a single project to avoid the "circumvention" referred in EPA's above-mentioned document, and MDNR should not have issued the air permit for the CDTF without conducting a PSD review.

Ambient Air Quality Impact

In the document entitled, "Predicted Air Quality Impacts for Fort Leonard Wood Smoke Training School" dated April 9, 1995, which was submitted to MDNR as a supplement to Fort Leonard Wood's fog oil air permit application, it was stated that the Fort Leonard Wood reservation is not considered to be "ambient air." However, this statement is incorrect according to the definition of "ambient air" contained in 10 CSR 10-6.020(2)(A)24. Consequently, the air modeling which was performed should have considered air quality impacts at additional areas where people could be exposed, other than being limited to the residences within Fort Leonard Wood's property boundary.

Dispersion Modeling

The environmental engineering firm of Schreiber, Grana & Yonley, Inc. ("Schreiber") performed additional air dispersion modeling using the same model and input parameters as the air modeling submitted by Fort Leonard Wood to MDNR on April 8, 1995. Schreiber's modeling showed that projected ambient air impacts significantly in excess of allowable increments will occur in other public access areas of Fort Leonard Wood as a result of obscurant training at the Ballard obscurant training site, which location was approved for smoke training in the draft permit issued by MDNR.

Specifically, with north-northwesterly winds, obscurant training at the Ballard training site will cause a 24-hour average PM_{10} impact of 202.1 micrograms per cubic meter at Trans World Express Airline's public airline terminal at Forney Air Field located on Fort Leonard Wood. This will exceed

the allowable 24-hour average PM_{10} increment of 30 micrograms per cubic meter.

BACT Analysis Issues

Federal Regulation 40 CFR 51.166(J)(3) requires BACT analyses for each proposed emission source (i.e. the fog oil generators, the CDTF incinerator, the radiological laboratories, etc.) when a major modification is made to a facility. The fog oil obscurant training operation qualifies as a major modification as correctly determined by MDNR. However, Fort Leonard Wood's fog oil permit application failed to address the BACT analyses for other proposed emission sources such as the CDTF incinerator and the radiological laboratories.

Additional Obscurant Issues

At Fort McClellan, Alabama, the Army Chemical School's smoke and obscurant training involves the use of phosphorus smokes, hexachloroethane smoke, diesel fuel, infrared smokes and other sources in addition to fog oil. However, the draft air permit issued by MDNR only allows the use of fog oil at Fort Leonard Wood. MDNR needs to verify from the applicant whether obscurant training at Fort Leonard Wood will involve only fog oil and that the Chemical School does not need to conduct any of the other obscurant training in Missouri. It should also be noted that hexachloroethane is a hazardous air pollutant and a water toxic pollutant (See 40 CFR § 401.15).

STATE OF MISSOURI

DEPARTMENT OF NATURAL RESOURCES

MISSOURI AIR CONSERVATION COMMISSION

PERMIT TO CONSTRUCT

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

Permit Number: 0695-010 Facility I.D. Number: 3860-0004-015

Owner: U. S. Army Engineer Center and Fort Leonard Wood

Owner's Address: Department of Defense

Facility Name: U. S. Army Engineer Center and Fort Leonard Wood

Facility Address: ATTN: ATZT-DPW-EE; Ft. Leonard Wood, MO 65473

Legal Description: Pulaski County, All or parts of T33, 34, 35N, R10, 11, 12W

Application for Authority to Construct was made for:

**** Permission to construct a static and mobile fog oil smoke training facility. This review was conducted in accordance with Section (8), Missouri State Rule 10 CSR 10-6.060, "Construction Permits Required." ****

☐ Special Conditions are not applicable to this permit.

☒ Special Conditions do apply to this permit and are listed as attachments starting on page 2.

June 7, 1995
EFFECTIVE DATE

John A. Young
DIRECTOR
DIVISION OF ENVIRONMENTAL QUALITY

MO 780-1204 (6-93)

RECYCLED PAPER

STANDARD CONDITIONS:

Permission to construct may be revoked if you fail to begin construction or modification within two (2) years from the date of this letter.

You must construct, modify, and operate your installation in the manner proposed in your application. You will be in violation of 10 CSR 10-6.060 if you fail to adhere to the specifications listed in this permit or in your application.

You must notify the Air Pollution Control Program of the anticipated date of start up of this facility. The information must be made available not more than sixty (60) days but at least thirty (30) days in advance of this date. Also, you must notify the Air Pollution Control Program within fifteen (15) days after the actual start up of this facility.

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

You may appeal this permit or any of the listed special conditions as provided in RSMo 643.075. If you choose to appeal, the Air Pollution Control Program must receive your written declaration within thirty (30) days of this letter.

If you do not choose to appeal, this certificate, your application, and associated correspondence constitutes your permit to construct. The permit allows you to construct and operate the facility, but in no way relieves you of the obligation to meet the air pollution control regulations, other Department of Natural Resources' regulations, or other federal, state, or local agencies' regulations.

If you have any questions regarding this air pollution permit, contact the New Source Review Section Chief, Air Pollution Control Program, (314) 751-4817. Correspondence should be addressed to the Air Pollution Control Program, P.O. Box 176, Jefferson City, MO 65102.

SPECIAL CONDITIONS:

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

Emissions Limitations

1. *Annual Throughput*. The U.S. Army Engineering Center, Fort Leonard Wood, (the "Permittee") shall process no more than 65,000 gallons of SGF-2 fog oil for smoke training during any 12-month period. This total shall include the fog oil used in the mobile (valley) operations and the static (introductory) operations.

2. *Daily Throughput*. The Permittee shall process no more than 3700 pounds of SGF-2 fog oil during any 24-hour period. This total shall include the fog oil used in the mobile (valley) operations and the static (introductory) operations. Fog oil shall not be processed at a rate in excess of 3700 pounds per hour.

3. *SGF-2 Fog Oil Material Requirements*. The Permittee shall only use the fog oil designated SGF-2 (CAS# 64742-52-5) to generate smoke during smoke training. The fog oil shall contain no additives nor any rerefined oils.

   In addition, the fog oil shall have the following properties and characteristics:

   a. The fog oil shall be severely hydrotreated to remove polycyclic aromatic hydrocarbons (PAHs) and their nitrogen and oxygen analogues, and

   b. The fog oil shall contain no carcinogenic or potentially carcinogenic constituents as defined under the Hazard Communication Standard (HCS) 29 CFR 1910.1200, and

   c. The fog oil shall contain no more than 0.5% (one-half percent) by weight of any single hazardous air pollutant (HAP) as defined by 10 CSR 10-6.020(2)(C), "Table 3 – Hazardous Air Pollutants." The combination of all HAPs in the fog oil shall comprise no more than 1% (one percent) by weight of the fog oil.

   The Permittee is prohibited from using to create smoke for

SPECIAL CONDITIONS:

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

smoke training any fog oil designated PY8035000 on the Registry of Toxic Effects of Chemical Substances (RTECS) of the National Institute for Occupational Safety and Health (NIOSH).

The Permittee may not introduce any other substance into the fog oil used to generate smoke, e.g., kerosene to reduce viscosity in cold temperatures, graphite or brass to change or enhance obscurant effectiveness, etc.

4. *Fog Oil Material Certification*. The Permittee shall maintain fog oil Military Specifications, Material Safety Data Sheets (MSDS), and records of quantitative analytical chemical test data demonstrating compliance with Condition 3.

Said military specifications, test data, MSDSs, and certifications shall be maintained by the Permittee and made available to Missouri Department of Natural Resources (MDNR) personnel on request.

The Permittee shall certify in writing no less frequently than annually that all fog oil used in smoke training complies with Condition 3.

5. *Reporting of Violations*. The Permittee shall report to the Enforcement Section, Air Pollution Control Program (APCP), MDNR, no later than ten days after any fog oil not complying with Condition 3 or not certified in compliance with Condition 4 is used to create smoke for smoke training.

6. *Smoke Generating Equipment*. The Permittee shall use only the pulse jet mechanical smoke generator, Model M3A3 ("emm-three-A-three"). The smoke generators shall only be fueled with unleaded gasoline. The Permittee shall only generate smoke with smoke generators maintained in good working condition and operated in accordance with the manufacturer's specifications.

7. *Emissions Limitation*. The Permittee shall not emit particulate matter less than 10 microns (PM_{10}) at a rate in

SPECIAL CONDITIONS:

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

excess of 2600 pounds per hour. This rate corresponds to processing fog oil at the maximum rate of 3700 pounds per hour with a particulate conversion factor of 70%.

8. *Recordkeeping*. The Permittee shall record the amount of fog oil processed by the smoke generators during the previous month and the previous twelve months. During any month in which smoke training occurs, the Permittee shall record daily and hourly consumption of fog oil. The Permittee shall maintain said records and provide them to MDNR personnel on request.

9. *Reporting of Violations*. The Permittee shall report to the Enforcement Section, APCP, no later than ten days after the end of each month during which the preceding 12-month cumulative total of fog oil processed exceeds 65,000 gallons of fog oil (Condition Number 1).

10. *Reporting of Violations*. The Permittee shall report to the Enforcement Section, APCP, no later than ten days after an exceedance of the 3700 pound daily limit or the 3700 pound/hour maximum rate limit of fog oil (Condition 2).

Ambient Air Monitoring

11. *Quality Assurance Project Plan*. The Permittee shall file two copies of a Quality Assurance Project Plan (QAPP) within 90 days of issuance of this permit for review and approval by the Staff Director, APCP. The QAPP shall describe the method and manner for collecting air quality monitoring data for PM_{10} and ozone required by this permit.

12. *Pre-Startup Monitoring*. Beginning as soon as possible after this permit is issued, the Permittee shall collect at least one year of continuous air quality monitoring data for PM_{10} and ozone in a manner and at locations to be determined by the Permittee with review and approval by the APCP. Collection of monitoring data shall begin no later than eighteen months immediately prior to the beginning of smoke training. Ozone monitoring is only required from April 1

SPECIAL CONDITIONS:

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

through October 31.

13. *Reporting*. The Permittee shall submit to the APCP no less frequently than quarterly the air quality monitoring data collected pursuant to Condition 12. All air quality monitoring data collected pursuant to Condition 12 shall be submitted to APCP no later than 60 days prior to the commencement of smoke training.

14. *Corrective Action*. If the air quality monitoring data of Condition 12 does not substantially conform with the assumptions and conclusions of air quality modeling or if the smoke training is shown to cause or contribute to a violation of National Ambient Air Quality Standards (NAAQS), the Director, MDNR, may require the Permittee to take corrective action or may revoke the permit.

15. *Post-Startup Monitoring*. Beginning with the commencement of smoke training, the Permittee shall collect at least two years of continuous air quality monitoring data for PM_{10} and ozone in a manner and at locations to be determined by the Permittee with review and approval by the APCP. Ozone monitoring is only required from April 1 through October 31.

16. *Reporting*. The Permittee shall submit to the APCP no less frequently than quarterly the air quality monitoring data collected pursuant to Condition 15.

Meteorological Monitoring

17. *Observers*. At all times during the operation of the smoke generators, a network of observers shall be stationed at locations from which they can observe the behavior of generated smoke and whether smoke crosses the Fort Leonard Wood property boundary. The observers shall maintain continuous electronic or visual communications with the smoke generator operators.

18. *Meteorological Monitoring*. For the entire period beginning no less than one hour prior to generating smoke and ending

SPECIAL CONDITIONS:

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

no less than one hour after ceasing generating smoke, the Permittee shall measure and record no less frequently than every sixty seconds meteorological data including ambient air temperature, atmospheric pressure, relative humidity, atmospheric stability, mixing height, and wind speed and direction at each training site at which smoke training is conducted. The monitoring records shall indicate those periods during which smoke is generated. Meteorological monitoring records shall be maintained by the Permittee and made available to the MDNR personnel on request.

19. *Limitations on Operations*. Smoke training shall only be conducted at the locations and under the meteorological conditions as described in Attachment A.

The Permittee may conduct smoke training operations at more than one location listed in Attachment A during any 24-hour period. However, smoke training operations may not occur at more than one location simultaneously, and the smoke training operations at multiple sites may not exceed the limitations of Condition 2.

20. *Meteorologist*. Meteorological monitoring and forecasting activities required by this permit shall be coordinated and supervised by a person (the "Meteorologist") with at least a Bachelor of Science degree in meteorology or atmospheric science from an accredited university or college.

21. *Forecasting Acceptable Conditions*. Smoke training may take place only if the Meteorologist forecasts no earlier than two hours prior to each smoke training exercise that the approved meteorological conditions described in Attachment A will exist throughout the anticipated smoke training exercise.

22. *Forecast Certification*. Prior to each smoke training exercise, the Meteorologist shall certify in writing the pre-exercise forecast required by Condition 21. Said forecast certification shall be maintained by the Permittee and made available to MDNR personnel on request.

SPECIAL CONDITIONS:

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

23. *Pre-Exercise Computer Modeling*. Prior to each smoke training exercise, the Permittee shall use the Tactical Smoke computer model, TACSMK, or equivalent, to perform pre-exercise predictions of smoke behavior during anticipated smoke training exercises. Printouts of the TACSMK pre-exercise predictions shall be maintained by the Permittee and made available to MDNR personnel upon request.

24. *Prohibitions*. Generation of smoke shall cease if:

a) Meteorological conditions are not within those approved for smoke training as described in Attachment A, or

b) Smoke behavior differs significantly from the pre-exercise predictions of Condition 23 so as to indicate a reasonable likelihood that visible smoke will drift beyond the Fort Leonard Wood property boundary, or

c) Conditions or smoke behavior are such so as to create a reasonable likelihood that visible smoke will cross the Fort Leonard Wood property boundary or that National Ambient Air Quality Standards at the Fort Leonard Wood property boundary will be exceeded, or

d) There is an interruption for 2 minutes in the meteorological monitoring required by Condition 18, or

e) Under other conditions as may be determined by the Director, MDNR.

For the purposes of determining compliance with Condition 24a, meteorological conditions shall be deemed outside the approved conditions when three consecutive measurements recorded at one-minute intervals are outside approved conditions.

Soil and Vegetation Sampling

25. *Soil and Vegetation Sampling Plan (SVSP)*. Within 180 days of the issuance of this permit, the Permittee shall submit

PERMIT NUMBER
0695-010

FACILITY I.D. NUMBER
3860-0004-015

SPECIAL CONDITIONS:

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

two copies of a SVSP to the Staff Director, APCP, for review and approval.

The SVSP shall describe the method and manner of collecting and analyzing soil and vegetation samples and of monitoring the impact of smoke training activities on soils and vegetation. The SVSP shall include an inventory of vegetation found within the impact area that has any recreational or commercial value and shall identify any of the vegetation which may be sensitive to elevated ozone or particulate levels. The SVSP shall also include descriptions of operational or seasonal restrictions that could be used to minimize emissions and any accompanying deposition effects.

26. *Pre-Startup Sampling*. For no less than one year prior to the commencement of smoke training, the Permittee shall collect and analyze soil and vegetation samples no less frequently than quarterly at each location described in Attachment A and at other locations described in the SVSP.

27. *Reporting*. The Permittee shall report the results of the sampling and analysis required by Condition 26 to the APCP within 60 days of the date the samples are collected. All soil and vegetation sampling data collected pursuant to Condition 26 shall be submitted to APCP no later than 60 days prior to the commencement of smoke training.

28. *Post-Startup Sampling*. Upon commencement of smoke training, the Permittee shall collect and analyze soil and vegetation samples no less frequently than monthly at each location described in Attachment A and at other locations described in the SVSP. After two years of sampling, the Permittee may petition the Staff Director, APCP, for modification of the sampling schedule and frequency.

29. *Reporting*. The Permittee shall report to the APCP no less frequently than quarterly the soil and vegetation sampling data collected pursuant to Condition 28.

30. *Corrective Action*. MDNR may reevaluate the Best Available

SPECIAL CONDITIONS:

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

Control Technology (BACT) analysis in support of this permit, establish any necessary operational restrictions, e.g., restricting smoke training to only the summer months, or require the Permittee to take any necessary corrective action, if the results of the soil, vegetation, or ambient air sampling indicate adverse deposition effects.

Other Special Conditions

31. *Record Retention*. All records required by this permit shall be maintained by the Permittee and made available for inspection by MDNR personnel for no less than ten years from the date the record is created.

32. *Public Information*. The Permittee shall cooperate with the APCP in presenting the air quality monitoring data of Condition 12 and soil and vegetation sampling data of Condition 26 to the public at an informational meeting to be convened by the APCP.

33. *Effects on Visibility*. Smoke training shall not be conducted so as to constitute or contribute to a safety hazard to air traffic or vehicular traffic on highways accessible to the public during smoke training exercises.

34. *Reporting of Violations*. Unless a different requirement is expressly provided for in this permit, the Permittee shall report to the Enforcement Section, APCP, MDNR, no later than ten days after any noncompliance with any condition or requirement of this permit.

35. *Corrective Action*. If in the opinion of the Director, MDNR, the presence of PM_{10} or ozone in the ambient air exists in quantities and durations that directly or proximately cause or contribute to injury to human, plant, or animal life or health, or to property, or that unreasonably interferes with the enjoyment of life or the use of property, the Director, MDNR, may require the Permittee to submit a corrective action plan adequate to timely and significantly mitigate the emission or the impact of PM_{10} or ozone. The Permittee

SPECIAL CONDITIONS:

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

shall implement any such plan immediately upon its approval by the Director, MDNR. Failure to either submit or implement such a plan shall be a violation of the permit.

36. *Compliance With Other MDNR Permits*. The Permittee shall comply with the sampling and monitoring conditions of Missouri State Operating Permit No. MO-0117251 granted by the Missouri Department of Natural Resources, Missouri Clean Water Commission.

37. *Notification of Commencement of Smoke Training*. The Permittee shall not commence smoke training activities subject to this permit without first providing written notification of such commencement to the Director, MDNR, no later than 30 days prior thereto. Said notification shall include the certification by the Responsible Official that the Permittee has satisfied all conditions precedent to the commencement of smoke training as described in this permit.

Attachment A

WIND DIRECTIONS (θ) SUITABLE FOR SMOKE TRAINING

Site	Stability Class (Notes 1, 2, and 3)				
	A	B	C	D	E
Musgrave	$130 \leq \theta \leq 220$	$150 \leq \theta \leq 220$	$160 \leq \theta \leq 215$	$170 \leq \theta \leq 215$ (Note 4)	$150 \leq \theta \leq 225$
Ballard	$340 \leq \theta \leq 35$	$340 \leq \theta \leq 35$	$340 \leq \theta \leq 35$	$350 \leq \theta \leq 35$	$340 \leq \theta \leq 35$
Mush Paddle	$195 \leq \theta \leq 275$	$195 \leq \theta \leq 275$	$195 \leq \theta \leq 270$	$195 \leq \theta \leq 240$ (Note 5)	$195 \leq \theta \leq 270$
Bailey	$125 \leq \theta \leq 115$	$340 \leq \theta \leq 40$ $175 \leq \theta \leq 325$	$340 \leq \theta \leq 40$ $175 \leq \theta \leq 325$	None	$230 \leq \theta \leq 240$ (Note 6)

Notes:

1. Allowable wind directions are indicated by an angular interval. Wind directions are expressed as an angle measured clockwise from north indicating direction wind is coming from. E.g., 0 means wind is coming from due north (wind is coming from zero degrees clockwise from north), 225 means wind is coming from southwest (wind is coming from 225 degrees clockwise from north). Thus, "$130 \leq \theta \leq 220$" means allowable wind directions are generally from the south, i.e., from 130 degrees (approximately southeast) clockwise to 220 degrees (approximately southwest); "$340 \leq \theta \leq 35$" means allowable wind directions are generally from the north, i.e., from 340 degrees (approximately north-northwest) clockwise to 35 degrees (approximately northeast).
2. Stability classes A - D are limited to wind speeds of at least 1 meter/second, and stability class E is limited to wind speeds of at least 4 meters/second. No smoke may be generated during stability condition F.
3. Mixing height of 200 meters is necessary for stability classes A - C. Mixing height of 320 meters is necessary for stability classes D - E.
4. Forty-five (45) minute limit on smoke training for wind directions $190 \leq \theta \leq 210$ degrees.
5. Forty-five (45) minute limit on smoke training for wind directions $220 \leq \theta \leq 240$ degrees.
6. Commencement and continuation of smoke training is discouraged at Bailey Hollow during stability class E due to the narrow range of allowed wind directions.

REVIEW OF APPLICATION FOR AUTHORITY TO CONSTRUCT AND OPERATE
SECTION (8) REVIEW
Project/Facility No: 3860-0004-015
Permit No: 0695-010

U. S. Army Engineering Center
Fort Leonard Wood
ATTN: ATZT-DPW-EE
Fort Leonard Wood, MO 65473

Complete: March 31, 1995
Reviewed: June 7, 1995

Parent Company:
U. S. Army Engineering Center
Fort Leonard Wood
ATTN: ATZT-DPW-EE
Fort Leonard Wood, MO 65473

Pulaski County, All or parts of T33, 34, 35N,
R10, 11, 12W

REVIEW SUMMARY

- This review is conducted in accordance with Section (8) of Missouri State Rule 10 CSR 10-6.060, "Construction Permits Required."
- Prevention of Significant Deterioration (PSD) regulations apply to this facility.
- Emissions of particulate matter less than ten microns (PM_{10}) at the facility will be greater than 15 tons per year; therefore, this is a major modification at a major facility.
- No Hazardous Air Pollutants (HAP) above *de minimis* amounts are emitted in this process.
- No federal New Source Performance Standards (NSPS) or National Emission Standards for Hazardous Air Pollutants (NESHAP) apply to this operation.
- Special conditions are imposed by this permit.

PROJECT DESCRIPTION

Fort Leonard Wood (the "Applicant") is an existing major source and has applied for permission to operate an obscurant (smoke) training school. The smoke training school will use M3A3 smoke generators (or equivalent) to train soldiers in the operation of the smoke generators and in the tactical use of obscurants during simulated battlefield operations.

To generate the smoke, SGF-2 fog oil (a severely hydrotreated heavy naphthenic petroleum distillate mineral oil) is vaporized, recondensed, and dispersed into the air. The fog oil is emitted as liquid droplets with diameters of 0.5 to 1.0 micron. This diameter size is close to the wavelength of visible light, making this oil the choice for smoke training.

Fort Leonard Wood shall only use the fog oil designated SGF-2 (CAS# 64742-52-5) to generate smoke during smoke training. The fog oil shall contain no additives nor any rerefined oils.

In addition, the fog oil shall have the following properties and characteristics:

a. The fog oil shall be severely hydrotreated to remove polycyclic aromatic hydrocarbons (PAHs) and their nitrogen and oxygen analogues, and

b. The fog oil shall contain no carcinogenic or potentially carcinogenic constituents as defined under the Hazard Communication Standard (HCS) 29 CFR 1910.1200, and

c. The fog oil shall contain no more than 0.5% (one-half percent) by weight of any single hazardous air pollutant (HAP) as defined by 10 CSR 10-6.020(2)(C), "Table 3 – Hazardous Air Pollutants." The combination of all HAPs in the fog oil shall comprise no more than 1% (one percent) by weight of the fog oil.

Fort Leonard Wood shall maintain Material Safety Data Sheets (MSDS) and test data demonstrating compliance with the fog oil material specifications.

Fort Leonard Wood is prohibited from using to create smoke for smoke training any fog oil designated PY8035000 on the Registry of Toxic Effects of Chemical Substances (RTECS) of the National Institute for Occupational Safety and Health (NIOSH).

Fort Leonard Wood may not introduce any other substance into the fog oil used to generate smoke, e.g., kerosene to reduce viscosity in cold temperatures, graphite or brass to change or enhance obscurant effectiveness, etc.

The M3A3 smoke generators are driven by gasoline-powered pulse jet engines. Each generator consumes 4 gallons of unleaded gasoline per hour and processes 40 gallons of fog oil per hour.

There will typically be about 12 generators operating each time the training is conducted. However, there will be no limitations on the number of generators; rather, limits are imposed on the amount of fog oil which may be processed. The smoke training will occur at several sites at Fort Leonard Wood. Smoke training can not be used at some sites during certain meteorological conditions because such conditions could cause an exceedance of the PM_{10} ambient air quality standards (10 CSR 10-6.010, "Ambient Air Quality Standards") or the ambient air increment (10 CSR 10-6.060(11)(A), "Table 1 – Ambient Air Increment Table").

The air quality impact due to the smoke training is evaluated by considering the fog oil as a volatile organic compound (VOC) and as PM_{10}. There is no ambient air quality standard for VOCs. In lieu of preapplication air quality analysis, pre- and post-operation ambient air monitoring for ozone will be required.

The air ambient quality impact of the emission of PM_{10} is evaluated using the ambient air quality model ISC2 (Industrial Source Complex), draft version dated December 6, 1994. This version of ISC2 is recommended by the EPA for use in this study to estimate the effect on the ambient air quality of the operation of equipment which emits air contaminants. This permit has conditions that prohibit smoke training operations at those locations when meteorological conditions exist that could cause an exceedance of the PM_{10} National Ambient Air Quality Standards (NAAQS) or the PM_{10} increment. The constraints have been developed based on wind direction, atmospheric stability, and distance from the site to the property line. Attachment A describes the acceptable sites under various meteorological conditions. Fort Leonard Wood agrees to maintain a minimum of 3 kilometers visibility at property boundary as related to the smoke training school.

The total amount of fog oil processed by the smoke generators is limited to 65,000 gallons during any 12-month period. Since this construction triggers the federal PSD regulations, a Best Available Control Technology (BACT) analysis must be performed. Adding a PM_{10} control device to the smoke generators would defeat the purpose of the mission. Other smoke generation systems were evaluated, and the proposed method is the most feasible.

EMISSIONS/CONTROLS EVALUATION

Most of the fog oil will disperse as PM_{10}, but some will evaporate as VOC. According to information provided by the applicant, 30% of the fog oil will evaporate before reaching the property boundary.

Additional emissions are expected from the combustion of gasoline in the pulse-jet engines. Emission rates for the combustion of gasoline from the smoke generators are calculated using emission factors from the U.S. Environmental Protection Agency document AP-42, "Compilation of Air Pollutant Emission Factors: Volume II: Mobile Sources," and from Material Safety Data Sheets supplied by Fort Leonard Wood.

Table 1 below lists the annual emissions expected when Fort Leonard Wood vaporizes 65,000 gallons of fog oil, including the combustion of unleaded gasoline in the pulse-jet engine.

Table 1: Pollutants Emissions in Tons per Year

	VOC	PM_{10}	SO_2	NO_x	CO	HAPs (Note 1)
Fog Oil	250	175	0.0	0.0	0.0	$\leq$ 2.5
Combustion	0.7	0.0	0.0	0.2	11.3	0.0
Totals	251	175	0.0	0.2	11.3	$\leq$ 2.5

Note 1: Emissions from all HAPs combined is limited to 2.5 tpy. Emissions from any single HAPs is limited to 1.25 tpy.

PERMIT RULE APPLICABILITY

This PSD review is conducted under Section (8) of Missouri State Rule 10 CSR 10-6.060, "Construction Permits Required." Compliance with this section of the rule means that the proposed source will not interfere with the attainment or maintenance of ambient air quality standards, will not cause or contribute to ambient air concentrations in excess of any applicable maximum allowable increase as listed in 10 CSR 10-6.060 Subsection (11)(A) Table 1, will not violate any applicable emission control regulations or the Air Conservation Law, and will not cause an adverse impact on visibility in any Class 1 area.

APPLICABLE REQUIREMENTS

I. Installation Level: Fort Leonard Wood
  A. General
    1. Applicable Requirements: Submission of Emission Data, Emission Fees and Process Information
      a. Regulatory Authority: 10 CSR 10-6.110
      b. Emission Limitation: $25.70 per ton of pollutant
      c. Recordkeeping Requirement: Emissions Inventory Questionnaire (EIQ)
      d. Reporting Requirement: April 1 for previous year's emissions (EIQ)
    2. Applicable Requirements: Operating Permits
      a. Regulatory Authority: 10 CSR 10-6.065
      b. Emission Limitation: None
      c. Recordkeeping Requirement: None
      d. Monitoring Requirement: None
      e. Reporting Requirement: Submission of Future Operating Permit Application

II. Emission Point Level: Smoke Training Sites
  A. PM_{10} Emissions
    1. Applicable Requirements: Construction Permits Required
      a. Regulatory Authority: 10 CSR 10-6.060
      b. Emission Limitations: 65,000 gallons of SGF-2 fog oil per 12-month period; 3700 pounds of SGF-2 fog oil per day; 2600 pounds/hour of PM_{10}
      c. Recordkeeping Requirement: Annual and daily throughput; emissions rate
      d. Monitoring Requirements: Pre-startup and post-startup ambient air quality monitoring data; meteorological data; soil and vegetation sampling;
      e. Reporting Requirement: Violations of emission limitations; monitoring data
  B. VOC Emissions
    1. Applicable Requirements: Construction Permits Required
      a. Regulatory Authority: 10 CSR 10-6.060
      b. Emission Limitation: 65,000 gallons of SGF-2 fog oil per 12-month period.
      c. Recordkeeping Requirement: Annual and daily

throughput.
d. Monitoring Requirements: Pre-startup and post-startup ambient air quality monitoring data.
e. Reporting Requirement: Violations of emissions limitations.

C. Hazardous Air Pollutants (HAPs)
1. Applicable Requirements: Construction Permits Required
a. Regulatory Authority: 10 CSR 10-6.060
b. Emission Limitation: 2.5 tpy, Single HAPs. 1.25 tpy, Combination of HAPs. Below 25 tpy/10 tpy *de minimis* limit. Emissions are constrained by fog oil material specification, i.e., 1%/0.5% by weight HAPs.
c. Recordkeeping Requirement: None.
d. Monitoring Requirements: None.
e. Reporting Requirement: Violations of emissions limitations.

BACT ANALYSIS

A "top-down" BACT analysis is required to be submitted with this application. BACT is defined as an emission limitation based on the maximum degree of reduction for each pollutant which would be emitted from any proposed installation or major modification which the Director, on a case-by-case basis, taking into account energy, environmental and economic impacts, and other costs, determines is achievable for such an installation or major modification. BACT may be achieved through application of production processes, or available methods, systems, and techniques, including fuel cleaning or treatment or innovative fuel combustion techniques for control of the pollutant.

Applying any control device defeats the purpose of the generating smoke for smoke training. Smoke training is conducted so as to simulate various battlefield conditions as realistically as possible. Large open areas are required for the movement of troops and equipment participating in smoke training exercises. There are no available control options with practical potential for application to the emissions unit and the regulated pollutants under evaluation.

The only BACT option is to examine the other methods available to produce smoke. According to the U. S. Army Medical Research and

Development Laboratory's publication, "Smokes and Obscurants: A Guidebook of Environmental Assessment, Volume 1. Method of Assessment and Appended Data," there are several methods to produce smoke.

Phosphorous Smokes and Hexachloroethane Smokes are both delivered in a pyrotechnic setting. In other words, they involve the use of cannons, mortars, smoke grenades, tank guns, rockets, and bombs. Diesel Fuels and Fog Oils are delivered by Smoke Pots, Vehicle Engine Exhaust Smoke Systems, M3A3 Generators, and Jet-Turbine Helicopters. Infrared Smokes are delivered by grenades. They contain powdered brass, which is an alloy of copper and zinc.

The purpose of smoke training is to train soldiers on the use of the M3A3 fog oil smoke generator and to allow them to observe the behavior of fog oil smoke under field conditions. The other methods of generating smoke produce significant Hazardous Air Pollutants (HAP) or are delivered in a more dangerous manner than the M3A3 generator.

There are no technically feasible control options, and the use of the M3A3 smoke generators and SGF-2 fog oil does not result in the emission of hazardous air pollutants above *de minimis* levels, nor employ the use of pyrotechnics. Therefore, the M3A3/SGF-2 option as described herein is chosen as BACT.

MDNR may reevaluate this BACT analysis, establish any necessary operational restrictions, e.g., restricting smoke training to only the summer months, or require the Permittee to take any necessary corrective action, if the results of the soil, vegetation, or ambient air sampling indicate adverse deposition effects.

MODELING AND MONITORING

Fort Leonard Wood, in compliance with Missouri State Rule 10 CSR 10-6.060(8)(C), has conducted ambient air quality modeling. The review of the modeling is included as a memo from the Technical Support Section of APCP (Appendix A). The modelling showed compliance with the NAAQS and PSD increments. The modeled maximum concentrations exceeded the *de minimis* level for PM_{10}. Fort Leonard Wood will be required to conduct post-construction monitoring For PM_{10}.

Existing PM_{10} monitoring data was determined to be representative of conditions at Fort Leonard Wood (Appendix B attached) and was used to demonstrate compliance with the NAAQS. However, to check this data, Fort Leonard Wood is required to conduct one year of preconstruction monitoring for PM_{10} and ozone prior to the beginning of smoke training. Fort Leonard Wood shall take appropriate corrective action should this later air monitoring data not substantially conform with the assumptions and conclusions of the air quality modelling or if the smoke training is show to cause or contribute to a violation of NAAQS.

Air monitoring of PM_{10} and ozone will continue for two years after smoke training begins. Because of concerns about the air quality in the area, Fort Leonard Wood will present the air monitoring data at a public informational meeting to be convened by the APCP prior to commencement of smoke training.

CLASS I AREA IMPACT ANALYSIS

The federal PSD regulations as adopted in 10 CSR 10-6.060 require an ambient air quality impact analysis to be done on all Class I areas within 100 kilometers in order to assure that no adverse ambient air quality impact will occur within the Class I area. There are no Class I areas within 100 kilometers of the proposed plant. Therefore, no Class I impact analysis is required.

ANALYSIS OF IMPACT ON VISIBILITY, LOCAL SOILS, ANIMALS AND VEGETATION

The Applicant analyzed the projected impairment to visibility, soils, animals and vegetation.

Fort Leonard Wood submitted soil and vegetation sampling conducted during test smoke training exercises in 1993. Results of sampling for total petroleum hydrocarbons (TPH) indicated significant deposition with high levels of TPH which decreased over several weeks. However, Fort Leonard Wood indicated that the sampling protocol was flawed (e.g., samples were collected in plastic bags) which resulted in contaminated samples and the overestimation of TPH levels.

The procedures listed in the EPA document, "A Screening Procedure for the Impacts of Air Pollution Sources on Plants, Soils, and

Animals," were examined. Since there is no simple procedure for estimating the impact of ozone from a single source, and since PM_{10} is not one of the regulated pollutants for which screening is done in the EPA screening guidance, no further analysis of the impact of smoke training on visibility, local soils, animals and vegetation is required.

However, to more accurately assess the impact of smoke training on soil and vegetation, Fort Leonard Wood is required to conduct soil and vegetation sampling at the training sites. Quarterly sampling will be performed at each training site for at least one year prior to commencement of smoke training. Monthly sampling will continue after smoke training begins. Fort Leonard Wood shall cooperate with APCP to present the results of pre-startup soil and vegetation sampling at a public informational meeting to be convened by the APCP prior to the commencement of smoke training.

In addition, prior to commencement of smoke training, Fort Leonard Wood shall inventory vegetation found within the smoke training impact area that has any recreational or commercial value and shall identify any of the vegetation which may be sensitive to elevated ozone or particulate levels. Fort Leonard Wood should consider the following documents in performing said inventory: *Air Quality Criteria Documents*, U.S. Environmental Protection Agency, *A Screening Procedure to Evaluate Air Pollution Effects on Class I Wilderness Areas*, U.S. Forest Service, and *Air Quality in the National Parks*, National Park Service. Fort Leonard Wood shall also describe operational or seasonal restrictions that could be used to minimize emissions and any accompanying deposition effects.

The EPA's "Workbook for Plume Visual Impact Screening and Analysis," was used to determine the visual quality of the area and assess the visual impact of the proposed facility. The model indicates that the visibility in the area would not be adversely affected. Appendix B contains the result of the visibility analysis.

Fort Leonard Wood shall also comply with water sampling required by MDNR, Water Pollution Control Program.

GROWTH IMPACTS

The Applicant analyzed the air quality impact projected for the area as a result of general commercial, residential, industrial growth, as well as growth associated with this installation. The installation is expected to increase by 7900 persons. This includes civilian/permanent party military increase of 1600 and a trainee increase of 6300. All of the permanent party and military trainees will be served by the facility on-post. Increased fuel use for space heating and air conditioning could result in some increased emissions. However, the expected increase in personnel would merely bring Fort Leonard Wood back to the same level of personnel as served in 1990. Therefore, no additional growth-related air pollution impacts are anticipated.

STAFF RECOMMENDATION

On the basis of this review conducted in accordance with Section (8), Missouri State Rule 10 CSR 10-6.060, "Construction Permits Required," the undersigned recommend this permit be granted with conditions.

Sharon Turpin
Environmental Engineer

6/7/95
Date

Glenn A. Carlson, P.E.
Environmental Engineer

6/7/95
Date

APPENDIX A

Fort Leonard Wood Smoke Training PSD Modeling

STATE OF MISSOURI

DEPARTMENT OF NATURAL RESOURCES

MEMORANDUM

DATE: June 7, 1995

TO: Glenn Carlson, Acting Unit Chief
Permit Section

FROM: Calvin Ku, Section Chief CK
Technical Support Section

Chris Smith, Meteorologist CS
Technical Support Section

SUBJECT: Fort Leonard Wood Smoke Training PSD Modeling (Revised)

I. Introduction

Fort Leonard Wood is proposing to conduct smoke training at several locations within their property. Due to the emission rates of the smoke generators to be used in the training, this project is subject to PSD (Prevention of Significant Deterioration) permit review including modeling requirements.

A modeling report entitled 'Predicted Air Quality Impacts for Fort Leonard Wood Smoke Training School' was submitted by Burns & McDonnell on April 9, 1995(attached). This report includes two separate analyses, the PSD increment analysis and the NAAQS (National Ambient Air Quality Standard) analysis. These analyses indicate that the smoke training can be conducted during specific meteorological conditions in order to meet the necessary standards. The following report summarizes the modeling review and the resulting recommendations for permit requirements.

II. Modeling Procedures

The modeling procedures used in this study follow PSD and air quality modeling guidelines. The selected model for this application is the draft version of the new ISC2 (Industrial Source Complex) model dated Dec. 6, 1994. This version of the ISC2 includes simple and complex terrain algorithms and

incorporates EPA's intermediate terrain policy. Additionally, the new version includes new area source and deposition algorithms. This model was recommended by EPA for use in this study.

The source information differs in the PSD increment modeling and the NAAQS modeling. For the PSD increment model, only the smoke generator sources are included. These generators will be placed on vehicles and may be moved during their operation. The vehicles will be spaced by at least 20 meters and will be oriented in a line or a 'v'. For modeling purposes, worst case is assumed to be a line of volume sources with an interval of 20 meters. The smoke generators are evaluated based on an emission rate of 2600 pounds per hour of PM_{10}. The smoke sources are modeled at all possible locations of operation within the fort. The NAAQS modeling includes all major sources within 50 kilometers of Fort Leonard Wood. A major source list was generated from the state's emission inventory databases and additional quality assurance was conducted prior to modeling to verify emission rates and source locations. These sources are modeled as continuous operations for worst case impacts.

The meteorological data sets are also different in the PSD increment and NAAQS runs. Because the smoke generators will be allowed to operate only during specific meteorological conditions, user-generated meteorological data sets are used for the PSD increment modeling. Varying meteorological conditions based on wind speed, stability, mixing height, and temperature are used in the model. Wind direction is considered by placing all receptors in a straight line at the proper downwind distance. Using this method, it is possible to model direct path wind directions to all fence line receptors in one model run. The NAAQS runs use five years of actual meteorological data from Springfield and Monett, Missouri.

III. PSD Increment Results

Because the baseline has not been established in this area, the entire PSD increments are available. These values are 30 ug/m^3 and 17 ug/m^3 for the 24-hour and annual average, respectively. The one-hour averages produced by the model are divided by 24 to obtain a representative 24-hour average. These results are then compared to the 24-hour increment of 30 ug/m^3 to identify receptors along the property boundary that will not exceed the increment. Corresponding wind directions are identified as acceptable conditions for operation. This procedure is duplicated for each possible training location. From these runs, a list of acceptable meteorological conditions is derived for each smoke training site (see Table II of the modeling report).

Because the smoke training will not be conducted more than 135 days per year, the annual increment does not require an evaluation. Even if a 30 ug/m^3 maximum 24-hour concentration occurs at the same receptor all 135 days, the annual concentration will only be 11 ug/m^3, well below the annual increment.

IV. NAAQS Results

PSD guidelines require that a NAAQS demonstration be conducted for the area that will be significantly impacted by the new source. For this study, a 50 kilometer radius is used. The model predicts several violations of the NAAQS due to sources beyond the Fort Leonard Wood property boundary. These locations are listed in Table III of the attached modeling report. Due to these potential exceedances of the NAAQS, the smoke training will not be allowed to occur under meteorological conditions which will result in a significant contribution. Several of the sites will not impact any of these potential exceedances already. However, under certain meteorological conditions stipulated in the PSD increment review as being acceptable, there is a significant contribution. Therefore, the fort is further restricted in their operation of the smoke generators. The resulting meteorological conditions which are acceptable for the PSD increment and the NAAQS are given in Table II of the modeling report.

V. Recommendations

Basis on the modeling analysis, we recommend the following conditions that should be required with the issuance of the smoke training permit:

1) The smoke generators shall be operated no more than 135 days per year.

2) The total emissions of PM10 from the smoke generators shall be limited at a rate of 2600 pounds per hour. This emission rate is based on the use of 3700 pounds per hour of fog oil and assumes a 70% conversion rate to particulate matter.

3) The smoke training emissions are found to be acceptable for the PSD increment and the NAAQS for the wind directions, stabilities, and durations listed in Table II of the smoke training modeling report provided by Fort Leonard Wood.

4) In addition to the wind direction and stability requirements, the model indicates that a wind speed of at least 1 m/s is necessary for stabilities A-D and at least 4 m/s for

stability E. Also, a mixing height of 200 meters is necessary for stabilities A-C and a mixing height of 320 meters is required for stabilities D-E.

5) Under no circumstance should the smoke training be conducted during F stability.

6) No smoke training should occur at any locations other than those specified in Table II of the modeling report.

7) The model predicts concentrations during very specific meteorological conditions. Special attention should be given to the measurement and monitoring of these parameters before, during, and after the smoke training occurs. This requires not only appropriate instrumentation, but qualified personnel as well. Fort Leonard Wood should be required to secure these instruments and trained personnel.

VI. Conclusion

Based on the modeling analysis, the proposed smoke training at Fort Leonard Wood, if operated under the requirements listed in Section V, will not cause or contribute to a violation of the PSD increment or NAAQS for PM10.

APPENDIX B

Background Concentration for the Fort Leonard Wood Smoke Training

STATE OF MISSOURI

DEPARTMENT OF NATURAL RESOURCES

MEMORANDUM

DATE: June 1, 1995

TO: Randy Raymond, Chief, Permitting Section
Air Pollution Control Program

FROM: Calvin Ku, Chief, Technical Support Section
Air Pollution Control Program

SUBJECT: Background Concentration for the Fort Leonard Wood Smoke Training

Background concentration determination is an important part of the ambient air quality impact analysis. In multi-source areas, two components of background should be considered. The first component is due to the nearby major sources which are expected to affect the area air quality. The impact of the nearby sources was modeled and areas of the maximum impact (hot spots) were identified in a report "Predicted Air Qality Impacts for Fort Leonard Wood Smoke Training School" prepared by the Army's Consultant, Burns and McDonnell.

The second component of the background is attributable to other sources such as natural sources and minor sources. Because no ambient monitors are located in the vicinity of Fort Leonard Wood, air quality data collected at the Mark Twain site was used to determine the natural and minor source background. The Mark Twain site was considered because it has a similar environmental setting as Fort Leonard Wood.

Attached is a report which shows three year PM_{10} data collected at the Mark Twain site between 1992 and 1994. The first and second maximum 24-hour concentrations collected in 1994 are 54 and 39 ug/m^3, respectively. The annual average is 15 ug/m^3. The maximum 24-hour concentration was recorded on June 19, 1994. This maximum concentration should not be used for background because the wind speed recorded was less than 1 m/s for all 24 hours in the day except two. The wind speed data for June 19, is also attached. As specified in the draft permit, the smoke training should not be conducted when the wind speed is 1 m/s or less.

It is recommended that a 24-hour background of 39 ug/m^3 and an annual background of 15 ug/m^3 be used in the air quality analysis for the smoke training. In addition, a 12-month pre-construction monitoring should start immediately after approval of the monitoring plan by the Missouri Department of Natural Resources to verify the background concentrations.

CK:sj

Attachment

PM-10 TOTAL 0-10UM (81102) MISSOURI UNITS: 001 UG/CU METER (25 C)

SITE ID	POC	MT	CITY	COUNTY	ADDRESS	YR	REP ORG	NUM OBS	SCHEDULED NUM OBS	% OBS	NUM REQ	MAXIMUM VALUES 1ST	2ND	3RD	4TH	VALS > 150 MEAS	EST	WTD ARIT MEA
29-007-0009	2	2	MEXICO	AUDRAIN CO	AUDRAIN COUNTY MEDICA	92	001	58	58	91	64	57	38	37	35	0	0.00	1
29-007-0009	2	2	MEXICO	AUDRAIN CO	AUDRAIN COUNTY MEDICA	93	001	60	59	94	63	37	35	31	31	0	0.00	1
29-007-0009	2	2	MEXICO	AUDRAIN CO	AUDRAIN COUNTY MEDICA	94	001	61	60	95	63	59	41	40	40	0	0.00	1
29-021-0005	1	3	ST JOSEPH	BUCHANAN C	SOUTH 759 HIGHWAY, PU	92	001	132	46	96	138	110	93	88	86	0	0.00	4
29-021-0005	2	2	ST JOSEPH	BUCHANAN C	SOUTH 759 HIGHWAY, PU	92	001	225	134	96	64	91	89	88	87	0	0.00	3
29-021-0005	2	2	ST JOSEPH	BUCHANAN C	SOUTH 759 HIGHWAY, PU	93	001	177	163	97	63	130	100	100	81	0	0.00	3
29-021-0005	2	2	ST JOSEPH	BUCHANAN C	SOUTH 759 HIGHWAY, PU	94	001	176	146	95	63	96	77	74	74	0	0.00	3
29-043-0004	1	3		CHRISTIAN	JOURNAGAN CLEVER QUAR	94	001	3	3	19	92	31	10	10		0	0.00	1
29-051-0003	1	3	JEFFERSON	COLE CO	MO STATE PENITENTIARY	94	001	15	15	94	16	24	19	17	17	0	0.00	1
29-077-0026	2	1	SPRINGFIEL	GREENE CO	5012 S. CHARLESTON S	92	005	61	61	95	64	49	44	38	35	0	0.00	1
29-077-0026	2	1	SPRINGFIEL	GREENE CO	5012 S. CHARLESTON S	93	005	61	61	97	63	40	37	34	31	0	0.00	1
29-077-0026	2	1	SPRINGFIEL	GREENE CO	5012 S. CHARLESTON S	94	005	61	61	97	63	51	36	31	29	0	0.00	1
29-077-0032	1	2	SPRINGFIEL	GREENE CO	S.W.MISSOURI STATE UN	92	005	58	58	91	64	50	42	41	38	0	0.00	1
29-077-0032	1	2	SPRINGFIEL	GREENE CO	S.W.MISSOURI STATE UN	93	005	59	59	94	63	38	34	33	31	0	0.00	1
29-077-0032	1	2	SPRINGFIEL	GREENE CO	S.W.MISSOURI STATE UN	94	005	61	61	97	63	58	39	32	30	0	0.00	1
29-077-0036	1	2	SPRINGFIEL	GREENE CO	HILLCREST HIGH SCHOOL	92	005	61	61	95	64	60	41	40	34	0	0.00	1
29-077-0036	1	2	SPRINGFIEL	GREENE CO	HILLCREST HIGH SCHOOL	93	005	61	61	97	63	42	39	37	33	0	0.00	1
29-077-0036	1	2	SPRINGFIEL	GREENE CO	HILLCREST HIGH SCHOOL	94	005	61	61	97	63	55	38	33	32	0	0.00	1
29-095-0009	1	2	INDEPENDEN	JACKSON CO	MOPAC RR RIGHT OF WAY	92	001	57	56	88	64	50	39	38	36	0	0.00	2
29-095-0009	1	2	INDEPENDEN	JACKSON CO	MOPAC RR RIGHT OF WAY	93	001	60	60	95	63	40	35	34	34	0	0.00	1
29-095-0009	1	2	INDEPENDEN	JACKSON CO	MOPAC RR RIGHT OF WAY	94	001	57	57	90	63	63	41	40	38	0	0.00	2
29-099-0005	2	2		JEFFERSON	DUNKLIN HIGH SCHOOL,	92	001	58	58	91	64	59	47	47	46	0	0.00	2
29-099-0005	2	2		JEFFERSON	DUNKLIN HIGH SCHOOL,	93	001	57	57	90	63	74	70	41	38	0	0.00	2
29-099-0005	2	2		JEFFERSON	DUNKLIN HIGH SCHOOL,	94	001	61	61	97	63	92	65	52	46	0	0.00	2
29-127-0004	2	2	HANNIBAL	MARION CO	ST ELIZABETH HOSPITAL	92	001	50	50	78	64	63	35	34	32	0	0.00	1
29-127-0004	2	2	HANNIBAL	MARION CO	ST ELIZABETH HOSPITAL	93	001	54	54	86	63	36	34	33	32	0	0.00	1
29-127-0004	2	2	HANNIBAL	MARION CO	ST ELIZABETH HOSPITAL	94	001	59	59	94	63	59	52	43	41	0	0.00	2
29-137-0001	1	3		MONROE CO	HWYS V & 107 MARK TWA	92	001	45	45	70	64	34	33	27	23	0	0.00	1
29-137-0001	1	3		MONROE CO	HWYS V & 107 MARK TWA	93	001	58	58	92	63	33	30	27	26	0	0.00	1
29-137-0001	1	3		MONROE CO	HWYS V & 107 MARK TWA	94	001	56	56	89	63	54	39	39	29	0	0.00	1
29-183-1002	1	2		ST CHARLES	GENERAL ELECTRIC STOR	92	001	47	47	73	64	63	43	36	31	0	0.00	1
29-183-1002	1	2		ST CHARLES	GENERAL ELECTRIC STOR	93	001	30	30	97	31	38	36	36	35	0	0.00	2
29-183-1002	1	2		ST CHARLES	GENERAL ELECTRIC STOR	94	001	41	41	85	48	56	54	51	44	0	0.00	2
29-215-0002	1	3		TEXAS CO	645 MAPLE	92	001	31	16	100	16	46	45	43	42	0	0.00	2

? INDICATES THAT THE MEAN DOES NOT SATISFY SUMMARY CRITERIA

06-01-1995
08:53:46

MET - AIR QUALITY DAILY DATA REPORT

Site: MTSP Date: 6/19/94

Hour	WINDS
0	1.00
1	0.00
2	0.00
3	0.00
4	0.00
5	0.00
6	0.00
7	0.00
8	1.00
9	1.00
10	1.00
11	2.00
12	3.00
13	1.00
14	3.00
15	1.00
16	0.00
17	0.00
18	0.00
19	1.00
20	0.00
21	0.00
22	0.00
23	0.00

The Anniston Star

Alabama's largest home-owned newspaper 50 cents

Smoke: Obstacle to moving chemical school?

By Eric Larson
Star Military Writer

'It's a show-stopper if not properly addressed'

The Army failed to consult with its own chemical school officials when planning smoke training at Fort Leonard Wood, Mo., and as a result may have "crippled" its ability to perform missions there, according to an internal Army memo written by a senior chemical school official.

The memo points to restrictions in a pending environmental permit that may make it harder for the Army to justify closing Fort McClellan.

The May 16 memo was sent by Lt. Col. Edward Newing, assistant commandant of the chemical school at Fort McClellan, to an officer in the Army's environmental law office.

Newing's memo is a critique of a smoke-training permit under consideration by the Missouri Department of Natural Resources. The permit contains several restrictions that "if allowed to stand ... would kill both the U.S. Army and U.S. Air Force smoke training," Newing wrote.

"I think this is a very serious memo," said U.S. Rep. Glen Browder, D-Jacksonville. "It indicates that not only did the responsible authorities not talk with the people in charge of the program ... but what they have set in motion is something that could seriously degrade the ability of our military to train for their mission."

The permit for Leonard Wood parcels four ranges on the 60,000-acre facility where smoke training can take place and limits the times it can be done. It would limit the amount of fog oil that could be vaporized to 65,000 gallons in a year and 500 gallons on any particular day. Emissions would be restricted to 2,600 pounds per hour.

"We don't give them the right to fog wherever they want, whenever they want," said David Shorr, director of the Missouri agency.

In Newing's opinion, however, the restrictions go too far. Missouri's proposed limit on fog oil is at least 30 percent short of what the chemical school would need to train effectively, Newing wrote. The limits would also cut by 75 percent the amount of time the Army operates on some days.

"After suffering these unacceptable losses, it further limits our joint forces to

■ See School/3A

The Anniston Star
May 20, 1995

School

■ From Page 1A

smoke operations during weather conditions which may exist only 60 percent of the year," Newing wrote.

"The Missouri smoke permit restrictions will ... tragically cripple the capability to conduct smoke training."

The memo — which has been widely circulated since being leaked — has raised eyebrows among those who have argued that closing Fort McClellan and moving its chemical school to Missouri would impair the training.

"To me it's a show-stopper if it's not properly addressed," said Walt Phillips, a former commandant of the chemical school. "About 50 percent of the chemical school mission is in the smoke-training area."

Browder said he's recommending that the Base Closure and Realignment Commission ask the General Accounting Office to investigate the smoke-training issue.

Members of the commission, including its chairman Alan Dixon, have said the Army must have its environmental permits in hand before June 22, when the commission begins voting on whether to close installations, including Fort McClellan.

"If they couldn't complete the mission because of the narrowness of a permit, (closing McClellan) is not going to fly, since military value is what our focus is," said John Earnhardt, a BRAC spokesman.

Army officials would not elaborate on the issues raised on the memo because the State of Missouri has not issued the permit yet.

"It is premature to speculate on restrictions, if any, with regard to the smoke-training permit in Missouri," Army spokesman Capt. Joe Pick said in a news release.

Fort Leonard Wood officials who worked on the application for the smoke-training permit were not available for comment Friday.

The smoke-training permit is the only one that has not yet been granted to the Army. The Missouri chapter of the Sierra Club and the Missouri Coalition for the Environment oppose the smoke training, saying it will hurt wildlife and plants in Mark Twain National Forest, which surrounds the base.

A 30-day public comment period on the draft permit ended May 12. Missouri officials are reviewing the comments.

Shorr said his conversations with Army officials have given him the impression that the current permit still accommodates training, he said. If the Army takes Newing's memo to heart and decides to try to make changes to the permit, it may be out of luck.

"They could ask for changes, but the reality of it is I don't think there's a lot of room for them," Shorr said. "This is a well-sculpted permit to meet the mission and protect the environment."

Except for a six-year hiatus, smoke training has been done on McClellan's Pelham Range since 1951. The exercises teach chemical officers to use the smoke to cloak troops over a large area and gives soldiers practice in maneuvering through the thick white cloud.

The Alabama Department of Environmental Management has not required that the Army apply for an air permit to do smoke training. However, the agency has collected data on the practice from the Army over the years.

According to ADEM, in 1993 the Army vaporized 65,340 gallons of fog oil. That's barely over the limit that Missouri officials are considering imposing, but Phillips said a total of 90,000 gallons a year might be required once the Air Force begins doing its chemical defense training with the Army, as is planned.

The training will be done in accordance with the Air Force's Disaster Preparedness School, which opened at Fort McClellan in October. The Pentagon's proposal to close Fort McClellan does not specifically mention where the school would go.

This is not the first time smoke training has become in issue with the chemical school's relocation.

Lack of accommodations for smoke training in Aberdeen, Md., was part of the reason the chemical school returned to Fort McClellan in 1979. The Army had moved the school to Maryland in 1973, but smoke training had to be done in Pennsylvania, said Phillips, a chemical corps officer during the time.

Newing wrote in the memo that he sees in the draft permit a prohibition on smoke pots, smoke hand grenades, riot control agents and infrared obscurants.

But Shorr said the permit currently pending applies only to the fog-oil training and doesn't necessarily prohibit those additional practices.

"A lot of those things they do right now at Fort Leonard Wood," Shorr said. Because many of the practices are small-scale, they may not require permits, he said.

The Birmingham News
June 8, 1995

Missouri makes new move to take schools from Fort McClellan

From staff, wire reports

Missouri gave final approval Wednesday for chemical weapons training at Fort Leonard Wood, a move opponents with environmental concerns pledged to challenge.

The state permit was required by a federal panel before it would consider recommending to President Clinton that the Army's chemical and military police schools be moved from Alabama's Fort McClellan.

The permit from the Department of Natural Resources allows the Army to spray a white, oil-based fog into the air on the southern Missouri base as part of its training.

Critics contend the fog could slip off the sprawling base, harming plants and animals in the adjoining Mark Twain National Forest and several small communities.

But DNR's director, David Shorr, said after reviewing and approving the permit that "from a waste standpoint, it's small potatoes."

"When you compare it to our major chemical manufacturers in Hannibal, St. Louis and Kansas City — boy, this is nothing," Shorr said.

But the Missouri Coalition for the Environment said Wednesday that it plans to appeal the oil-fog permit.

The group already has filed an administrative appeal on a separate state incinerator permit, and opposes moving the chemical school to Fort Wood.

"We're going to fight this thing to the end," said Roger Pryor, executive director of the coalition. "If the commission wants to recommend this program and go forward, they can. But they do so at the risk of it being thrown out in court."

In Alabama, the head of the task force that has battled for Fort McClellan through two previous attempts to close the base said the news that Missouri has cleared the last obstacle is the biggest blow yet.

"I am very disappointed that they got that smoke permit," said Gerald Powell, head of the Calhoun County Military Task Force. "They have short-cut every procedure they needed to do and the biggest one being that the public was uninformed about what they were doing."

Powell said if Missouri's actions lead to the approval of the Army's plans to relocate the chemical school to Fort Leonard Wood, the entire United States will suffer the consequences.

"The country will live to regret it," he said. "We will never again have the facilites or the capabilities we have right here at Fort McClellan. That's an opinion shared by many military people."

The new mission is considered a major economic prize: an extra 15,000 soldiers would be assigned to Fort Leonard Wood each year for 13-week training courses.

The Army also would shift 1,800 permanent Army jobs, 400 civilian jobs and nearly $150 million in annual salaries and construction contracts from Alabama to Missouri.

The federal Base Closure and Realignment Commission required the two permits and a third state license on wastewater discharges before considering recommending the move.

The panel has until July 1 to make its recommendation to Clinton.

The permit process for the base transfer has been on a fast track since the Pentagon notified Missouri in March that the relocation commission had set a deadline of June 22 for receiving the state permits.

Shorr said his staffers worked overtime to complete in three months a process that normally takes nearly twice that long. Their speed prompted the environmental coalition to file appeals seeking to slow down the process.

DEPARTMENT OF THE ARMY
UNITED STATES ARMY ENGINEER SCHOOL
FORT LEONARD WOOD, MISSOURI 65473-6600

21 April 1995

REPLY TO
ATTENTION OF

Environmental Division

Missouri Department of Natural Resources
Attention: Roger Randolf
Director of Air Pollution Control Program
P.O. Box 176
Jefferson City, MO 65102

Dear Mr. Randolf

Enclosed please find a completed Variance Application Form for the Smoke Training operation at Fort Leonard Wood. It is our understanding that this application will be considered at the April 27, 1995 meeting of the Air Conservation Commission.

If you have any questions concerning the application or need more information please call Scott Murrell or Rory McCarthy at 314 596-0869.

Sincerely

Scott Murrell
Chief, Environmental Division

DEPARTMENT OF NATURAL RESOURCES
MISSOURI AIR CONSERVATION COMMISSION

VARIANCE APPLICATION FORM

Complete and return. Separate sheets may be used in the event that space provided is insufficient.

The affiant states the following are true and complete to the best of his knowledge and belief;

1. Date of application: April 1995

2. Name of applicant: U.S. Army Engineer Center and Fort Leonard Wood.

____Corporation _____Partnership ____Sole Proprietorship

If not a corporation, give name and address of owners:

Name: Department of Defence

Address: Fort Leonard Wood

3. Home office address or headquarters of applicant:

USAEC & FLW
ATTN: ATZT-CG
FORT LEONARD WOOD MO 65473-5000

Telephone: 314 596-0869

4. Source of air contaminant for which variance is sought:

Mailing address:

USAEC & FLW
ATTN: ATZT-CG
FORT LEONARD WOOD MO 65473-5000

Telephone: 314 596-0869

Geographical location (if not situated at numbered street address, give grid coordinates according to Missouri Coordinate System)

37 DEGREES 92 MINUTES LATITUDE 45 DEGREES 07 MINUTES LONGITUDE

Pulaski County, All or parts of T33, 34, 35N, R10, 11, 12W.

5. Person authorized to represent the applicant for purposes of this application and to accept service of process in behalf of the applicant:

Name: Major General Joe N. Ballard Title: Commanding General

Address:

USAEC & FLW
ATTN: ATZT-CG
FORT LEONARD WOOD MO 65473-5000

Telephone: 314 596-0869

6. Person responsible for operation of the source:

Name: Major General Joe N. Ballard Title: Commanding General
Address

USAEC & FLW
ATTN: ATZT-CG
FORT LEONARD WOOD MO 65473-5000

Telephone: 314 596-0869

7. Description of type of business:

Department of Defense training for use of obscurants.

8. Description of source operation for which variance is sought. Use Form or Form if applicable.

For the generation of fog/smoke/obscurant. An SAE 20 oil without additives, SGF2, is vaporized by a generator. The vaporized oil, condences when it exits the generator, into a white cloud of small oil droplets. The generators are positioned so that the cloud is directed by winds to a target that is to be obscured. Soldiers are trained in the mechanical and tactical use of the generators.

9. Terms and conditions, in detail, of variance applied for. Include description of control equipment, both existing and proposed, emission limit to be achieved, laws of operation. Use Form or Form if applicable.

The variance applied for is from the new installation opacity limit requirement of 10 CSR 10-3.080 (4). The operation is the subject of a prelimanry permit determination Project/Facility No. 3860-0004-015, currently out for public comment. As stated in the BACT Analysis portion of the Prelimanary Determination, "any control devise defeats the purpose of the generating for smoke training."

10. In support of application, furnish names of all attorneys, accountants, agents, appraisers, consultants, engineers, salesmen, supplier representatives and all other parties who have rendered services or advice or furnished informaiton relied upon, with their addresses, telephone numbers and nature of service or advice rendered, or informaion furnished:

Glen Rubel U.S. Army Environmental Center Aberdeen Proving Ground, Edgewood Maryland 410 671-2395. He has done extensive modeling for the disperaion of fog oil obscurants.

Paul Josephson U.S. Army Environmental Center Aberdeen Proving Ground, Edgewood Maryland 410 671-1209. He is responsible for centralizing information currently available on the subject of fog oil smoke.

Rochelle Williams U.S. Army Forces Command Atlanta, Georgia, 404 669-7095. She is the Forces Command point of contact for fog oil obscurant training.

Block Andrews Burns and McDonnell Kansas City, Missouri, 816 822-3455. Has worked with Fort Leonard Wood on permitting and modeling of smoke operations on the 1993, and 1995 Base Realignment and Closure actions.

Larry Weber U.S. Army Environmental Center, Aberdeen Proving Ground, Edgewood Maryland, 410 671-1204. He is a technical point of contact for Clean Air Act compliance issues.

Lieutenant Colonel Sutton, Training and Doctrine Command Smoke Integration Proponancy Office, Fort McClellan, Alabama 205 848-4435. He was consulted about the need for the training, and on the use of new types of fog oil generators.

Major Teller, Environmental Law Division of the Department of Army. He covers Army compliance issues related to Clean Air Act, and has worked in the past with operation and permit issues as they relate to obscurant training.

11. Reason variance is sought:

(a) If application is based on the contention that compliance with the applicable regulation would result in an unreasonable cost without corresponding public benefit, or that it would result in an economic hardship for the plant, installation or operation, the application shall include a statennent setting forth in detail a comparison of the cost of installation and operation if operated under of the variance sought and the cost of installation and operation if the terms of the variance sought and the cost of installation and operation if operated in compliance with the applicable regulation. Use Form or Form if applicable. Comlplete financial information forms (Form) for source. (This form may be submitted in facsimile as long as all information requested is included and the order and general format is

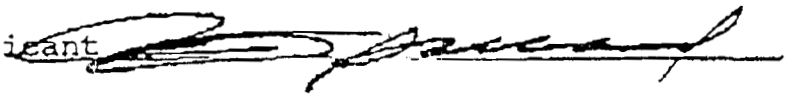
maintained.)

The training is conducted to assure the proficiency of soldiers in battlefield operations related to visual obscuration. Obscurants are used to conceal friendly forces from enemy fire, and to allow evasive maneuvers to be conducted. The training occurs at static sites where soldiers are taught the mechanical operation of the generator, and at mobile or tactical sites where the soldiers are taught the tactical uses of obscurants.

11. (continued)
(b) If application is based on contention that compliance with regulations would result in economic hardship to the applicant whether a firm, corporation or individual, the application shall include, in addition to the information required in (a) above, photo duplicates of the three federal income tax returns for the three years immediately preceding the application, and a list of the principal officers and their salaries, Give any other income derived from the operation, include both the number of persons employed at the installation for which the variance is sought, and the total number of persons employed by the applicant:

NA

12. Notarize certification of all information on the application:

Signature of applicant 

Subscribed and sworn to before me this

21st day of April, 1995

Ellen K. York
Notary Public

ELLEN K. YORK
Notary Public – Notary Seal
STATE OF MISSOURI
Pulaski County
My Commission Expires: June 30, 1997

Environmentalists seek to delay OK of incinerator

The Associated Press

JEFFERSON CITY — An environmentalist group filed petitions with the state Thursday seeking to slow down the process of approving a plan to relocate the Army's only chemical defense training base to Fort Leonard Wood.

The petitions filed with the Department of Natural Resources allege that the Army has "not accurately and truthfully described" the operations of an incinerator that would burn chemically decontaminated clothing and other materials.

The Coalition for the Environment is appealing a state permit issued April 17, giving the Army the go-ahead to build and operate the incinerator. Environmentalists want the permit overturned until a public hearing is held.

The petitions also seek to delay state approval of a waiver allowing the Army to spray a white oil-based fog into the air as part of its training for soldiers.

Approval of both permits is vital to move the Army's chemical defense training base from Fort McClellan, Ala., to Fort Leonard Wood in southern Missouri, military officials said.

The federal Base Closure and Realignment Commission plans to make its final recommendations to President Clinton by July 1.

If the commission doesn't have the state permits approved by June 22, "they cannot consider the recommended move," said Fort Leonard Wood spokesman Brad Rose.

During a meeting Thursday with state environmental officials, Army officials stressed the need for quick action on their requests.

"This is essential for the defense of the country and it does need to be done," said Scott Murrell, the Army's environmental chief at Fort Leonard Wood.

The base relocation would bring an additional 4,200 soldiers yearly to Fort Leonard Wood, plus 1,800 permanent jobs and 400 civilian jobs, Rose said. It also could pump up to $150 million in salaries and construction contracts into the state economy, he said.

But environmentalists and some nearby residents fear the new mission could spew tons of contaminants.

Among the chemicals used in Army training is Sarin, the colorless vapor that recently killed 10 people and injured hundreds more on a Tokyo train.

But Army officials said any fears are unwarranted and caused by misleading information.

Neither the thick fog, the potentially fatal chemicals nor the incinerator pose any danger to nearby residents, Murrell said.

He said Sarin and other nerve gases only are produced in small quantities and are kept inside at all times. Furthermore, polluted materials are decontaminated before being incinerated, Murrell said.

As for the oil-fog sprayed from canisters on jeeps: "I've observed it, I've walked through it, and it has no effect at all," Murrell said.

Nonetheless, the Army needs an exemption from state environmental laws to spray the thick substance. A waiver hearing before the Missouri Air Conservation Commission was canceled Thursday because four of its seven members were absent.

Commissioners and DNR employees plan to hear public comments about the oil-fog training on May 12 in Waynesville, near Fort Leonard Wood. A hearing about the state waiver is set for May 25 in Kansas City.

In response to the petitions filed Thursday, an appeal hearing also must be held on the incinerator permit. No hearing date has been set.

The petitions allege that the Army underestimated the incinerator's potential sulfur emissions, failed to identify some waste products to be burned and overlooked the oil-fog's potential effect on endangered species, such as the bald eagle and Indiana bat.

"We're not trying to stop the darn thing. We're trying to get information out to the public," environmental attorney Lewis Green said.

Air Conservation Commission chairman Harriet Beard said the panel will "take the concerns under advisement" and try to reach some decision by June.

The Birmingham News
April 28, 1995

Group fights Missouri OK of chem unit

JEFFERSON CITY, Mo. (AP) — An environmental group filed petitions with the state Thursday seeking to slow down the process of approving a plan to relocate the Army's only chemical defense training base to Fort Leonard Wood.

The petitions filed with the Department of Natural Resources allege the Army has "not accurately and truthfully described" the operations of an incinerator that would burn chemically decontaminated clothing and other materials.

The Coalition for the Environment is appealing a state permit issued April 17, giving the Army the go-ahead for the incinerator. Environmentalists want the permit overturned until a public hearing is held.

The petitions also seek to delay state approval of a waiver allowing the Army to spray a white oil-based fog into the air as part of its training for soldiers.

Approval of both permits is vital to move the Army's chemical defense training base from Fort McClellan, Ala., to Fort Leonard Wood, military officials said.

The federal Base Closure and Realignment Commission plans to make its final recommendations to President Clinton by July 1.

If the commission doesn't have the state permits approved by June 22, "they cannot consider the recommended move," said Fort Leonard Wood spokesman Brad Rose.

During a meeting Thursday with state environmental officials, Army officials stressed the need for quick action on their requests.

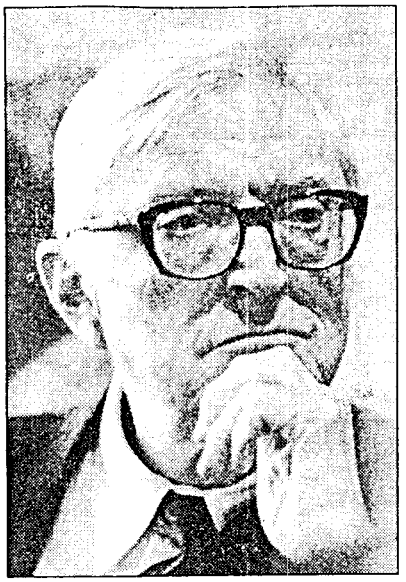
"This is essential for the defense of the country and it does need to be done," said Scott Murrell, the Army's environmental chief at Fort Leonard Wood.

But environmentalists and some nearby residents fear the new mission could spew tons of contaminants. Among the chemicals used in Army training is Sarin, the gas that recently killed 10 people and injured hundreds more in Tokyo.

Army officials said the fears are unwarranted.

Neither the thick fog, the potentially fatal chemicals nor the incinerator pose any danger to nearby residents, Murrell said.

He said Sarin and other nerve gases only are produced in small quantities and are kept inside at all times. Furthermore, polluted materials are decontaminated and incinerated, Murrell said.



Lewis Green
Enviromental attorney.

"This is serious business. We're talking about nerve gases, biological agents and chemicals," environmental attorney Lewis Green said in a session with three members of the Air Conservation Commission.

"We're not trying to stop the darn thing. We're trying to get information out to the public," he said.

Jefferson City Post-Tribune

VOL. 130, NO. 56 JEFFERSON CITY, MISSOURI FRIDAY AFTERNOON, APRIL 28, 1995

Environmentalists fight plan to move chemical training to Fort Wood

The Associated Press

Rebecca Gibbs worries that a thick, white oil-based fog might some day float through the air and into her back yard from nearby Fort Leonard Wood.

"What I hear is that it coats things when it settles to the earth – the grass, the trees, the streams, the bugs, my kids," Ms. Gibbs said. "I have no idea what the potential effects could be."

So Ms. Gibbs contacted an environmental attorney to try to delay a plan to move the Army's only chemical defense training base from Fort McClellan, Ala., to Fort Leonard Wood in southern Missouri.

On Thursday, Gibbs and an environmental group filed petitions with the Department of Natural Resources alleging that the Army failed to assess the "potential threat to health" posed by the fog used in its training.

Army officials said those concerns have no validity.

As for the oil-fog sprayed from jeep-bound canisters: "I've observed it, I've walked through it, and it has no effect at all," said Fort Leonard Wood environmental chief Scott Murrell.

The Coalition for the Environment also is appealing a state permit issued April 17, giving the Army the go-ahead to build and operate an incinerator that would burn chemically decontaminated materials. Environmentalists want the permit overturned until a public hearing is held.

Approval of both permits is vital to proceed with moving the Army's chemical school to Missouri. The federal Base Closure and Realignment Commission plans to make its final recommendations to President Clinton by July 1.

If the commission doesn't have the state permits approved by June 22, "they cannot consider the recommended move," said Fort Leonard Wood spokesman Brad Rose.

During a meeting Thursday with state environmental officials, Army officials stressed the need for quick action on their requests.

"This is essential for the defense of the country and it does need to be done," Murrell said.

St. Louis environmental lawyer Lewis Green presses his case to the Air Conservation Commission. AP

The base relocation would bring an additional 4,200 soldiers yearly to Fort Leonard Wood, plus 1,800 permanent jobs and 400 civilian jobs, Rose said. It also could pump up to $150 million in salaries and construction contracts into the state economy, he said.

But environmentalists and nearby residents fear the new mission could spew tons of contaminants.

Among the chemicals used in Army training is Sarin, the colorless vapor that recently killed 10 people and injured hundreds more on a Tokyo train.

Army officials said concerns about a similar disaster in Missouri are unwarranted.

Murrell said Sarin and other nerve gases only are produced in small quantities and are kept inside at all times. Furthermore, polluted materials are decontaminated before being incinerated, he said.

The petitions filed Thursday allege that the Army underestimated the incinerator's potential sulfur emissions, failed to identify some waste products to be burned and overlooked the oil-fog's potential effect on endangered species, such as the bald eagle and Indiana bat.

See FT. WOOD, page 8

☆Ft. Wood

From page one

"This is serious business. We're talking about nerve gases, biological agents and chemicals," environmental attorney Lewis Green said in a session with three members of the Missouri Air Conservation Commission. A formal hearing before the commission was canceled Thursday because four of its seven members were absent.

"We're not trying to stop the darn thing. We're trying to get information out to the public," Green said.

Commission chairman Harriet Beard said the panel will "take the concerns under advisement" and try to reach some decision by June.

Officials at the Department of Natural Resources, which grants the permits, said they already had done a thorough job of evaluating the permit applications.

"Some of the stuff they brought up we've already talked about with our staff. It's not an issue," said Roger Randolph, director of DNR's air pollution control program.

Commissioners and DNR employees plan to hear public comments about the oil-fog training on May 12 in Waynesville, near Fort Leonard Wood. A hearing about the state waiver is set for May 25 in Kansas City.

In response to the petitions, an appeal hearing also must be held on the incinerator permit. No hearing date has been set.

BEFORE THE MISSOURI
AIR CONSERVATION COMMISSION

IN THE MATTER OF:	)
	)
WILLIAM A. GIBBS, REBECCA I. GIBBS, AND THE COALITION FOR THE ENVIRONMENT	)
	)
Petitioners,	)
vs.	)
	)
MISSOURI DEPARTMENT OF NATURAL RESOURCES,	)
	)
Respondent.	)

PETITION AND REQUEST FOR A HEARING IN OPPOSITION TO MDNR REQUEST FOR VARIANCE FOR FOG TRAINING EXERCISES AT FORT LEONARD WOOD

Come Now Petitioners, by and through their attorneys, and pursuant to § 643.110(4) RSMo., appeal the decision of the Missouri Department of Natural Resources ("MDNR") to issue a variance to the U.S. Army Engineering Center and Fort Leonard Wood for visible emissions resulting from the operation of an obscurant (smoke) training school at the facility and request the Commission to conduct an evidentiary hearing on the proposed variance. In support thereof, Petitioners state as follows:

1. Petitioners William A. Gibbs and Rebecca I. Gibbs (hereinafter "the Gibbs") are residents of Newberg, Missouri and own real property near Fort Leonard Wood. The Gibbs and their minor children use for recreational purposes the streams and national forest areas adjacent to Fort Leonard Wood and live and recreate within the potential impact area of the proposed smoke training exercises. The Gibbs from time to time visit Fort Leonard Wood and are present on the premises. They will be

adversely affected by the emissions resulting from the smoke training exercises.

2. The Missouri Coalition for the Environment ("Coalition") is a corporation organized and existing under the not-for-profit corporation laws, qualified to do business in Missouri, with its principal office located in St. Louis County, Missouri. The Coalition exists for the purpose of protecting and preserving environmental values in Missouri, and has for years been actively concerned with protecting air quality throughout the state. The Coalition has thousands of members, many of whom seek recreation in floating the Big Piney River, which flows through Fort Leonard Wood, and the Gasconade River, which flows within approximately three miles of the fort, and also in hiking and camping in the Mark Twain National Forest, which surrounds the fort on three sides. The Coalition's interest in protecting and enhancing the quality of the ambient air throughout the state will be adversely affected if the variance is granted. The Coalition members will be adversely affected by the emissions from the fogging operations which are the subject of this variance request, if the variance is granted. The Coalition files this petition on its own behalf and on behalf of its members.

3. The Gibbs and the Coalition are "aggrieved persons" within the meaning of § 643.110(4) in that each Petitioner has a specific and legally cognizable interest in the subject matter of this administrative action, and the decision of the Commission will have a direct and substantial impact on that interest.

4. As part of the base closure and realignment process, the Army has proposed to relocate from its present location in Fort McClellan, Alabama to Fort Leonard Wood, Missouri the United States Army's nuclear, biological and radiological training programs including the Chemical Decontamination Facility and Thermal Treatment Unit ("CDTF") and smoke obscurant training. Approval of such a move by the BRAC Commission is contingent upon the Army obtaining all necessary environmental permits from MDNR.

5. As part of the chemical, biological and radiological training program, the Army intends to conduct fog oil obscurant training exercises. Accordingly, on or about March 1, 1995, the Army submitted to MDNR for approval an Application For Authority to Construct a Static Or Mobil Fog Oil Generators (hereinafter the "Fog Oil Permit") at Fort Leonard Wood.

6. A public hearing on the Fog Oil Permit is scheduled for May 12, 1995 in Waynesville, Missouri.

7. Missouri regulations require that new sources, such as those proposed in the Fog Oil Permit, limit opacity to 20%. The opacity requirements provide regulators with the ability to make instantaneous determinations as to regulatory compliance. See 10 CSR 10-3.080

8. MDNR estimates that opacity from the smoke training will routinely be 100% and has recommended that the Army be granted a variance from Missouri's opacity requirements.

9. Pursuant to 643.110(1) RSMo., the Commission may grant a variance of a rule or requirement only where, upon presentation of adequate proof, the requirement would result in either the

taking of property or the closing and elimination of any business, occupation or activity. Neither of these conditions exist here.

10. Moreover, MDNR's variance request is tantamount to a modification of the State Implementation Plan ("SIP"). Revisions to Missouri's SIP, in addition to EPA approval, require proper notice and the opportunity for a public hearing. MDNR has failed to provide adequate notice and the opportunity for meaningful public comment.

11. Pursuant to 643.110(1) RSMo., no variance may be granted where the effect of that variance would permit the continuance of a health hazard.

12. In its evaluation of the variance request, it appears that MDNR failed to adequately assess the potential threat to health posed by the fog training to nearby residents, Army personnel, or visitors to Fort Leonard Wood and recreational users of the national forest, rivers and streams surrounding Ford Leonard Wood.

13. MDNR apparently failed to address the impact of the proposed blanket variance respecting emissions which extend beyond the immediate training area.

14. Lastly, MDNR failed to assess the impact of such a variance and the fog training exercises on endangered species such as the Indiana bat, the gray bat and the American Bald Eagle, which live and feed in the Fort Leonard Wood area.

WHEREFORE, for all the foregoing reasons, Petitioners respectfully request that the Commission conduct an evidentiary

hearing pursuant to § 643.100 RSMo. concerning the Army's request for a variance from Missouri's opacity requirements and for such other and further relief as the Commission deems just and proper.

GREEN, HENNINGS & HENRY

By: _____

LEWIS C. GREEN
314 North Broadway, Suite 1830
St. Louis Missouri 63102-2097
(314) 231-4181

Attorneys for Petitioners

BEFORE THE MISSOURI
AIR CONSERVATION COMMISSION

IN THE MATTER OF:

WILLIAM A. GIBBS, REBECCA I. GIBBS, AND THE COALITION FOR THE FOR THE ENVIRONMENT

Petitioners,

vs.

MISSOURI DEPARTMENT OF NATURAL RESOURCES,

Respondent.

PETITION AND REQUEST FOR A HEARING IN OPPOSITION TO MDNR REQUEST FOR VARIANCE FOR FOG TRAINING EXERCISES AT FORT LEONARD WOOD

Comes now Wendy Pelton, by her attorney, pursuant to § 643.110.4, RSMo., and joins in the petition and request for hearing of William A. Gibbs, et al., on the application of the U.S. Army and Fort Leonard Wood for variance for visible emissions resulting from operation of a smoke training school. Petitioner Pelton resides and owns property a short distance from Fort Leonard Wood. From time to time she drives through the fort. She frequently floats the Big Piney River a few miles from the fort. She will be adversely affected by the emissions resulting from the smoke training exercises. She incorporates by reference the petition of William A. Gibbs, et al.

GREEN, JENNINGS & HENRY

by _____
Lewis C. Green
314 N. Broadway, Suite 1830
St. Louis, Mo. 63102
{314} 231-4181

BEFORE THE AIR CONSERVATION COMMISSION
STATE OF MISSOURI

IN THE MATTER OF:	)	
	)	
THE COALITION FOR THE ENVIRONMENT AND WENDY PELTON,	)	
	)	
Petitioners,	)	
	)	
v.	)	No. 95-12-V
	)	
	)	
MISSOURI DEPARTMENT OF NATURAL RESOURCES,	)	
	)	
Respondent,	)	
	)	
THE UNITED STATES ARMY ENGINEERING CENTER AND FORT LEONARD WOOD,	)	
	)	
Applicant for Variance.	)	

FINDINGS OF FACT AND CONCLUSIONS OF LAW

Introduction

The Commission conducted a hearing on this matter at its regularly scheduled meeting on Thursday, May 25, 1995, at the Allis Plaza Marriott, Kansas City, Missouri. Presiding over the hearing was Harriet Beard, Chairman. Other Commissioners participating were Michael Foresman, William Clark, Andrew Farmer and David Crane. The hearing continued on Friday, May 26, 1995, at the same location, and the following Commissioners were in attendance: Harriet Beard, Johnny Ray Conklin and Andrew Farmer. Lewis C. Green, of the law firm Green, Hennings & Henry, St. Louis, represented the petitioners. Deborah Neff, Assistant Attorney General, represented the Missouri Department of Natural Resources

("DNR"). Lt. Col. Uldric L. Fiore, Staff Judge Advocate, represented the applicant for the variance.

Following the hearing of live testimony, the parties submitted designated portions of deposition transcripts and exhibits and replies to such designations by June 1, 1995, and these items have been considered as part of the record. A transcript of the proceedings and the exhibits admitted into evidence have been reviewed by any member of the Commission who has participated in the rendering of a decision in this matter, but was not present for any part of the hearing. The Commission conducted a phone conference, which was closed pursuant to § 610.021(1), RSMo 1994, to discuss and vote upon these findings of fact, conclusions of law and order on June 6, 1995. Counsel was directed to immediately send copies of this decision to the parties of record.

Findings of Fact

1. The United States Army Engineering Center and Fort Leonard Wood ("Applicant"), at the request of the DNR, filed an application for a variance to operate a static and mobile fog oil smoke training facility for the purposes of training personnel in the operation and tactical use of obscurants during simulated battle conditions, beyond the limitations prescribed by Regulation 10 CSR 10-3.080, Restriction of Emission of Visible Air Contaminants for the Outstate Missouri Area. The process involves the use of oil, described in the application as SGF-2 motor oil; injecting it into generators, which heat the substance to 800-1200 degrees F, causing the substance to vaporize. As the heated oil is released into the atmosphere it condenses as particulate matter that remains suspended and refracts light, creating a smoke obscurant. The process can be operated to control opacity to 20%, as the rule would require,

but the Applicant seeks a variance to reach 100% opacity for the training to be effective. The throughput limitations set forth in a draft Prevention of Significant Deterioration (PSD) permit currently under review by the DNR is 65,000 gallons per year. The draft permit requires a limitation of fog oil emissions of 3700 pounds per hour. Applying a conversion factor of 70%, this rate corresponds to PM_{10} emissions of 2600 pound per hour.

2. The Missouri Department of Natural Resources ("DNR") was prepared to recommend that this Commission approve the request for the variance, at its regular meeting on April 27, 1995, in Jefferson City, Missouri, and the matter was included on the agenda for that meeting. The DNR was not aware of any opposition to the variance request. The Commission could not take up the matter at that time for lack of a quorum. The Commissioners in attendance, however, invited comments from representatives of the Applicant, DNR and the public to become acquainted with the request.

3. During the meeting on April 27, 1995, the Commissioners present were informed by Lewis Green, attorney, that a Petition and Request For A Hearing In Opposition To MDNR Request For Variance For Fog Training Exercises At Fort Leonard Wood had been filed on behalf of William A. Gibbs, Rebecca I. Gibbs and the Coalition for the Environment. The Commissioners heard comments from Mr. Green, Roger Pryor, chief executive for the Coalition, and Robert Schreiber, environmental consultant for the Coalition, concerning the petition. The Commissioners were informed that the Base Realignment and Closing Commission ("BRAC"), which was considering a proposal to relocate the static and mobile fog oil smoke training facility from Fort McClellan in Alabama to Fort Leonard Wood, has

required Fort Leonard Wood to obtain all required permits and authorizations, such as the variance at issue here, no later than June 22, 1995.

4. The Missouri Coalition for the Environment ("Coalition") is a corporation organized and existing under the not-for-profit corporation laws, qualified to do business in Missouri, with its principal office located in St. Louis County. The Coalition exists for the purpose of protecting and preserving environmental values in Missouri, and has for years been actively concerned with protecting air quality throughout the state. In this matter the Coalition asserts that it has thousands of members, many of whom seek recreation in floating the Big Piney River, which flows through Fort Leonard Wood, and the Gasconade River, which flows within approximately three miles of the fort, and also in hiking and camping in the Mark Twain National Forest, which surrounds the fort on three sides. The Coalition asserts that its interest in protecting and enhancing the quality of the ambient air throughout the state will be adversely affected if the variance requested by the Applicant is granted, and that Coalition members will be adversely affected as well. A member of the Coalition who resides near Fort Leonard Wood and frequently uses facilities on the premises testified in this matter.

5. On April 27, 1995, Wendy Pelton joined the request for a hearing on the variance filed by the petitioners. Ms. Pelton asserts that she resides and owns property a short distance from Fort Leonard Wood; that she from time to time drives through the fort; that she frequently floats the Big Piney River a few miles from the fort; and that she will be adversely affected by emissions from the training facility at issue in this variance request. Ms. Pelton also testified in this matter.

6. In view of the requirement of Sec. 643.110, RSMo 1994, that this matter be determined by the Commission after a hearing, and in view of the urgency of the deadline imposed by the BRAC, the Chairman decided that the hearing on the variance request should be scheduled for the next regular meeting of the Commission, May 25, 1995, before one or several Commissioners as she may appoint pursuant to the authority granted her by Sec. 643.100, RSMo 1994. By letter prepared on May 3, 1995, and sent by certified mail, return receipt requested, by Timothy P. Duggan, Assistant Attorney General and counsel to the Commission, the parties were so advised.

7. On May 3, 1995, the petitioners filed a Motion For Continuance, To Consolidate, To Appoint A Hearing Officer And Set Hearing, And To Shorten Time And Enter A Discovery Schedule. On May 8, 1995, five Commissioners participated in a phone conference with attorneys for the parties to consider these motions, which were denied by Chairman Beard, with concurrence of the other Commissioners.

8. On or about May 17, 1995, William A. Gibbs and Rebecca I. Gibbs voluntarily dismissed their petition for a hearing on the variance application, without prejudice.

9. The proposed smoke training is a lawful activity of the United States Army. Such training is necessary to protect the lives of soldiers on the battlefield in modern warfare, in that it prepares soldiers to create smoke to obscure friendly troop movements from an enemy.

10. The method for creating the smoke is similar to the method expressly allowed by 10 CSR 10-3.080(5)(E)6 for purposes of training air pollution control inspectors. The rule also expressly exempts fires used solely for the purpose of training firemen {subsection (5)(E)5}.

11. The opacity limitation for a new installation is 20%, pursuant to in 10 CSR 10-3.080(4). In general the opacity limitation is not considered by DNR to be a health-based standard, but relates to aesthetics, in that it protects a visible skyline or landscape. The Applicant proposes to generate smoke at 100% opacity for the specific purpose of training soldiers in concealing friendly troop movements from an enemy under battle conditions, which is an activity that cannot be conducted in compliance with this rule.

12. Otherwise the DNR considers an apparent violation of the opacity rule to be an indicator of a problem with air pollution control equipment. If an inspector observes smoke with an opacity greater than the prescribed limitation for a given facility, the inspector will issue a notice of excess emissions, which may be upgraded to notice of violation, unless the opacity limitation was exceeded because of equipment failure or other problem beyond the control of the operator. In order for the training proposed by the Applicant to be effective, the Applicant must achieve an opacity level of 100%, effectively eliminating opacity as a tool for DNR to determine problems with air pollution control equipment.

13. For some types of equipment and operations opacity can be an indicator of increased levels of emissions. In this matter, however, the witnesses for the DNR testified that emissions calculations will be determined from the throughput for the generators, not opacity, for purposes of the PSD permit application, which is not yet before this Commission. For purposes of this variance request, the Commission finds that opacity will not be relied upon as an indicator of the level of emissions and that control of the level of emissions will be based upon the allowed amount of throughput and other controls that may be established by a PSD permit. The Commission also finds that DNR will not rely upon opacity as an indicator

of the quality or health effects of substances emitted into the air for purposes of the smoke obscurant training.

14. Health concerns associated with the composition of the smoke will be addressed through a Prevention of Significant Deterioration (PSD) permit, if it is issued by the DNR. Accordingly, the granting of the variance from rule 10 CSR 10-3.080, standing alone, will not result in the continuance of a health hazard. If the permit is not issued for health related reasons, the smoke training cannot occur and the variance will be moot.

15. With appropriate conditions, the order of variance can assure that violation of the permit or any health-based laws and regulations, or any laws pertaining to nuisance will cause the variance to be null and void.

16. The applicant is willing to comply with environmental regulations, and recognizes the authority of the DNR to take enforcement actions to prevent the smoke training exercises in the interest of protecting the environment and the public health and welfare.

17. It is the policy of the Applicant to restrict public access to military training exercises, including the smoke obscurant training proposed in this matter, in the interest of public health and safety.

18. If a variance is not granted from the 20% opacity limitation required by 10 CSR 10-3.080, the smoke training exercises will be effectively eliminated without sufficient corresponding benefit or advantage to the people.

Conclusions of Law

I. Jurisdiction

The Commission has jurisdiction over this appeal pursuant to § 643.110, RSMo 1994. The Commission is required to cause a hearing to be set and a record of the evidence to be prepared pursuant to § 643.120, RSMo 1994. A decision of this Commission must be approved in writing by at least four members, each of whom must have either attended the hearing or reviewed all exhibits and read the entire transcript of the proceeding, pursuant to § 643.100, RSMo 1994. All final orders or determinations of this Commission shall be subject to judicial review pursuant to the provisions of §§ 643.130 and 536.100 to 536.140, RSMo 1994.

II. Standing of Petitioners

Objections to the standing of petitioners was waived by the DNR and Applicant during the hearing. In any event, Wendy Pelton and the Coalition assert that they will be aggrieved by the granting of the variance for the reasons set forth in paragraphs 4 and 5 of the Findings of Fact, above. These reasons, which the Commission finds are credible, are sufficient to give the petitioners standing, according to *Citizens for Rural Preservation v. Robinett*, 648 S.W.2d 117, 133-134 (Mo. App. 1978).

III. Burden of Proof and Legal Issues

Section 643.110.4 provides that in any hearing on a variance request the burden of proof shall be on the person applying for the variance. The Commission finds and concludes that the Applicant has sustained its burden of proof.

Section 643.110.1 provides that the Commission may grant individual variances beyond the limitations prescribed in chapter 643 whenever it is found, upon presentation of adequate proof, that compliance with any provision of this chapter or any rule, requirement or order of the commission or director of the Department of Natural Resources will result in a taking of property without just compensation or in the closing and elimination of any lawful business, occupation or activity, without sufficient corresponding benefit or advantage to the people; except that no variance shall be granted where the effect of the variance will permit the continuance of a health hazard; and except, also, that any variance so granted shall not be so construed as to relieve the person who receives the variance from any liability imposed by other law for the commission or maintenance of a nuisance.

In determining under what conditions and to what extent a variance may be granted, the Commission shall exercise a wide discretion in weighing the advantages and disadvantages to the applicant and to those affected by air contaminants emitted by the applicant. § 643.110.2. Variances shall be granted for such period of time and under such terms and conditions as shall be specified by the Commission in its order. The variance may be extended by affirmative action of the Commission. § 643.110.3.

Petitioners argue that § 643.110, in general, allows variances only for existing facilities that require more time to come into compliance with a standard established by law or regulation, and that the Commission lacks the authority to grant a variance to a proposed facility or operation. The Commission does not read the statute so narrowly, however.

§ 643.110.2 allows the Commission wide discretion to determine under what conditions and to what extent a variance may be granted, to weigh the equities involved and

the advantages and disadvantages to the Applicant and to those affected by air contaminants emitted by the Applicant. 10 CSR 10-3.080(4) specifically applies to new installations, and in this case a variance is necessary for the installation to exist at all. It would not make sense economically to require Applicant to create and operate the training program in order to be allowed to seek a variance. If the facility existed already, all other considerations would be the same.

Furthermore, § 643.110.1 expressly provides that the Commission may grant a variance beyond the limitations prescribed in chapter 643, where compliance will result in the elimination of any lawful business, occupation or activity without sufficient corresponding benefit or advantage to the people; except that no granting of the variance shall be granted if it will permit the continuance of a health hazard. The fog oil training is a lawful activity of the U.S. Army, but requiring the training to comply with the 20% opacity limitation of 10 CSR 80-3.010 will clearly defeat the purpose of the training, thereby eliminating it. There was no evidence presented that eliminating this activity will result in a corresponding benefit or advantage to the people. Nor was there evidence to indicate that granting the variance will result in the continuation of a health hazard.

The legal issue before the Commission is whether there is a health impact created by allowing the smoke used in the training to be at 100% opacity. This does not concern the constituents in the smoke itself, either in terms of the toxicity, size, or other hazardous characteristics, particularly in terms of respiratory effects of the smoke upon persons exposed to it; such issues are being studied by the DNR in the context of the PSD permit review for the obscurant training. The PSD permit, if issued, will be subject to an appeal to this

Commission for a contested case hearing and determination of the propriety of such permit. Because the training cannot occur until such a permit is issued, and because the variance would be rendered moot in the event that the permit is denied, the granting of the variance in this order will not result in the continuance of a health hazard. This decision should in no way be construed as a determination of any matter that may come before this Commission in the context of an appeal from a PSD permit issued by the DNR for the smoke obscurant training. Throughout these proceedings the Commission has made it clear that such issues are not ripe for consideration at this time.

The Commission finds and concludes, within its sound discretion after weighing the equities involved, that the variance from 10 CSR 10-3.080 standing alone, with the terms and conditions recommended by the DNR and incorporated herein, will not result in the continuance of a health hazard, nor relieve the Applicant from any liability imposed by other law for commission or maintenance of a nuisance.

Order

Under the authority of § 643.110, RSMo 1994, and subject to the terms and conditions set out below, this Commission grants a variance to the United States Army Engineer Center and Fort Leonard Wood to operate certain equipment and/or process, which will discharge into the ambient air such air contaminants of a shade or density, or of an opacity as to obscure an observer's view, beyond the limits prescribed in 10 CSR 10-3.080, Restriction of Emission of Visible Air Contaminants, to operate a static and mobile fog oil smoke training facility for the purposes of training personnel in the operation and tactical use of obscurants during simulated battle conditions at their Fort Leonard Wood facility.

Terms and Conditions

i. All dates, terms, design specifications and operating conditions specified in the application submitted by the United States Army Engineer Center and Fort Leonard Wood shall govern the mode of operation of the static and mobile fog oil training at the Fort Leonard Wood facility, except that where the dates specified herein are inconsistent with the dates specified in the application, the dates herein shall govern. No alteration of the proposed operation may be made without the approval of the Director, Department of Natural Resources.

ii. At all times during the operation of the static and mobile fog oil training, the United States Army Engineer Center and Fort Leonard Wood shall comply with the permit(s) (if any) that may be issued by the Department of Natural Resources pursuant to Chapter 643, RSMo, and the rules and regulations promulgated pursuant thereto, for the static and mobile fog oil training at the Fort Leonard Wood facility.

iii. At all times during the operation of the static and mobile fog oil training, the United States Army Engineer Center and Fort Leonard Wood shall comply with Missouri State Rule 10 CSR

10-6.170, Restriction of Particulate Matter to the Ambient Air Beyond the Premises of Origin.

iv. The United States Army Engineer Center and Fort Leonard Wood shall furnish the Air Pollution Control Program with a schedule of training to be conducted at the beginning of each calendar quarter.

v. This variance shall be in effect for one year from the date of startup testing, at which time the United States Army Engineering Center and Fort Leonard Wood may apply for an extension of one year.

APPROVED and ENTERED on June 6, 1995. Separate forms have been signed and will be filed by the members of the Commission to indicate their individual decisions. The individual votes are recorded as follows:

Harriet Beard, concurs
Chairman

Michael Foresman, concurs
Commissioner

Johnny Ray Conklin, not participating
Commissioner

William Clark, concurs
Commissioner

David Crane, concurs
Commissioner

Andrew Farmer, concurs
Commissioner

OZARKS / MISSOURI

Petition filed against Fort Wood chemical permit

The Associated Press

ST. LOUIS — An environmental group filed a petition Friday to overturn a state permit that would allow chemical-weapons training at Fort Leonard Wood.

The Missouri Coalition for the Environment filed the petition in St. Louis Circuit Court, two days after the Department of Natural Resources approved a permit that allows the Army to spray a white, oil-based fog into the air on the southern Missouri base as part of its training.

The state permit was required by a federal panel before it would consider recommending to President Clinton that the Army's chemical and military police schools be moved to Fort Wood from Fort McClellan in Alabama.

Lewis Green, attorney for the coalition, said the group's goal is to force the state to obey its own laws.

"The environmental laws of Missouri should be upheld and observed and not subverted and trashed as they are being done by the Department of Natural Resources," Green said.

"In the end, if that keeps this chemical thing out of Missouri, so be it. But if it does come to the state, it needs to follow the laws of the state," he said.

The petition alleges that pollutants in the fog violate a state regulation limits the opacity of emissions.

Critics contend the fog could slip off the sprawling base, causing harm to plants and animals in the adjoining Mark Twain National Forest and several small communities.

Base officials downplayed Friday's petition.

"We're not overly concerned about the various appeals we anticipate from environmental groups related to the issuance of the permits," said Lt. Col. Jeff Davis, public affairs officer at Fort Leonard Wood.

The fort has met all its requirements concerning what facilities were needed and how training should be conducted, Davis said.

"The fact is we did what we were asked to do, and we can do this without harming the environment. If somebody wants to take it to court, then we will deal with it," he said.

The group also has filed an administrative appeal on a separate state incinerator permit, and opposes moving the chemical school to Fort Wood.

If the Alabama operations were moved to Missouri, they would bring an extra 15,000 soldiers to Fort Wood for 13-week training courses.

The Army also would shift 1,800 permanent Army jobs, 400 civilian jobs and nearly $150 million in annual salaries and construction contracts from Alabama to Missouri.

The federal Base Realignment and Closure Commission required the incinerator and fog permits and a third state license on wastewater discharges before considering recommending the move.

Hearings on the proposed move are scheduled Monday and Tuesday in Washington.

IN THE CIRCUIT COURT OF THE CITY OF ST. LOUIS
STATE OF MISSOURI

MISSOURI COALITION FOR THE ENVIRONMENT, a corporation, and WENDY PELTON, Plaintiffs,	)	
vs.	)	No. 954-1339
HARRIET BEARD, Chair, and DAVID CRANE, MICHAEL FORESMAN, WILLIAM CLARK, and ANDREW FARMER, members of the Air Conservation Commission of Missouri; AIR CONSERVATION COMMISSION; and U.S. ARMY ENGINEERING CENTER and FORT LEONARD WOOD, Defendants.	)	Div. 3

PETITION FOR JUDICIAL REVIEW

Come now plaintiffs and for their Petition for Judicial Review state the following:

1. This action is brought in this Court pursuant to § 536.110 RSMo. to review and set aside a decision of the Air Conservation Commission of Missouri (the "Commission") dated June 6, 1995. Pursuant to § 643.130 RSMo., all final orders of the Commission are subject to judicial review as set forth in § 536.100 to § 536.140 RSMo.

2. Plaintiff Missouri Coalition for the Environment (hereinafter the "Coalition") is a corporation organized and existing under the not-for-profit corporation laws, qualified to do business in Missouri, with its principal office located in St. Louis County, Missouri. The Coalition exists for the purpose of protecting and preserving environmental values in Missouri, and has for years been actively concerned with protecting air quality throughout

the state. The Coalition has thousands of members, many of whom seek recreation in floating the Big Piney River, which flows through Fort Leonard Wood, and the Gasconade River, which flows within approximately three miles of the fort, and also in hiking and camping in the Mark Twain National Forest, which surrounds the fort on three sides. The Coalition's interest in protecting and enhancing the quality of the ambient air throughout the state will be adversely affected by the variance. The Coalition members will be adversely affected by the emissions from the fogging operations which are the subject of this variance. The Coalition files this appeal on its own behalf and on behalf of its members. At the hearing of this matter before the Commission, Missouri Department of Natural Resources ("MDNR") and the U.S. Engineering Center at Fort Leonard Wood ("Army") stipulated to the Coalition's standing to bring this action. Defendant Commission independently found that the Coalition has standing.

3. Plaintiff Wendy Pelton ("Pelton") is a resident of Pulaski County, Missouri and resides and owns property a short distance from Fort Leonard Wood, Missouri. From time to time she drives through the Fort and frequently floats the Big Piney River a few miles from the Fort. At the hearing in this matter before the Commission, defendants MDNR and the Army stipulated to Pelton's standing to bring this action. The Commission independently found that Pelton has standing.

4. Pursuant to § 536.110.3 RSMo., venue properly lies in the Missouri Circuit Court, Twenty-Second Judicial Circuit (St. Louis City) because the registered office of the Coalition is located in the City of St. Louis.

5. As part of the base closure and realignment process, the Army has proposed, as a possibility, relocating its Nuclear, Biological and Radiological training programs, including the chemical decontamination facility and thermal treatment unit ("CDTF") and smoke obscurant training, from its present location in Fort McClellan, Alabama to Fort Leonard Wood, Missouri.

6. On about March 1, 1995, the Army submitted to MDNR for approval an

application for authority to construct a static or mobile fog oil generator (hereinafter the "fog oil permit application") at Fort Leonard Wood.

7. On April 11, 1995, MDNR issued its proposed draft fog oil permit.

8. Missouri regulations, 10 CSR 10-3.080.4 require that new sources, such as those proposed in the fog oil permit application, limit opacity of omissions to 20%.

9. On April 17, 1995, and prior to receiving the Army's variance request, MDNR recommended to the Commission that the variance be issued.

10. On April 24, 1995, MDNR received from the Army a request for a variance from Missouri's opacity regulation for visible emissions resulting from the operation of an obscurant (smoke) training school at Fort Leonard Wood, incorporating by reference the fog oil permit application to describe the process.

11. Pursuant to 643.110.1 RSMo., a variance from a rule or requirement may be granted only where, upon presentation of adequate proof, enforcement of the rule or requirement will result in either: (1) the taking of property, or (2) the closing and elimination of any business, occupation or activity. In addition, no variance may be granted where the effect of that variance would permit the continuance of a health hazard. The burden of proof is on the applicant.

12. The smoke obscurant training process involves the use of oil injected into generators which heat the substance until vaporization occurs. As the heated oil is released into the atmosphere, it condenses as particulate matter that remains suspended and refracts light, creating a smoke obscurant. The substance used to create this obscurant is known as fog oil. Opacity from the smoke training will routinely be 100%.

13. The fog oil identified in the Army's permit application contains hazardous air pollutants.

14. On April 27, 1995, plaintiffs filed their Petition and Request for a Hearing in Opposition to the Army's Request for a Variance for Fog Training Exercises at Fort Leonard Wood.

15. On May 25 and 26, 1995, an evidentiary hearing was held on the proposed variance. Accordingly, this is a "contested case" as defined in § 536.010.2 RSMo.

16. At the hearing no substantial evidence was presented to support a finding that compliance with Missouri's opacity regulation would result in the closing and elimination of any lawful business, occupation or activity.

17. MDNR and the Army do not contend, and the Commission did not find, that compliance with Missouri's opacity regulations would result in a taking of property without just compensation.

18. At the hearing, no substantial evidence was presented to show that the variance would not permit a health hazard.

19. All evidence offered by plaintiffs to show a health hazard was excluded, on the ground that toxicity and other health effects would be studied in the proceedings respecting the fog oil permit application.

20. On June 2, 1995, defendant Beard, as Hearing Officer, signed an order denying admission of numerous exhibits and offers of proof offered by plaintiffs.

21. On June 6, 1995, the Commission entered its findings of fact, conclusions of law and final order granting the variance request, a copy of which is attached as Exhibit 1, incorporating by reference unspecified conditions which might be attached to a fog oil permit, if it should be issued.

22. Plaintiffs are aggrieved by the purported decision of the Commission. Pelton and Coalition members will be adversely affected by the Commission's granting of the variance.

23. The aforesaid action of the Commission was unlawful and void for numerous reasons, including, without limitation, the following:

(a) The action was in excess of the authority or jurisdiction of the Commission, in various respects including but not limited to the following:

i. The Commission lacks authority to grant a variance for a new

business, occupation or activity, in that § 643.110.1 authorizes a variance only where a regulation or order will result in the closing and elimination of an existing activity;

ii. The Commission lacks authority to grant a variance for an activity which is not yet known and defined, and the variance is so vague and indefinite that it violates the due process clauses of the Fourteenth Amendment of the United States Constitution and Article I, § 10 of the Missouri Constitution in that the decision purports to grant a variance for an activity which will be defined and limited, if at all, eventually, by the conditions of a fog oil permit which had not yet been finally granted, and the conditions of which were in the process of being revised;

iii. The Commission made no finding that compliance with the opacity regulation will result in the taking of property without just compensation or in the closing and elimination of any lawful business, occupation or activity, without sufficient corresponding benefit or advantage to the people, nor was there any evidence to support such a finding if it had been made, and the defendants conceded that these facts could not be proved;

iv. Although the Commission correctly concluded that the granting of the variance will not result in the continuance of a health hazard, in that the fog oil training does not now take place in Missouri, and is not now resulting in a health hazard in Missouri, the Commission made no finding that commencement of the activity in Missouri would not result in a health hazard, but has instead excluded altogether consideration of health hazards which would result from the fog oil training activity, explicitly depending upon a supposed later ruling by the Commission in a separate proceeding in an assumed appeal of an assumed fog oil permit to

assure that somehow no health hazard would result, and the Commission consistently excluded all testimony and evidence relating to the toxic constituents of the fog oil.

(b) The granting and upholding of the variance is unsupported by competent and substantial evidence upon the whole record. Specifically, but without limitation, the requisite findings are totally unsupported by any competent evidence:

i. There is no substantial evidence to support a finding (which was not even made) that enforcement of the opacity regulation would result in the closing of any lawful business, occupation or activity, and all undisputed evidence demonstrated that enforcement of the regulation would not have that result, and both the applicant and MDNR conceded that no such closing could be proved;

ii. There was no substantial evidence to support the Commission's finding that enforcement of the opacity limitation would eliminate the fog oil training, and the undisputed evidence was that enforcement of the regulation would not eliminate any such training in Missouri, because there is none, and would not eliminate any such training in Alabama, or any other place, and the applicant conceded that no such elimination could be proved;

iii. There was no substantial evidence that the granting of the variance would not result in a health hazard, and the undisputed evidence demonstrated that MDNR had deferred to the permit proceedings, as did the Commission, consideration of possible health hazards, and the Commission excluded all evidence of the toxic constituents of the fog oil, and all evidence that the granting of the variance would result in particulate concentrations in the ambient air, open to the public, in excess of national health standards.

(c) The granting and upholding of the variance were made upon unlawful

procedure and without a fair trial. Specifically, but without limitation:

i. In rushing the variance hearing to trial 31 days after the application for variance was filed, and 29 days after plaintiffs learned of the filing, the Commission denied plaintiffs a reasonable opportunity for discovery, in violation of § 643.100.2, and a reasonable opportunity for trial preparation;

ii. Both before and during the trial, the Commission (or its Hearing Officer, if any) followed unlawful and disorderly and erratic and inconsistent procedures, to the extent that plaintiffs were denied a fair trial. Specifically, without limitation, plaintiffs were told from time to time that a Hearing Officer (namely, the chair of the Commission) had been designated pursuant to § 643.100.3(2), and would conduct the hearing, and from time to time during the hearing plaintiffs were told that she was indeed the Hearing Officer, and from time to time she made rulings on the admissibility of evidence, and on motions. At other times other members of the Commission interrupted willy-nilly, and unilaterally ruled upon motions and on admissibility of evidence, sometimes taking conflicting positions with one another while the chair remained aloof. Time and again plaintiffs' counsel was compelled to request some sort of authoritative ruling, so that the hearing could proceed. The purported hearing was not only disorderly, but generally chaotic, and lacked the procedural safeguards and fairness guaranteed by the Missouri constitution and statutes. Although plaintiffs have again and again requested copies of orders, plaintiffs have never been able to obtain any copy of any order appointing a Hearing Officer, or setting the case for trial on May 25, when the hearing commenced. The Hearing Officer, if in fact she was ever appointed, failed to make recommended findings of fact as required by § 643.100.3(2). In its final ruling on June 6,

1995, the Commission and its Hearing Officer abandoned the claim that a Hearing Officer had been appointed, claiming instead that the Commission conducted the hearing.

iii. At the hearing the Hearing Officer, or the Commission, or individual members of the Commission acting unilaterally, consistently excluded competent, relevant, and material testimony offered by plaintiffs, and exhibits offered by plaintiffs, and deposition testimony constituting admissions against interest offered by plaintiffs, all clearly admissible under Missouri law and procedure, all relevant to the issue of whether there would be a closing and elimination of any lawful business, occupation or activity, without sufficient corresponding benefit or advantage to the people, or the issue whether the effect of the variance would permit a health hazard. Further, plaintiffs were prevented from cross-examining witnesses presented by the Army and MDNR concerning these issues, and were unlawfully precluded from making offers of proof.

iv. The totality of the pre-trial rulings, the trial rulings, and the chaotic procedure deprived plaintiffs of a fair trial.

v. In holding meetings and taking votes without agenda or minutes, in appointing a Hearing Officer and setting a hearing date without written orders, in failing to produce copies of such orders upon request, and in making various pre-trial rulings at an unlawful meeting, the Commission failed to comply with the requirements of the Sunshine Act, chapter 610, RSMo.

(d) The Commission decision was arbitrary and capricious, and constituted an abuse of discretion, for various reasons, including without limitation those enumerated above.

WHEREFORE, plaintiffs pray that this Court make and enter its Order:

1. Setting aside the ruling of the Commission of June 6, 1995, purporting to grant a variance;

2. Entering its declaratory judgment that:

A. The purported granting of the variance on June 6, 1995, is void;

B. The Air Conservation Commission lacks jurisdiction to grant a variance for a new activity, which is not yet taking place in Missouri;

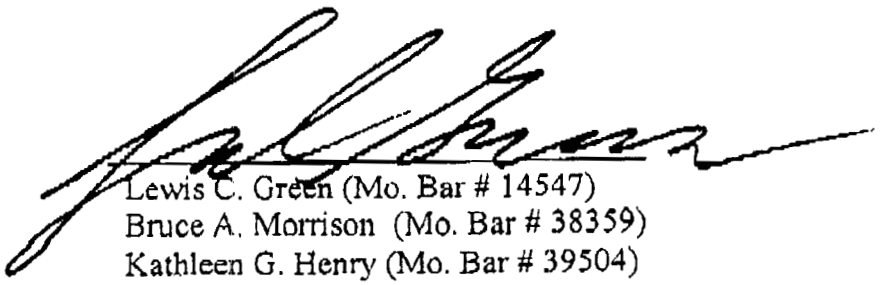
C. The Air Conservation Commission lacks jurisdiction to grant a variance without finding that enforcement of the applicable requirement will result in either (1) a taking of property without just compensation or (2) the closing and elimination of a lawful business, occupation or activity, without sufficient corresponding benefit or advantage to the people; and

D. The Air Conservation Commission lacks jurisdiction to grant a variance on the assumption that health hazards will be regulated or prohibited in some other proceeding, without considering the possibility that the activity for which the variance is granted will permit the existence of a health hazard, and without making a finding that it will not permit the existence of a health hazard.

3. Preliminarily, pursuant to § 536.120, RSMo, staying the variance pending the final disposition of this proceeding;

4. Awarding plaintiffs their reasonable fees and expenses pursuant to § 536.087, RSMo; and

5. Awarding plaintiffs such other and further relief as the Court may deem meet and proper.



Lewis C. Green (Mo. Bar # 14547)
Bruce A. Morrison (Mo. Bar # 38359)
Kathleen G. Henry (Mo. Bar # 39504)
Green, Hennings & Henry
314 North Broadway, Suite 1830
St. Louis, Missouri 63102
(314) 231-4181, Facsimile 231-4184
Attorneys for Plaintiffs

IN THE CIRCUIT COURT OF THE CITY OF ST. LOUIS
STATE OF MISSOURI

MISSOURI COALITION FOR THE ENVIRONMENT, a corporation, and WENDY PELTON,

Plaintiffs,

vs.

HARRIET BEARD, Chair, and DAVID CRANE, MICHAEL FORESMAN, WILLIAM CLARK, and ANDREW FARMER, members of the Air Conservation Commission of Missouri; AIR CONSERVATION COMMISSION; and U.S. ARMY ENGINEERING CENTER and FORT LEONARD WOOD,

Defendants.

No. 95-4-1339

Div. 3

PLAINTIFFS' MOTION FOR STAY

Come now plaintiffs, pursuant to § 536.120, RSMo, and move that this court stay the order of the Commission of June 6, 1995, purporting to grant a variance (copy attached to petition as exhibit 1) pending the final disposition of this proceeding for review.

In support of this motion plaintiffs state:

1. The Commission's order purported to grant a variance for a proposed new activity which is not taking place in Missouri at this time (see deposition of Col. Johnson, pp. 110-11, Appendix A attached).

2. Pursuant to § 643.110(1), RSMo, the Commission has no jurisdiction or authority to grant a variance for a new activity, but can only grant a variance for an

existing activity, where enforcement of an applicable regulation or requirement will result in a taking of property without just compensation or will result in the closing and elimination of any lawful business, occupation or activity, without sufficient corresponding benefit or advantage to the people.

3. Enforcement of the opacity regulation which is the subject of the purported variance cannot possibly result in the closing and elimination of any lawful activity, either in Missouri (where the activity does not exist) or anywhere else.

4. The Army has conceded on the record that any suggestion that denial of the variance could result in the closing and elimination of a lawful activity is speculative, and no such closing and elimination can be proved (see Appendix A and deposition of Rory McCarthy, pp. 80-81, Appendix B attached).

5. Defendant MDNR has conceded that denial of the variance would not result in the closing of any lawful business, occupation or activity (see deposition testimony of David Shorr, pp. 42-44, Appendix C attached).

6. The order purporting to grant the variance is clearly beyond the jurisdiction of the Commission, and plaintiffs have thus made a strong showing that they are likely to prevail on the merits of this appeal.

7. The variance purports to authorize an activity which requires a permit under the applicable Missouri air pollution regulations. Defendant MDNR has conceded, through its counsel, that the proposed permit cannot lawfully be issued unless the variance is valid. See deposition testimony of Roger Randolph, pp. 70-71, Appendix D attached.

8. A permit for the obscurant training activity, issued by the Director of MDNR on June 7, 1995, is being contested in an administrative appeal. If the requested stay should not be issued, the permit appeal will proceed through extensive discovery, and the draining of time, energy, and money from plaintiffs, as well as the Army and MDNR. All of this expenditure of time, energy, and money on the part of all parties, including MDNR, will be unnecessary if plaintiffs prevail in this suit on final hearing.

9. If the stay is not issued, plaintiffs will be irreparably injured by being

compelled to proceed through the demanding and expensive litigation of the permit appeal.

10. Issuance of the stay will not harm the other parties interested in the proceedings. Nobody has a legitimate interest in pursuing the demanding litigation over the issuance of a permit if in fact plaintiffs should prevail in this suit on final hearing, and the variance is set aside. Delaying the permit appeal proceedings will not injure MDNR in any way. Nor will delaying the permit appeal proceedings injure the Army in any way. The Army does not plan to commence obscurant training at Fort Leonard Wood until approximately 1997.

11. Granting a stay will advance the public interest. The staff of MDNR has work to do in the public interest. To tie up the staff with extensive depositions, and attendance at an extensive hearing on the permit application, will not only squander public funds but also divert the staff from upholding and enforcing Missouri's air pollution regulations, thereby adversely affecting the public interest.

WHEREFORE, the premises considered, plaintiffs pray that this Court make and enter its order staying the purported variance pending the final disposition of this case.

Lewis C. Green (Mo. Bar # 14547)
Bruce A. Morrison (Mo. Bar # 38359)
Kathleen G. Henry (Mo. Bar # 39504)
Green, Hennings & Henry
314 North Broadway, Suite 1830
St. Louis, Missouri 63102
(314) 231-4181, Facsimile 231-4184
Attorneys for Plaintiffs

IN THE CIRCUIT COURT OF THE CITY OF ST. LOUIS
STATE OF MISSOURI

MISSOURI COALITION FOR THE ENVIRONMENT,
a corporation,
and
WENDY PELTON,

Plaintiffs,

vs.

HARRIET BEARD, Chair,
and
DAVID CRANE, MICHAEL FORESMAN,
WILLIAM CLARK, and ANDREW FARMER,
members of the Air Conservation
Commission of Missouri;
AIR CONSERVATION COMMISSION;
and
U.S. ARMY ENGINEERING CENTER and
FORT LEONARD WOOD,

Defendants.

No. 9574339

Div. 3

PLAINTIFFS' MEMORANDUM IN SUPPORT OF MOTION FOR STAY

I. THE FACTS

The Air Conservation Commission has issued a variance for a proposed new activity (fog oil obscurant training), an activity which is not now taking place in Missouri. See Appendix A attached to Plaintiffs' Motion for Stay.

The variance was purportedly issued pursuant to § 643.110, RSMo, which provides in relevant part:

> The commission may grant individual variances beyond the limitations prescribed in this chapter whenever it is found, upon presentation of adequate proof, that compliance with any provision of this chapter or any rule, requirement or order of the commission or director will result in a taking of property

> without just compensation or in the closing and elimination of any lawful business, occupation or activity, without sufficient corresponding benefit or advantage to the people. . .

There is no contention on the part of anybody that enforcement of the opacity regulation with respect to the fog oil obscurant training will result in a taking of property without just compensation, nor has the commission made any such finding.

There is no contention on the part of anybody that enforcement of the opacity regulation will result in the **closing** of any lawful business, occupation or activity, nor did the commission make any such finding. See Appendix C.

The applicant for the variance has conceded that any question of possible **elimination** of any lawful business, occupation or activity, either in Missouri or Alabama or elsewhere is "speculative," and therefore cannot be proved. See Appendix A and B.

There is no way that an existing activity in Missouri could be eliminated by enforcing the opacity regulation in this instance, because the obscurant training is not taking place in Missouri. Nevertheless the Commission found that "requiring the training to comply with the 20% opacity limitation of 10 CSR 80-3.010 will clearly defeat the purpose of the training, thereby eliminating it" (Exhibit 1 attached to petition, page 10).

Prior to the filing of the variance application on April 24, 1995, the Army had, on March 1, 1995, filed an application for an air pollution permit for the proposed fog oil training. In processing that permit, MDNR recognized that the permit cannot issue unless the Army first obtains a variance from the opacity regulation[1]. See Appendix D.

Immediately after the variance was granted on June 6, the director of MDNR on June 7 granted a permit for the obscurant training. That permit is being appealed, and after discovery will be tried before the Commission or a Hearing Officer. As MDNR

---

[1] The regulations require that, before a permit can be issued, MDNR must find that the permitted source will be in compliance with all applicable regulations. MDNR, in this instance, has chosen to interpret this requirement as being satisfied by a variance. Plaintiffs disagree. A variance excuses compliance, it does not constitute compliance.

conceded, that permit cannot be upheld if the variance is invalid. Litigating the validity of the permit at full speed while the variance awaits a final ruling by this Court would require great expenditure of time, energy, money, and general resources by plaintiffs, by the Army, by MDNR, and by the Commission.

The proposed obscurant training is not scheduled to commence for approximately two years. No construction is required in preparation for that training. There is no evidence that the Army would be prejudiced in any way by a stay pending judicial review.

II. ARGUMENT

Section 536.120, RSMo, provides in part:

> Any court in which such proceedings for review may be pending may issue all necessary and appropriate process to stay or require the agency to stay the enforcement of its order . . . pending the final disposition of such proceedings for review. Such stay or other temporary relief by a reviewing court may be conditioned upon such terms as shall appear to the court to be proper. No such stay or temporary relief shall be granted by a reviewing court without notice, except in cases of threatened irreparable injury; and when in any case a stay or other temporary relief is granted without notice the court shall then make an order, of which due notice shall be given, setting the matter down for hearing as promptly as possible on the question whether such stay or other temporary relief shall be continued in effect. No such stay or other temporary relief shall be granted or continued unless the court is satisfied that the public interest will not be prejudiced thereby.

In short, a stay of the administrative decision is appropriate if the court "is satisfied that the public interest will not be prejudiced thereby." The statute does not even require a showing of irreparable injury (unless the stay is sought ex parte), although plaintiffs here will show irreparable injury anyway. Absent a showing of prejudice to the public interest, a stay should be granted. E.g., *Missouri Real Estate Commission v. McCormick*, 778

S.W.2d 303, 305 (Mo. App. 1989).

In this instance, a stay would not injure the public interest in any way. On the contrary, a stay would greatly advance the public interest. If no stay is granted, the parties must devote their full energies to litigating the permit proceedings. The MDNR staff will be tied up for approximately a week in depositions, and perhaps another week in trial. The Assistant Attorney General representing MDNR will be tied up for those periods, and also other periods preparing for trial. All of this time and effort on the part of these public officials, and the expenditure of public funds, will be wasted if the variance is held invalid, for MDNR has conceded that the permit cannot be granted without the variance. The MDNR staff should be devoting its time, effort, and resources to maintaining the purity of the air resources, not tilting at windmills. The Assistant Attorney General should also be doing something constructive in the public interest, not wasting time. In short, a stay will advance the public interest considerably.

Although irreparable injury need be shown only for an ex parte stay, § 536.120, RSMo, plaintiffs nevertheless can show irreparable injury here. If the stay is not granted, plaintiffs will have to devote massive amounts of time, energy, resources, and money to litigation of the permit proceedings. All of that will be irreparably wasted if the variance is held invalid, because the permit proceedings need not be litigated if the variance is invalid.

Although the statute makes the public interest the relevant criterion, not the interest of the parties, it may be noted that a stay here would not prejudice the defendants. On the contrary, it would benefit them, saving them time and expense, just as it would save plaintiffs time and expenses. The obscurant training operations are not scheduled to begin for approximately two years, and require no significant construction in advance. There is no evidence that a stay of this proceeding until it can be fully heard by this court will prejudice the Army in any way.

Although the Missouri statute does not require a showing of probable success on

the merits to support a stay, it is clear that there is a substantial probability of success. Section 643.110.1 authorizes a variance only if the applicant proves that compliance with the opacity regulation will result in (1) a taking of property or (2) the closing and elimination of any lawful business, occupation or activity. Nobody contends, and the Commission did not find, that there would be any taking of property. Nobody contends, and the Commission did not find, that there would be any closing of any lawful business, occupation or activity. Accordingly, even if the word "elimination" could be distorted as it has been distorted by the Commission, there is no way that the variance could be upheld.

The Commission's finding of "elimination" of a future activity cannot be supported by any evidence, and is flatly contradicted by the undisputed evidence. One cannot eliminate something that does not yet exist. Counsel for the Army vigorously objected to any inquiries about elimination of lawful activity, pointing out correctly that any such consideration is "speculative" and therefore cannot be proved. The undisputed evidence shows that the obscurant training is not being conducted in Missouri, and therefore it cannot be eliminated in Missouri.

Further, any action taken by Missouri will not eliminate that training in Alabama, or in some other state.

The statute plainly authorizes a variance only for a period of time in which an existing operation can be brought into compliance with a newly applicable regulation. That is consistent with the purpose of the Air Conservation Law as set forth in § 643.030, to maintain the purity of the air resources of the state. In allowing time for an existing operation to come into compliance with a new regulation, by granting a variance, the Commission does not authorize degradation of the air resources of the state, because the existing operation is already in existence. However, if the Commission were to be authorized to grant a variance for a new activity, the Commission would be permitting a new activity in Missouri which does not meet the requirements of the Missouri

regulations, and the Commission would therefore be authorizing the degradation of the air resources of the state. The statute was carefully, explicitly drafted to authorize a variance only for an existing activity, and not for a new activity.

This has been the administrative interpretation of the statute, if any such interpretation is needed, for the first 30 years of the existence of the statute, which was enacted in 1965. Between them, the various witnesses had personal recollection of the period from 1974 to the present. None of the present or former MDNR employees could recall that any variance had ever been granted for a new activity. See deposition of Steve Feeler, p. 29; testimony of Robert Schreiber, Tr. 320-23 (excerpts attached as Appendix E).

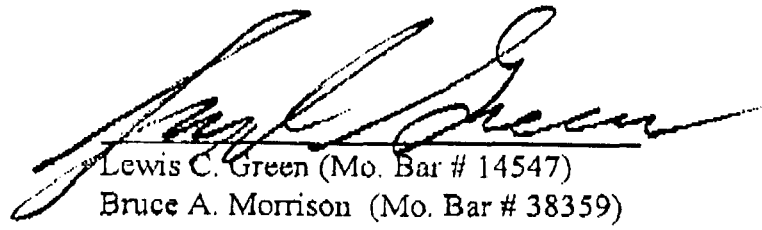
Clearly the governor wants the permit to be issued immediately, and therefore wants the variance to be granted, and he has made his desires known. MDNR and the Commission have responded, granting a variance directly in conflict with the statutory language, and in conflict with 30 years of administrative enforcement. Such a new administrative interpretation is entitled to no deference in court where, as in this instance, it is directly in conflict with the statutory language..

Without reviewing the numerous other errors in the agency proceedings, the language of the variance statute is sufficient to demonstrate a substantial probability of success on the merits. While that probability of success is not a prerequisite to the issuance of a stay, it is entitled to consideration by this Court in granting a stay.

CONCLUSION

Plaintiffs have shown a high probability of success on the merits and have shown that granting a stay will substantially advance the public interest, will avoid irreparable injury to plaintiffs, and will cause no substantial injury to any other party. Accordingly, the variance should be stayed pending final disposition of this proceeding.

Respectfully submitted,



Lewis C. Green (Mo. Bar # 14547)
Bruce A. Morrison (Mo. Bar # 38359)
Kathleen G. Henry (Mo. Bar # 39504)
Green, Hennings & Henry
314 North Broadway, Suite 1830
St. Louis, Missouri 63102
(314) 231-4181, Facsimile 231-4184
Attorneys for Plaintiffs

IN THE CIRCUIT COURT OF THE CITY OF ST. LOUIS
STATE OF MISSOURI

MISSOURI COALITION FOR THE ENVIRONMENT,
a corporation,
and
WENDY PELTON,

Plaintiffs,

vs.

HARRIET BEARD, Chair,
and
DAVID CRANE, MICHAEL FORESMAN,
WILLIAM CLARK, and ANDREW FARMER,
members of the Air Conservation
Commission of Missouri;

AIR CONSERVATION COMMISSION;
and
U.S. ARMY ENGINEERING CENTER and
FORT LEONARD WOOD,

Defendants.

No. 95H-1339

Div. 3

ORDER TO SHOW CAUSE

The Court having before it plaintiffs' motion for stay, it is hereby ORDERED that defendants show cause why the motion for stay should not be granted at 10 a.m. on the 16 day of June, 1995.

/s/
Circuit Judge

Dated: June 9, 1995

a:flw\causeprd.608

DEPARTMENT OF THE ARMY
UNITED STATES ARMY ENGINEER SCHOOL
FORT LEONARD WOOD, MISSOURI 65473-8900

REPLY TO
ATTENTION OF

March 2, 1995

Mr. Tim L. Stallman
Environmental Specialist - Geologist
Water Pollution Control Program
Division of Environmental Quality
Department of Natural Resources
P.O. Box 176
Jefferson City, Missouri 65102-0176

Dear Mr. Stallman

Please review the attached map of Fort Leonard Wood showing locations which have been considered as possible sites for large area smoke training. These areas were considered in 1993 for this type of training and, due to the recent Base Realignment and Closure Commission anouncement, could be used for this activity in the future. As you realize, modifications might be required in the non point source water discharge permit for the installation.

Sincerely,

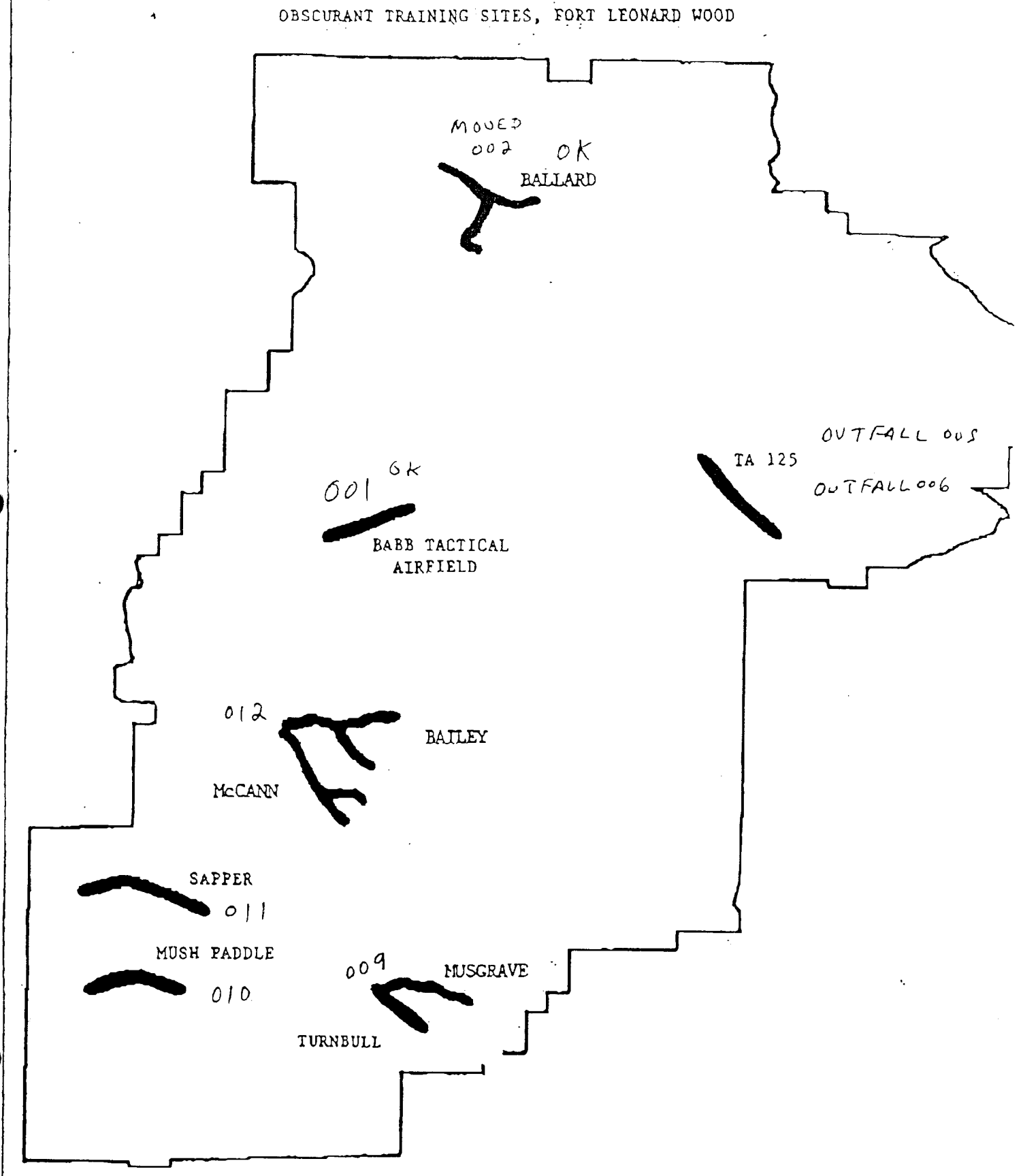
Scott Murrell
Scott Murrell
Chief/ Environment, Energy
and Natural Resources Div.
Directorate of Public Works

Enclosure

Center for Excellence

Produced by: US Army CERL, Champaign, Illinois
Software: GRASS

TITLE: (smoke.buff.11)
LOCATION: Fort Leonard Wood, Missouri



Ozark Chapter / Sierra Club

Ken Midkiff
Program Director
1005 Belleview Ct.
Columbia, MO 65203
(442-5570)

April 2, 1995

John Young, Director
Department of Environmental Quality
Missouri Department of Natural Resources
PO Box 180
Jefferson City, MO 65102-0180

COMMENTS ON THE FORT LEONARD WOOD NPDES PERMIT MO-0117251

The Ozark Chapter Sierra Club opposes the approval of the Fort Leonard Wood NPDES permit MO-011721 at this time. The primary reason for our opposition is the complete lack of any background scientific information which could serve as a basis for monitoring and compliance procedures.

The facility proposed for Fort Leonard Wood presently exists at Fort McClellan in Alabama, and thus is subject to Clean Water Act provisions in that state. Therefore, existing monitoring data should be readily available from the agency with primacy in the state of Alabama. This information should serve as the basis for the scientific analysis, as the hydrogeologic conditions at Fort McClellan are similar to those at Fort Leonard Wood. Both these bases are located in areas of karst topography and dissected low plateaus. The information from Fort McClellan should be included in the public file maintained for the NPDES permit application, and should be considered for a revised draft NPDES permit. Until such time as this information is included, the application must be considered incomplete, and we must oppose its issuance.

Once the NPDES draft permit has been revised, a public hearing should be conducted on the draft permit because of the widespread public interest and potential impacts on the land and streams in the area.

The revised draft permit should include a number of additional provisions including the following:

1) The NPDES permit must require both ground water and surface water monitoring.

2) The NPDES permit monitoring should be correlated with the use of the obscurants. Monitoring at a minimum must include grab samples 24 hours and 72 hours after the completion of each obscurant training exercise. Background grab samples should be collected on a monthly basis regardless of the timing of the obscurant training at each outfall.

3) Every outfall where obscurant training is conducted at any time should have additional monitoring requirements for heavy metals, particularly zinc and lead, which are present in trace amounts in petroleum products.

4) Every outfall where obscurant training is conducted at any time should have an additional monitoring requirement for Biochemical Oxygen Demand.

Sincerely,

Ken Midkiff

Ken Midkiff, Program Director

cc David Shorr, Director, MDNR
Brad Ketcher, Governor's Office

USA, Ft. Leonard Wood
MO-0117251, Pulaski Co.

STATE OF MISSOURI

Mel Carnahan, Governor • David A. Shorr, Director

DEPARTMENT OF NATURAL RESOURCES

DIVISION OF ENVIRONMENTAL QUALITY

P.O. Box 176 Jefferson City, MO 65102-0176

APR 11 1995

U.S. Army (USA)
Bldg. 2200 A
Ft. Leonard Wood, MO 65473

Dear Permittee:

Pursuant to the Federal Water Pollution Control act, under the authority granted to the state of Missouri and in compliance with the Missouri Clean Water Law, we have issued and are enclosing your State Operating Permit to Discharge from USA, Ft. Leonard Wood.

Please read your permit and attached Standard Conditions. They contain important information on monitoring requirements, effluent limitations, sampling frequencies and reporting requirements.

Monitoring reports required by the special conditions must be submitted on a periodic basis. Copies of the necessary report forms are enclosed and should be mailed to the regional office listed below. Please contact that office for additional forms.

This permit is both your Federal Discharge Permit and your new State Operating Permit and replaces all previous state operating permits for this facility. In all future correspondence regarding this facility, please refer to your State Operating Permit number and facility name as shown on page one of the permit.

If you have any questions concerning this permit, please do not hesitate to call this office or our Jefferson City Regional Office at 1908 Bubba Lane, P.O. Box 176, Jefferson City, MO 65102, (314) 751-2729.

Sincerely,

WATER POLLUTION CONTROL PROGRAM

Daniel R. Schuette
Chief of Permit Section

DRS:rb

Enclosure

c: EPA - Billing Branch

RECYCLED PAPER

STATE OF MISSOURI

DEPARTMENT OF NATURAL RESOURCES

MISSOURI CLEAN WATER COMMISSION

MISSOURI STATE OPERATING PERMIT

In compliance with the Missouri Clean Water Law, (Chapter 644 R.S. Mo. as amended, hereinafter, the Law), and the Federal Water Pollution Control Act (Public Law 92-500, 92nd Congress) as amended,

Permit No. MO-0117251

Owner: U. S. Army (USA)

Owner's Address: Bldg. 2200 A, Ft. Leonard Wood, MO 65473

Operating Authority: N/A

Operating Authority's Address: N/A

Facility Name: USA, Ft. Leonard Wood

Facility Address: Bldg. 2200 A, Ft. Leonard Wood, MO 65473

Legal Description: All or parts of: T33, 34, 35N, R10, 11, 12W, Pulaski County

Receiving Stream & Basin: Roubidoux Creek (Gasconade Basin) (10290203-35-02) (C)
Big Piney (Big Piney Basin) (10290202-01-00) (P)

is authorized to discharge from the facility described herein, in accordance with the effluent limitations and monitoring requirements as set forth herein:

FACILITY DESCRIPTION

Outfall #001 - #008 - - SIC #9711

Continued on Next Page

This permit authorizes only wastewater discharges under the Missouri Clean Water Law and the National Pollutant Discharge Elimination System; it does not apply to other regulated areas. This permit may be appealed in accordance with Section 644.051.6 of the Law.

February 17, 1995-April 4, 1995 (revised)
Effective Date

John A. Young
Director, Division of Environmental Quality

February 16, 2000
Expiration Date

Director of Staff, Clean Water Commission

MO 780-0041 (10-93)

Facility Descriptions (continued)

Outfall #001 - Smith Branch
Components:
Explosives detonation area FLW-4, 5, 6: SW, Sec. 31, T35N, R11W
Forney army airfield FLW-12: NW, Sec. 27, T35N, R11W
Forney army airfield FLW-13: SE, Sec. 28, T35N, R11W
Normandy training area FLW-15: Sec. 29 & 32, T35N, R11W
Smoke training
Outfall is SW ¼, Sec. 29, T35N, R11W
Smith Branch (Gasconade River Basin) (10290203-35-02)

Outfall #002
Components:
Area 007A 800-880 motorpool: NW, Sec. 22, T35N, R11W
Area 007B 900-900 motorpool: SW, Sec. 22, T35N, R11W
Area 007E 600-671 motorpool: SE, Sec. 15, T35N, R11W
Area 007F 700-771 motorpool: NW, Sec. 22, T35N, R11W
Smoke training
Outfall is Center Sec. 8, T35N, R11W
Pond Hollow, Ballard Hollow (Gasconade River Basin) (10290203-35-02)

Outfall #003
Components:
Transfer station FLW-16: SE, Sec. 15, T35N, R11W
Outfall is SE ¼, Sec. 11, T35N, R11W
Dry Creek (Big Piney River Basin) (10290202-01-00)

Outfall #004 - Unnamed Branch of Big Piney River
Components:
Defense reutilization and marketing office FLW-1: NW, Sec. 13, T35N< R11W
Bulk fuel storage FLW-2: NW, Sec. 13, T35N, R11W
Bulk fuel storage FLW-3: NW, Sec. 13, T35N, R11W
Outfall is SW ¼, Sec. 18, T35N, R11W
Unnamed branch #1 (Big Piney River Basin) (1029202-01-00)

Outfall #005 - Unnamed Branch of Big Piney River
Components:
102 ARCOM maintenance area FLW-7D: SE, Sec. 23, T35N, R11W
Smoke training
Outfall is NW ¼, Sec. 25, T35N, R11W
Unnamed branch #2 (Big Piney River Basin) (10290202-02-00)

(continued on next page)

C. Facility Description (continued)

Outfall #006
Components:
Asphalt training facility FLW-14: NE, Sec. 36, T35N, R11W
Smoke training
Outfall is at end of oil water separator discharge pipe, NW ¼, Sec. 31, T35N, R10W
Big Piney River (Big Piney River Basin) (10290202-01-00)

Outfall #007
Components:
Rock quarry FLW-17: N ½, Sec. 31, T35N, R10W
Outfall is at sediment pond outfall NW ¼, Sec. 31, T35N, R10W
Big Piney River (Big Piney River Basin) (10290203-01-00)

Outfall #008
Components:
Sanitary landfill FLW-8, 9, 10: NW, Sec. 5, T34N, R11W
Outfall is SE ¼, Sec. 32, T35N, R11W
Smith Branch (Gasconade River Basin) (10290203-35-02)

Outfall #009 - Musgrove and Turnbull Hollows
Outfall is SE ¼, Sec. 19, T34N, R11W
Musgrove Hollow (Gasconade River Basin) (10290203-35-02)

Outfall #010 - Mush Paddle Hollow
Outfall is SW ¼, Sec. 23, T34N, R11W
Mush Paddle Hollow (Gasconade River Basin) (10290203-35-02)

Outfall #011 - Sapper Hollow
Outfall is NW ¼, Sec. 23, T34N, R11W
Sapper Hollow (Gasconade River Basin) (10290203-35-02)

Outfall #012 - Bailey - McCann Hollow
Outfall is SW ¼, Sec. 1, T34N, R11W, near McCann Cemetery
Hurd Hollow (Gasconade River Basin) (10290203-35-02)

Outfalls #009, #010, #011, #012
Activities related to obscurant training, also called "smoke training". This involves the use of finely dispersed oil to created foglike conditions.

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

The permittee is authorized to discharge from outfall(s) with serial number(s) as specified in the application for this permit. The first effluent limitations shall become effective upon issuance and remain in effect until expiration of the permit. Such discharges shall be controlled, limited, and monitored by the permittee as specified below:

OUTFALL NUMBER AND EFFLUENT PARAMETER(S)	UNITS	FINAL EFFLUENT LIMITATIONS			MONITORING REQUIREMENTS	
		DAILY MAXIMUM	WEEKLY AVERAGE	MONTHLY AVERAGE	MEASUREMENT FREQUENCY	SAMPLE TYPE
Outfall #001 Smith Branch						
Flow	MGD	*		*	once/year	24 hr. estimate
Settleable Solids	mL/L/hr	2.5		1.5	once/year	grab
Oil & Grease	mg/L	15		10	once/year	grab
Total Petroleum Hydrocarbons	mg/L	20		15	once/year	grab
pH - Units	SU	**		**	once/year	grab
Nitrate	mg/L	10		10	once/year	grab
Ammonia and N	mg/L	5		5	once/year	grab
Lead, Total Recoverable	mg/L	0.020		0.020	once/year	grab
Iron, Total Recoverable	mg/L	1.0		1.0	once/year	grab
Zinc, Total Recoverable	mg/L	0.345		0.345	once/year	grab
Copper, Total Recoverable	mg/L	0.029		0.029	once/year	grab
MONITORING REPORTS SHALL BE SUBMITTED ANNUALLY. THE FIRST REPORT IS DUE October 28, 1995						
Color****		*		*	once/quarter***	visual
MONITORING REPORTS SHALL BE SUBMITTED QUARTERLY. THE FIRST REPORT IS DUE July 28, 1995						

MONITORING REPORTS SHALL BE SUBMITTED as outlined above ; THE FIRST REPORT IS DUE as outlined above
THERE SHALL BE NO DISCHARGE OF FLOATING SOLIDS OR VISIBLE FOAM IN OTHER THAN TRACE AMOUNTS.

B. STANDARD CONDITIONS

IN ADDITION TO SPECIFIED CONDITIONS STATED HEREIN, THIS PERMIT IS SUBJECT TO THE ATTACHED Part I STANDARD CONDITIONS DATED October 1, 19 80 , AND HEREBY INCORPORATED AS THOUGH FULLY SET FORTH HEREIN.

OUTFALL NUMBER AND EFFLUENT PARAMETER(S)	UNITS	FINAL EFFLUENT LIMITATIONS			MONITORING REQUIREMENTS	
		DAILY MAXIMUM	WEEKLY AVERAGE	MONTHLY AVERAGE	MEASUREMENT FREQUENCY	SAMPLE TYPE
Outfall #002 Pond Hollow. Ballard Hollow						
Outfall #004 Unnamed branch of Big Piney						
Outfall #005 Unnamed branch of Big Piney						
Flow	MGD	*		*	once/year	24 hr. estimate
Settleable Solids	mL/L/hr	2.5		1.5	once/year	grab
Oil & Grease	mg/L	15		10	once/year	grab
Total Petroleum Hydrocarbons	mg/L	20		15	once/year	grab
pH - Units	SU	**		**	once/year	grab
MONITORING REPORTS SHALL BE SUBMITTED ANNUALLY. THE FIRST REPORT IS DUE October 28, 1995						
Color****		*		*	once/quarter***	visual
Outfall #003						
Color****		*		*	once/quarter***	visual
MONITORING REPORTS SHALL BE SUBMITTED QUARTERLY. THE FIRST REPORT IS DUE July 28, 1995						

OUTFALL NUMBER AND EFFLUENT PARAMETER(S)	UNITS	FINAL EFFLUENT LIMITATIONS			MONITORING REQUIREMENTS	
		DAILY MAXIMUM	WEEKLY AVERAGE	MONTHLY AVERAGE	MEASUREMENT FREQUENCY	SAMPLE TYPE
Outfall #006 Asphalt plant at oil water separator discharge pipe						
Sampling Requirements - Discharge of storm water only.						
Flow	MGD	*		*	once/year	24 hr. estimate
pH - Units	SU	**		**	once/year	grab
Oil & Grease	mg/L	15		10	once/year	grab
Total Petroleum Hydrocarbons	mg/L	20		15	once/year	grab
Settleable Solids	mL/L/hr	1.5		1.0	once/year	grab
MONITORING REPORTS SHALL BE SUBMITTED ANNUALLY. THE FIRST REPORT IS DUE October 28, 1995						
Color****		*		*	once/quarter***	visual
MONITORING REPORTS SHALL BE SUBMITTED QUARTERLY. THE FIRST REPORT IS DUE July 28, 1995						
Discharges during dry weather (no storm water runoff is occurring) where the discharge may contain pollutants form the putting, placing, disposal, or dumping of residual concrete and washdown waters.						
Flow	MGD	*		*	once/year	24 hr. estimate
pH - Units	SU	**		**	once/year	grab
Total Suspended Solids	mg/L	70			once/year	grab
MONITORING REPORTS SHALL BE SUBMITTED ANNUALLY. THE FIRST REPORT IS DUE October 28, 1995						
Color****		*		*	once/quarter***	visual
MONITORING REPORTS SHALL BE SUBMITTED QUARTERLY. THE FIRST REPORT IS DUE July 28, 1995						

[redacted] OUTFALL NUMBER AND EFFLUENT PARAMETER(S)	UNITS	FINAL EFFLUENT LIMITATIONS			MONITORING REQUIREMENTS	
		DAILY MAXIMUM	WEEKLY AVERAGE	MONTHLY AVERAGE	MEASUREMENT FREQUENCY	SAMPLE TYPE
Outfall #007 Rock Quarry Dry weather flows						
Flow	MGD	*		*	once/year	24 hr. estimate
Total Suspended Solids	mg/L	30		15	once/year	grab
pH - Units	SU	**		**	once/year	grab
MONITORING REPORTS SHALL BE SUBMITTED ANNUALLY. THE FIRST REPORT IS DUE October 28, 1995						
Color		*		*	once/quarter***	visual
MONITORING REPORTS SHALL BE SUBMITTED QUARTERLY. THE FIRST REPORT IS DUE July 28, 1995						
[redacted] Storm Water Flows						
Flow	MGD	*		*	once/year	24 hr. estimate
Settleable Solids	mL/L/hr	1.0		0.5	once/year	grab
pH - Units	SU	**		**	once/year	grab
MONITORING REPORTS SHALL BE SUBMITTED ANNUALLY, THE FIRST REPORT IS DUE October 28, 1995						
Color****		*		*	once/quarter***	visual
MONITORING REPORTS SHALL BE SUBMITTED QUARTERLY. THE FIRST REPORT IS DUE July 28, 1995						
[redacted]						

OUTFALL NUMBER AND EFFLUENT PARAMETER(S)	UNITS	FINAL EFFLUENT LIMITATIONS			MONITORING REQUIREMENTS	
		DAILY MAXIMUM	WEEKLY AVERAGE	MONTHLY AVERAGE	MEASUREMENT FREQUENCY	SAMPLE TYPE
Outfall #008 Sanitary landfill (FLW-8, 9, & 10)						
Flow	MGD	*		*	once/quarter***	instantaneous estimate
Rainfall	inches	*		*	daily measurement	grab
BETX	mg/L	0.75		0.75	once/quarter***	grab
Biochemical Oxygen Demand$_5$	mg/L	60		45	once/quarter***	grab
Chemical Oxygen Demand	mg/L	120		90	once/quarter***	grab
Total Suspended Solids	mg/L	80		60	once/quarter***	grab
Settleable Solids	mL/L/hr	1.5		1.0	once/quarter***	grab
Total Dissolved Solids	mg/L	*		*	once/quarter***	grab
Conductivity (Specific Conductance)	umhos/cm	*		*	once/quarter***	grab
Chloride Plus Sulfates	mg/L	1000		1000	once/quarter***	grab
Iron, Total Recoverable	mg/L	*		*	once/quarter***	grab
pH - Units	SU	**		**	once/quarter***	grab
Color****		*		*	once/quarter***	visual

MONITORING REPORTS SHALL BE SUBMITTED QUARTERLY. THE FIRST REPORT IS DUE July 28, 1995

OUTFALL NUMBER AND EFFLUENT PARAMETER(S)	UNITS	FINAL EFFLUENT LIMITATIONS			MONITORING REQUIREMENTS	
		DAILY MAXIMUM	WEEKLY AVERAGE	MONTHLY AVERAGE	MEASUREMENT FREQUENCY	SAMPLE TYPE
Outfall #008 Sanitary landfill (continued)						
Calcium	mg/L	*		*	once/year	grab
Fluoride	mg/L	*		*	once/year	grab
Total Hardness	mg/L	*		*	once/year	grab
Barium, Total Recoverable	mg/L	*		*	once/year	grab
Boron, Total Recoverable	mg/L	*		*	once/year	grab
Cadmium, Total Recoverable	mg/L	*		*	once/year	grab
Chromium, Total Recoverable	mg/L	*		*	once/year	grab
Cobalt, Total Recoverable	mg/L	*		*	once/year	grab
Copper, Total Recoverable	mg/L	*		*	once/year	grab
Sodium, Total Recoverable	mg/L	*		*	once/year	grab
Ammonia as N	mg/L	5.0		5.0	once/year	grab
Nitrate and Nitrite as N	mg/L	*		*	once/year	grab
Phosphorus, Total Recoverable	mg/L	*		*	once/year	grab
Mercury, Total Recoverable	mg/L	*		*	once/year	grab
Arsenic, Total Recoverable	mg/L	*		*	once/year	grab
Lead, Total Recoverable	mg/L	*		*	once/year	grab
Selenium, Total Recoverable	mg/L	*		*	once/year	grab

(continued on next page)

OUTFALL NUMBER AND EFFLUENT PARAMETER(S)	UNITS	FINAL EFFLUENT LIMITATIONS			MONITORING REQUIREMENTS	
		DAILY MAXIMUM	WEEKLY AVERAGE	MONTHLY AVERAGE	MEASUREMENT FREQUENCY	SAMPLE TYPE
Outfall #008 Sanitary landfill (continued)						
Silver, Total Recoverable	mg/L	*		*	once/year	grab
Manganese, Total Recoverable	mg/L	*		*	once/year	grab
Magnesium, Total Recoverable	mg/L	*		*	once/year	grab
Zinc, Total Recoverable	mg/L	*		*	once/year	grab
Antimony, Total Recoverable	mg/L	*		*	once/year	grab
Beryllium, Total Recoverable	mg/L	*		*	once/year	grab
Nickel, Total [redacted]verable	mg/L	*		*	once/year	grab
Sulfate	mg/L	*		*	once/year	grab
Thallium, Total Recoverable	mg/L	*		*	once/year	grab
Total Organic Carbon	mg/L	*		*	once/year	grab
Vanadium, Total Recoverable	mg/L	*		*	once/year	grab
Oil and Grease	mg/L	15		10	once/year	grab
Total Petroleum Hydrocarbons	mg/L	20		15	once/year	grab

MONITORING REPORTS SHALL BE SUBMITTED ANNUALLY, THE FIRST REPORT IS DUE October 28, 1995

OUTFALL NUMBER AND EFFLUENT PARAMETER(S)	UNITS	FINAL EFFLUENT LIMITATIONS			MONITORING REQUIREMENTS	
		DAILY MAXIMUM	WEEKLY AVERAGE	MONTHLY AVERAGE	MEASUREMENT FREQUENCY	SAMPLE TYPE
Outfall #009 - Musgrove and Turnbull Hollows Area						
Outfall #010 - Mush Paddle Hollow Area						
Outfall #011 - Sapper Hollow Area						
Outfall #012 - Bailey McCann Hollow Area						
Flow	MGD	*		*	once/quarter***	24 hr. estimate
Total Petroleum Hydrocarbons	mg/L	20		15	once/quarter***	grab
Oil and Grease	mg/L	15		10	once/quarter***	grab
pH - Units	SU	**		**	once/quarter***	grab
Color****		*		*	once/quarter**	visual

MONITORING REPORTS SHALL BE SUBMITTED QUARTERLY. THE FIRST REPORT IS DUE July 28, 1995

* Monitoring requirement only.

** pH is measured in pH units and is not to be averaged. The pH is limited to the range of 6.0-9.0 pH units.

*** Once quarter in the months of March, June, September, and December.

**** Permittee shall observe outfall for presence of oil sheen or other unnatural colors. This requirement exists whether it has rained or not.

C. SPECIAL CONDITIONS

1. Report as no-discharge when a discharge does not occur during the report period.

2. Outfall =008 only. All design and operating specifications and all Waste Management Program approval conditions pertaining to water quality are hereby made a part of this permit and shall apply throughout the life of this permit without regard to other conditions, permits, occurrences, etc.

3. This permit may be modified, or alternatively revoked and reissued, to comply with any applicable effluent standard or limitation issued or approved under Sections 301(b)(2) (C), and (D), 304(b)(2) and 307(a)(2) of the Clean Water Act, if the effluent standard or limitation so issued or approved:

   a. Contains different conditions or is otherwise more stringent than any effluent limitation in the permit: or

   b. Controls any pollutant not limited in the permit.

   The permit as modified or reissued under this paragraph shall also contain any other requirements of the Act then applicable.

4. This permit may be reopened and modified or alternatively revoked and reissued, to incorporate new or modified effluent limitations or other conditions, if the result of a waste load allocation study, toxicity test, or other information indicates changes are necessary to assure compliance with Missouri's Water Quality Standards.

5. This permit does not allow the discharge of storm water that has contacted the open face of the landfill. This permit does not allow the discharge of untreated leachate. All leachate shall be handled in accordance with the Solid Waste Disposal Area Operating Permit, Report of Approval of Plans and Specifications (with conditions).

6. Changes in Discharges of Toxic Substances:

   The permittee shall notify the Director as soon as it knows or has reason to believe:

   a. That any activity has occurred or will occur which would result in the discharge of any toxic pollutant which is not limited in the permit, if that discharge will exceed the highest of the following "notification levels:"

      (1) One hundred micrograms per liter (100 ug/l);

      (2) Two hundred micrograms per liter (200 ug/l) for acrolein and acrylonitrile: five hundred micrograms per liter (500 ug/l) for 2,4 dinitrophenol and for 2-methyl-4, 6-dinitrophenol: and one milligram per liter (1 mg/l) for antimony;

      (3) Five (5) times the maximum concentration value reported for the pollutant in the permit application;

      (4) The level established in Part A of the permit by the Director.

   b. That they have begun or expect to begin to use or manufacture as an intermediate or final product or by-product any toxic pollutant which was not reported in the permit application.

C. SPECIAL CONDITIONS (continued)

7. All discharges shall comply with the Missouri Water Quality Standards, 10 CSR 20-7.031, Section (3)(C), which states (Waters shall be free from substance in sufficient amounts to cause unsightly color or turbidity...", and Section (4)(G), which states "Water contaminants shall not cause or contribute to turbidity or color that will cause substantial visible contact with the natural appearance of the stream...".

8. Outfall =008 only. All activities performed to control erosion on the landfill site (seeding, mulching, terracing, etc.) shall be described and submitted along with the second quarter and fourth quarter Discharge Monitoring Reports. If no erosion controls are undertaken, indicate so on the reports.

9. U.S. Army, Ft. Leonard Wood will protect the asphalt plant from the 100 year flood event by appropriate methods.

10. Outfall sampling and observation points must be clearly marked in the field.

11. This condition is in addition to regular monitoring. When smoke training actually begins, permittee shall sample monthly each outfall located in the vicinity of where the training has occurred. Sample shall be taken within 24 hours after 1.0 inch of rainfall has fallen. If a 1.0 rainfall does not occur in a given month, report " no 1.0 inch rainfall event." This sampling shall continue until permittee is notified by Department of Natural Resources Water Pollution Control Program that this monitoring can be discontinued. Sampling analyses shall be the same as for outfalls =009, =010, =011, and =012, with the addition of Lead and Zinc. Results should be submitted with regular quarterly monitoring reports.

    A rain gauge located at a place of the permittees choosing, shall be used to determine whether 1.0 inch of rain has fallen.

MISSOURI DEPARTMENT OF NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL QUALITY

NPDES MONITORING REPORT FOR NON-MUNICIPAL WASTEWATER DISCHARGES

INSTRUCTIONS:

1. Mail to the appropriate DNR regional office as noted in your permit.
2. Report must be signed by owner and by analyst. Report should be typed or neatly printed.
3. Part A of the permit specifies the parameters to be monitored, frequency of monitoring and frequency of reporting results. If quarterly reports are required, they are due on April 28, July 28, October 28, and January 28, each report covering the preceding 3-month period not including the reporting month. See the permit for reporting dates if other than quarterly.
4. Report results of all analyses, even if performed more frequently than required by Part A of the permit.
5. File a report even if discharge is intermittent and no discharge occurred during the monitoring period. Complete the identification section, write "ND" in the appropriate columns for the dates the facility was checked, and sign the report. NOTE: If a discharge occurs any time during the monitoring period, it must be reported.
6. Under "Sample Type" indicate whether sample analyzed was: (a) grab sample; (b) 24-hour composite sample; or (c) modified composite sample. NOTE: See permit for type of sample required for each parameter.
7. Under "Sample Type" for Flow indicate whether figures shown are based on (a) instantaneous measurements or (b) actual 24-hour measured flow. Figure recorded is to represent the total 24-hour flow for the date shown or a reasonable estimate.
8. Indicate whether samples were collected by owner or by personnel of the lab performing the analyses.

NOTE: This reporting form is a universal reporting form for non-municipal sewage treatment plants, industries, and other point-source discharges.

Industries and individuals who have their own report forms designed for their specific needs are encouraged to substitute their forms. A suitable substitute must meet the following specifications.

(a) Form must be 8½" x 11".
(b) Report must show all of the information indicated on this standard form.

FACILITY NAME	PERMIT NUMBER	COUNTY	OWNER	TYPE OF FACILITY
REQUIRED FREQUENCY OF MONITORING		THIS REPORT COVERS PERIOD ________, 19___ THROUGH ________, 19___		

DATES SAMPLED														SAMPLE TYPE (SEE NOTES 6 AND 7)			(RECORD, AS APPROPRIATE, SUCH INFORMATION AS METHOD OF PRESERVATION, METHODS OF SAMPLE COLLECTION, ABNORMAL AGE OF SAMPLE, EXPLANATION OF UNUSUAL RESULTS, ETC.)
TIME OF DAY SAMPLED																	
SAMPLES COLLECTED BY																	
DATES OF ANALYSES																	
PARAMETERS	PERMITTED FINAL LIMITS		RECORD ACTUAL RESULTS OF ANALYSIS — DO NOT AVERAGE													ANALYTICAL METHOD (BE SPECIFIC)	REMARKS AND COMMENTS
FLOW GPD																	
BOD mg/l																	
SUS. SOLIDS mg/l																	
pH UNITS																	
FECAL COLI. /100 ml.																	

ANALYSES PERFORMED BY	SIGNATURE OF ANALYST
REPORT APPROVED BY OWNER	DATE

STANDARD CONDITIONS FOR NPDES PERMITS
ISSUED BY
THE MISSOURI DEPARTMENT OF NATURAL RESOURCES
MISSOURI CLEAN WATER COMMISSION
Revised
October 1, 1980

PART I — GENERAL CONDITIONS
SECTION A — MONITORING AND REPORTING

1. **Representative Sampling**
   A. Samples and measurements taken as required herein shall be representative of the nature and volume, respectively, of the monitored discharge. All samples shall be taken at the outfall(s), and unless specified, before the effluent joins or is diluted by any other body of water or substance.
   B. Monitoring results shall be recorded and reported on forms provided by the Department, postmarked no later than the 28th day of the month following the completed reporting period. Signed copies of these, and all other reports required herein, shall be submitted to the respective Department Regional Office, the Regional Office address is indicated in the cover letter transmitting the permit.

2. **Schedule of Compliance**
   No later than fourteen (14) calendar days following each date identified in the "Schedule of Compliance", the permittee shall submit to the respective Department Regional Office as required therein, either a report of progress or, in the case of specific actions being required by identified dates, a written notice of compliance or noncompliance. In the latter case, the notice shall include the cause of noncompliance, any remedial actions taken, and the probability of meeting the next scheduled requirements, or if there are no more scheduled requirements, when such noncompliance will be corrected. The Regional Office address is indicated in the cover letter transmitting the permit.

3. **Definitions**
   Definitions as set forth in the Missouri Clean Water Law and Missouri Clean Water Commission Definition Regulation 10 CSR 20-2.010 shall apply to terms used herein.

4. **Test Procedures**
   Test procedures for the analysis of pollutants shall be in accordance with the Missouri Clean Water Commission Effluent Regulation 10 CSR 20-7.015.

5. **Recording of Results**
   A. For each measurement or sample taken pursuant to the requirements of this permit, the permittee shall record the following information:
      (i) The date, exact place, and time of sampling or measurements;
      (ii) The individual(s) who performed the sampling or measurements;
      (iii) The date(s) analyses were performed;
      (iv) The individual(s) who performed the analyses;
      (v) The analytical techniques or methods used; and
      (vi) The results of such analyses.
   B. The Federal Clean Water Act provides that any person who falsifies, tampers with, or knowingly renders inaccurate any monitoring device or method required to be maintained under this permit shall, upon conviction, be punished by a fine of not more than $10,000 per violation, or by imprisonment for not more than 6 months per violation, or by both.
   C. Calculations for all limitations which require averaging of measurements shall utilize an arithmetic mean unless otherwise specified by the Director in the permit.

6. **Additional Monitoring by Permittee**
   If the permittee monitors any pollutant at the location(s) designated herein more frequently than required by this permit, using approved analytical methods as specified above, the results of such monitoring shall be included in the calculation and reporting of the values required in the Monitoring Report Form. Such increased frequency shall also be indicated.

7. **Records Retention**
   The permittee shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this permit, and records of all data used to complete the application for this permit, for a period of at least 3 years from the date of the sample, measurement, report or application. This period may be extended by request of the Department at any time.

SECTION B — MANAGEMENT REQUIREMENTS

1. **Change in Discharge**
   A. All discharges authorized herein shall be consistent with the terms and conditions of this permit. The discharge of any pollutant not authorized by this permit or of any pollutant identified in this permit more frequently than or at a level in excess of that authorized shall constitute a violation of the permit.
   B. Any facility expansions, production increases, or process modifications which will result in new, different, or increased discharges of pollutants shall be reported by submission of a new NPDES application at least sixty (60) days before such changes, or, if they will not violate the effluent limitations specified in this permit, by notice to the Department at least thirty (30) days before such changes.

2. **Noncompliance Notification**
   A. If, for any reason, the permittee does not comply with or will be unable to comply with any daily maximum effluent limitation specified in this permit, the permittee shall provide the Department with the following information, in writing within five (5) days of becoming aware of such condition:
      (i) A description of the discharge and cause of noncompliance, and
      (ii) The period of noncompliance, including exact dates and times or, if not corrected, the anticipated time the noncompliance is expected to continue, and steps being taken to reduce, eliminate and prevent recurrence of the noncomplying discharge.
   B. Twenty-four hour reporting. The permittee shall report any noncompliance which may endanger health or the environment. Any information shall be provided orally within 24 hours from the time the permittee becomes aware of the circumstances. A written submission shall also be provided within 5 days of the time the permittee becomes aware of the circumstances. The Department may waive the written report on a case-by-case basis if the oral report has been received within 24 hours.

3. **Facilities Operation**
   Permittees shall operate and maintain facilities to comply with the Missouri Clean Water Law and applicable permit conditions. Operators or supervisors of operations at publicly owned or publicly regulated wastewater treatment facilities shall be certified in accordance with 10 CSR 20-9.020(2) and any other applicable state law or regulation. Operators of other wastewater treatment facilities, water contaminant source or point sources, shall, upon request by the department, demonstrate that wastewater treatment equipment and facilities are effectively operated and maintained by competent personnel.

4. **Adverse Impact**
   The permittee shall take all necessary steps to minimize any adverse impact to waters of the state resulting from noncompliance with any effluent limitations specified in this permit or set forth in the Missouri Clean Water Law and Regulations (hereinafter the Law and Regulations), including such accelerated or additional monitoring as necessary to determine the nature and impact of the noncomplying discharge.

5. **Bypassing**
   A. Any bypass or shut down of a wastewater treatment facility and tributary sewer system or any part of such a facility and sewer system that results in a violation of permit limits or conditions is prohibited except:
      (i) Where unavoidable to prevent loss of life, personal injury, or severe property damages; and
      (ii) Where unavoidable excessive storm drainage or runoff would catastrophically damage any facilities or processes necessary for compliance with the effluent limitations and conditions of this permit; (iii) Where maintenance is necessary to ensure efficient operation and alternative measures have been taken to maintain effluent quality during the period of maintenance.
   B. The permittee shall notify the department in writing of all bypasses or shut down that result in a violation of permit limits or conditions. This section does not excuse any person from any liability, unless such relief is otherwise provided by the statute.

6. **Removed Substances**
   Solids, sludges, filter backwash, or other pollutants removed in the course of treatment or control of wastewaters shall be disposed of in a manner such as to prevent any pollutants from entering waters of the state unless permitted by the Law, and a permanent record of the date and time, volume and methods of removal and disposal of such substances shall be maintained by the permittee.

7. **Power Failures**
   In order to maintain compliance with the effluent limitations and other provisions of this permit, the permittee shall either:
   A. in accordance with the "Schedule of Compliance", provide an alternative power source sufficient to operate the wastewater control facilities; or,
   B. if such alternative power source is not in existence, and no date for its implementation appears in the Compliance Schedule, halt or otherwise control production and all discharges upon the reduction, loss, or failure of the primary source of power to the wastewater control facilities.

8. **Right of Entry**
   For the purpose of inspecting, monitoring, or sampling the point source, water contaminant source, or wastewater treatment facility for compliance with the Clean Water Law and these regulations, authorized representatives of the department shall be allowed by the permittee, upon presentation of credentials and at reasonable times:
   A. to enter upon permittee's premises in which a point source, water contaminant source, or wastewater treatment facility is located or in which any records are required to be kept under terms and conditions of the permit;
   B. to have access to, or copy, any records required to be kept under terms and conditions of the permit;
   C. to inspect any monitoring equipment or method required in the permit;
   D. to inspect any collection, treatment, or discharge facility covered under the permit; and
   E. to sample any wastewater at any point in the collection system or treatment process.

9. **Permits Transferable**
   A. Subject to section (3) of 10 CSR 20-6.010 an operating permit may be transfered upon submission to the department of an application to transfer signed by a new owner. Until such time as the permit is officially transfered, the original permittee remains responsible for complying with the terms and conditions of the existing permit.
   B. The department, within thirty (30) days of receipt of the application shall notify the new permittee of its intent to revoke and reissue or transfer the permit.

10. **Availability of Reports**
    Except for data determined to be confidential under Section 308 of the Act, and the Law and Missouri Clean Water Commission Regulation for Public Participation, Hearings and Notice to Governmental Agencies 10 CSR 20-6.020, all reports prepared in accordance with the terms of this permit shall be available for public inspection at the offices of the Department. As required by statute, effluent data shall not be considered confidential. Knowingly making any false statement on any such report shall be subject to the imposition of criminal penalties as provided for in Section 204.076 of the Law.

11. **Permit Modification**
    A. Subject to compliance with statutory requirements of the Law and Regulations and applicable Court Order, this permit may be modified, suspended, or revoked in whole or in part during its term for cause including, but not limited to, the following:
       (i) violation of any terms or conditions of this permit or the Law;
       (ii) having obtained this permit by misrepresentation or failure to disclose fully all relevant facts;
       (iii) a change in any circumstances or conditions that requires either a temporary or permanent reduction or elimination of the authorized discharge, or
       (iv) any reason set forth in the Law and Regulations.
    B. The filing of a request by the permittee for a permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance, does not stay any permit condition.

12. **Permit Modification-Less Stringent Requirements**
    If any permit provisions are based on legal requirements which are lessened or removed, and should no other basis exist for such permit provisions, the permit shall be modified after notice and opportunity for a hearing.

13. **Civil and Criminal Liability**
    Except as authorized by statute and provided in permit conditions on "Bypassing" (Standard Condition B-5) and "Power Failures" (Standard Condition B-7) nothing in this permit shall be construed to relieve the permittee from civil or criminal penalties for noncompliance.

14. **Oil and Hazardous Substance Liability**
    Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties to which the permittee is or may be subject under Section 311 of the Act, and the Law and Regulations. Oil and hazardous materials discharges must be reported in compliance with the requirements of the Federal Clean Water Act.

15. **State Laws**
    Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties established pursuant to any applicable state statute or regulations.

16. **Property Rights**
    The issuance of this permit does not convey any property rights in either real or personal property, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of or violation of federal, state or local laws or regulations.

17. **Duty to reapply**
    If the permittee wishes to continue an activity regulated by this permit after the expiration date of this permit, the permittee must apply for a new permit 180 days prior to expiration of this permit.

18. **Toxic Pollutants**
    If a toxic effluent standard, prohibition, or schedule of compliance is establisned under section 307(a) of the Federal Clean Water Act for a toxic pollutant in the discharge of permittee's facility and such standard is more stringent than the limitations in the permit, then the more stringent standard, prohibition, or schedule shall be incorporated into the permit as one of its conditions, upon notice to he permittee.

19. **Signatory requirement**
    All reports, or information submitted to the Director shall be signed (See 40 CFR-122.6).

20. **Rights Not Affected**
    Nothing in this permit shall affect the permittee's right to appeal or seek a variance from applicable laws or regulations as allowed by law.

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

BEFORE THE MISSOURI
WATER CONSERVATION COMMISSION

IN THE MATTER OF:	)
	)
WILLIAM A. GIBBS, REBECCA I. GIBBS, WENDY PELTON, AND THE COALITION FOR THE ENVIRONMENT	)
	)
Petitioners,	)
vs.	)
	)
MISSOURI DEPARTMENT OF NATURAL RESOURCES,	)
	)
Respondent.	)

NOTICE OF APPEAL OF THE MISSOURI DEPARTMENT OF NATURAL RESOURCES' APPROVAL OF STATE OPERATING PERMIT TO DISCHARGE

Come Now Appellants, by and through their attorneys, and pursuant to Ch. 644.056(4) RSMo., appeal the decision of the Missouri Department of Natural Resources ("MDNR") to issue a Missouri State Operating Permit To Discharge (Permit Number MO-0117251) to the U.S. Army and Fort Leonard Wood. In support thereof, Appellants state as follows:

1. Appellants William A. Gibbs and Rebecca I. Gibbs (hereinafter "the Gibbs") are residents of Newberg, Missouri and own real property near Fort Leonard Wood. The Gibbs and their minor children use for recreational purposes the streams and national forest areas adjacent to Fort Leonard Wood. The Gibbs from time to time visit Fort Leonard Wood and are present on the premises. They will be adversely affected by the Army's proposed operations at Fort Leonard Wood including, without limitation, fog oil obscurant training, flame training, the Chemical Decontamination Treatment Facility and the decontamination training facility, all which will have the potential to degrade

the waters of the state.

2. Petitioner Wendy Pelton resides and owns property a short distance from Fort Leonard Wood. From time to time she drives through the Fort and she frequently floats the Big Piney River a few miles from the Fort. She will be adversely affected by the proposed fog oil obscurement training which has the potential to degrade the waters of the state.

3. The Missouri Coalition for the Environment ("Coalition") is a corporation organized and existing under the not-for-profit corporation laws, qualified to do business in Missouri, with its principal office located in St. Louis County, Missouri. The Coalition exists for the purpose of protecting and preserving environmental values in Missouri, and has for years been actively concerned with protecting water quality throughout the state. The Coalition has thousands of members, many of whom seek recreation by floating the Big Piney River, which flows through Fort Leonard Wood, and the Gasconade River, which flows within approximately three miles of the fort, and also in hiking and camping in the Mark Twain National Forest, which surrounds the fort on three sides. The Coalition's interest in protecting and enhancing the quality of the water throughout the state will be adversely affected if the permit is upheld. The Big Piney River and the Roubidoux Creek are classified as cold water sport fishing streams known for their trout fishing. The Coalition files this appeal on its own behalf and on behalf of its members.

4. The Gibbs, Ms. Pelton and the Coalition are persons with an interest which is or may be adversely affected within the

meaning of 10 CSR 20-6.020, in that each Appellant has a specific and legally cognizable interest in the subject matter of this administrative action, and the decision of the Commission will have a direct and substantial impact on that interest.

5. On January 24, 1994, the Army filed with MDNR its Application For Permit to Discharge Stormwater Discharges Associated with Industrial Activity at Fort Leonard Wood, Missouri.

6. In January 1995, MDNR, pursuant to the Federal Water Pollution Control Act and the Missouri Clean Water Law, issued to the Army a proposed State Operating Permit to Discharge.

7. On February 17, 1995, MDNR formally issued to the Army an Operating Permit. The permit will expire February 16, 2000.

8. On or about March 2, 1995, the Army submitted to MDNR a request for modification of the water discharge permit for Fort Leonard Wood. The Army requested a modification to the stormwater discharge permit due to the proposed smoke training. A copy of Fort Leonard Wood's modification is appended hereto as Exhibit A.

9. On April 4, 1995, MDNR issued a revised permit which included smoke training at several outfalls at Fort Leonard Wood and added additional discharge point (Outfalls 9-12). The revised permit failed to identify the type of obscurant used in the proposed smoke training.

10. Pursuant to 10 CSR 20-6.200(2)(C)1A, modifications and revisions to a permit to allow additional discharges must include a site plan containing a description of control measures and the

applicant must recertify that process waters are not being discharged. See 10 CSR 20-6.200(2)(C). In its modification request, the Army failed to provide a description of the required control measures and to recertify their application as required.

11. The Army, as part of its base relocation and realignment process, intends to relocate to Fort Leonard Wood the following training activities and operations: flame training, the Chemical Decontamination Treatment Facility, fog oil obscurant training and the decontamination activities training facility. The Army has failed to seek discharge permits for most of these proposed operations.

12. For example, upon information and belief, the operations conducted at the CDTF will result in the generation of substantial amounts of decontamination water outside of the training building. The Army has failed to include potential stormwater discharges associated with the CDTF in its Permit Application and in its Modification Request.

13. In approving the permit application, MDNR failed to impose monitoring requirements for heavy metals such as cadmium and lead for Outfall 002. Significant quantities of these metals were identified in the sampled discharge from the motor pool area which discharges into the Big Piney River.

14. In addition, the Army's Permit Application is defective in that the Army failed to conduct adequate sampling and properly complete the application and other requisite forms. In addition, the Army failed to cross reference other existing environmental permits so that the information could be properly verified.

Numerous other defects are contained in the Application, as will be developed during the hearing of this case.

15. Had the Fort Leonard Wood Permit Application been accurate, complete and truthful, as required by law, MDNR would have imposed other special conditions such as additional monitoring parameters not in the Permit as issued. Because the underlying Permit Application is inaccurate and incomplete, the Permit is invalid.

16. Each of the Appellants oppose MDNR's issuance of the Permit on grounds that they have an interest that may be adversely affected in that they use and recreate in the streams and rivers which flow through Fort Leonard Wood and degradation of water quality would impact Appellants.

17. In issuing the Permit, MDNR has failed to (1) properly evaluate the impact of the Army's present and proposed operations on receiving streams; and (2) determine that the Permit Application submitted by Fort Leonard Wood was defective, incomplete, and inaccurate.

18. Pursuant to 644.056, permits may be terminated or modified if the applicant fails to fully disclose all relevant facts or when required to protect the waters of the state.

WHEREFORE, for all the foregoing reasons, Petitioners respectfully request the Commission to:

(a) Grant a full evidentiary hearing as required by law, at which time Petitioners may present evidence regarding their appeal.

(b) Enter its Order that the Permit to Operate be denied; and

(c) For such other and further relief as the Commission deems just and proper.

GREEN, HENNINGS & HENRY

By: _____

LEWIS C. GREEN
314 North Broadway, Suite 1830
St. Louis Missouri 63102-2097
(314) 231-4181

Attorney for Petitioners

Attachment A

Please deliver to Mr Tim Stallman

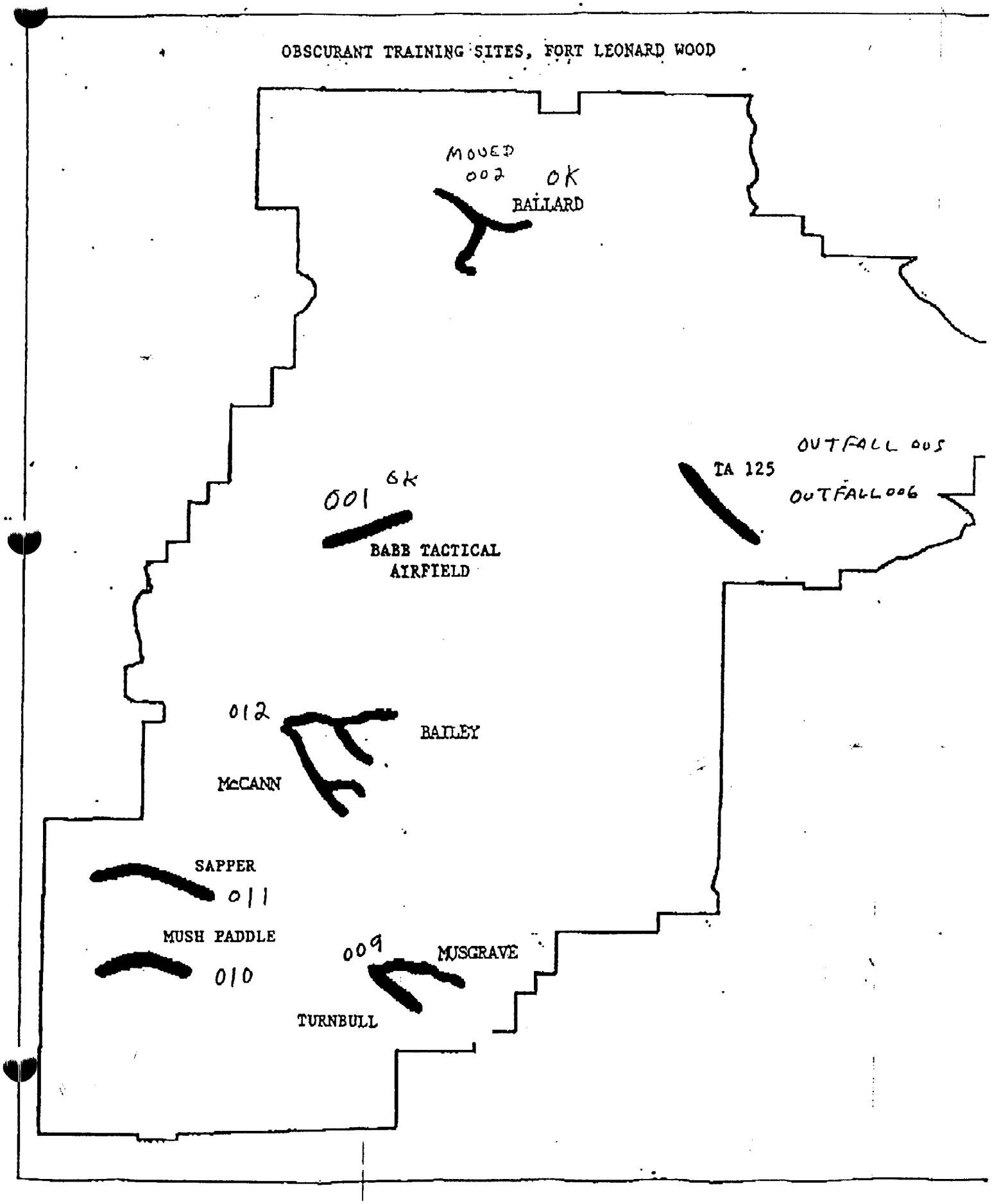
314-751-7625

From

Scott Murrell 314-596-0869

e: GRASS

TITLE: (smoke_buff.11)
LOCATION: Fort Leonard Wood, Missouri



DEPARTMENT OF THE ARMY
UNITED STATES ARMY ENGINEER SCHOOL
FORT LEONARD WOOD, MISSOURI 65473-8600

REPLY TO
ATTENTION OF

March 2, 1995

Mr. Tim L. Stallman
Environmental Specialist - Geologist
Water Pollution Control Program
Division of Environmental Quality
Department of Natural Resources
P.O. Box 176
Jefferson City, Missouri 65102-0176

Dear Mr. Stallman

Please review the attached map of Fort Leonard Wood showing locations which have been considered as possible sites for large area smoke training. These areas were considered in 1993 for this type of training and, due to the recent Base Realignment and Closure Commission anouncement, could be used for this activity in the future. As you realize, modifications might be required in the non point source water discharge permit for the installation.

Sincerely,

Scott Murrell
Scott Murrell
Chief/ Environment, Energy
and Natural Resources Div.
Directorate of Public Works

Enclosure

Center for Excellence

WHITE PAPER ON THE LIVE AGENT NUCLEAR DEFENSE TRAINING CONDUCTED BY THE U.S. ARMY CHEMICAL SCHOOL AT FORT McCLELLAN, ALABAMA, WHICH HAS BEEN RECOMMENDED FOR RELOCATION TO FORT LEONARD WOOD, MISSOURI

APRIL 18, 1995

WHITE PAPER ON THE
LIVE AGENT NUCLEAR DEFENSE TRAINING
CONDUCTED BY THE U.S. ARMY CHEMICAL SCHOOL
AT FORT McCLELLAN, ALABAMA,
WHICH HAS BEEN RECOMMENDED FOR RELOCATION
TO FORT LEONARD WOOD, MISSOURI

CHEMICAL SCHOOL'S NUCLEAR DEFENSE OPERATIONS

The United States Army Chemical School at Fort McClellan, Alabama, conducts training and research in nuclear, biological and chemical warfare defense. The nuclear defense portion of the Chemical School training is conducted by the Edwin R. Bradley Radiological Laboratories, consisting of ten laboratories performing separate functions. Eight of the laboratories provide initial entry and professional development live agent nuclear training for:

(a) Chemical Corps soldiers;

(b) Joint services training for Navy, Marines, Air Force, Defense Logistics Agency, On-Site Inspection Agency, and Defense Nuclear Agency personnel; and

(c) Radiation Protection and Safety Training for Department of Defense military and civilian personnel.

The Army nuclear defense facility's two other laboratories provide support for the radiological labs, such as preparing radioisotopes, and safety support for the Chemical Defense Training Facility ("CDTF"), which provides live agent nerve gas chemical training at Fort McClellan.

The Radiological Laboratories contain specially-designed safety features including: a high efficiency particulate air filter system, an interlock system for high nuclear radiation areas, special shielding barriers and double shielded walls, a liquid

waste containment system, a special monitoring and alarm system, a state-of-the-art health physics laboratory, and special use laboratories. The radiological facility covers approximately 11,500 square feet and was completed in 1988 at a cost of approximately $1 million. Decommissioning costs for this facility alone would be approximately $1 million, and replacement cost would be approximately $3 million.

NUCLEAR DEFENSE TRAINING

Fort McClellan is the only Army school capable of providing broad-scope, hands-on training and experience with live radioactive materials for radiation protection and nuclear defense. It is also the only Army facility licensed to conduct live agent radiological identification and decontamination training.

The largest training mission for the radiological labs involves nuclear and radiological training for the Army's Chemical Corps soldiers. During 1994, approximately 4,000 Chemical Corps soldiers, mainly privates and second lieutenants, received training on nuclear agent detection and area and personnel monitoring. Live nuclear agents, including Cobalt 60 and Calcium 45, are used during this training.

The facility also conducts Radiation Protection Officer/ Radiation Safety Officer training. This training includes Department of the Army and Department of Defense civilians, Defense Logistics Agency personnel, and military personnel from the Army, Navy, Air Force and Marine Corps. Each military installation, activity and division is required by federal law to have two

Radiation Protection Officers ("RPO's"). Because of the widespread use of radioactive elements in various military equipment, this requires over 300 military installations and units around the world to have trained RPO's. During 1994, approximately 400 RPO's were trained at Fort McClellan.

RPO's learn identification of particular radioactive isotopes in common use, protective measures, decontamination techniques, transportation requirements for nuclear materials, monitoring and surveying techniques, and various laws and regulations including Title 10 of the Code of Federal Regulations (Atomic Energy Act) and Army and Department of Defense regulations. As part of their training, a number of different types of live radiological agents are used in identification, decontamination, and monitoring exercises.

Fort McClellan's radiological laboratories also conduct radiological training for U. S. State Department personnel assigned to the U.S. On-Site Inspection Agency. This training focuses on protective measures needed to protect American and foreign personnel from radiation exposure during their activities related to nuclear arms treaty compliance and verification inspections.

SUPPORT FOR THE NERVE GAS TRAINING FACILITY

The Chemical School radiological labs also support the nerve gas training conducted at the Chemical Defense Training Facility ("CDTF") at Fort McClellan. The CDTF uses three types of nerve gas detection equipment which contain radioactive source materials: (1) The M8A1 Tactical Chemical Agent Alarm; (2) the Chemical Agent

Monitor ("CAM"); and (3) the Improved Chemical Agent Monitor ("ICAM"). Because these hand-held nerve gas detection devices contain radioactive sources, they are required to be tested every twelve months for radioactive leakage. Consequently, a procedure called a "wipe test" is performed on this equipment. This involves wiping the nerve gas detection equipment with a piece of absorbent cloth and then analyzing the cloth for the presence of radioactive material. Because this detection equipment is used in the CDTF where live nerve gas is present, the detection equipment is potentially contaminated with nerve agent. Since the absorbent cloths used in the wipe test might also be potentially contaminated with nerve agent, the wipe test analysis is conducted on-site at Fort McClellan by the radiological labs. This arrangement avoids having to ship potentially extremely hazardous substances off-site to another installation.

While the M8A1 and the CAM nerve gas detection equipment is licensed under a general Nuclear Regulatory Commission license held by the Army Material Command, as is all other common Army equipment containing radioactive source material, the ICAM is an experimental piece of equipment not yet adopted by the Army. It is used solely at Fort McClellan under the nuclear license held by the radiological laboratory. Consequently, until a new facility receives a nuclear license at Fort Leonard Wood, soldiers would not be able to use the ICAM in their Chemical School training in Missouri.

NUCLEAR REGULATORY COMMISSION LICENSES AT FORT McCLELLAN

The United States Army Chemical School at Fort McClellan currently possesses two Nuclear Regulatory Commission ("NRC") licenses issued by NRC's Region II office in Atlanta, Georgia: (1) a Part 70 special nuclear material license; and (2) a Part 30 nuclear byproduct material license. Both NRC licenses are specific to Fort McClellan. Copies of McClellan's two latest licenses (they are renewed every five years) are attached.

A. Part 70 License No. SNM-1877 (Special Nuclear Material)

The Chemical School has a Part 70 special nuclear material license, because the school has small amounts of Plutonium 239 and Uranium 233 on hand which is used to calibrate the lab's radiation equipment and to train nuclear weapons response teams in the proper calibration of their own equipment. Small amounts of these two nuclear isotopes are needed for this purpose.

B. Part 30 License No. 01-02861-05 (Nuclear Byproduct Material)

The Chemical School also has a Part 30 nuclear byproduct material license for the other radioactive isotopes and the materials exposed to radiation which are used in live agent nuclear training, operation of the laboratory, and research and development. This Part 30 NRC license is a broad-scope license which allows Fort McClellan to possess and use many different radioactive isotopes. There are currently 25-30 different nuclear isotopes in use at the Chemical School's radiological laboratories including: Americium 241, Nickel 63, Cobalt 60, Calcium 45, Cesium 137, Radium 226, Gold 198, Polonium 210, Promethium 147, Strontium 90, Thorium 232, and Hydrogen 3

(tritium). These isotopes, which emit varying amounts of alpha, beta and gamma radiation, are used in training (detection, identification, monitoring and decontamination), support functions, laboratory research and development.

NRC LICENSING REQUIREMENTS AT FORT LEONARD WOOD

The only NRC license currently held by Fort Leonard Wood is a Part 35 license for the Post hospital. Consequently, to move the Army Chemical School's nuclear defense training to Missouri would require additional NRC licenses at Fort Leonard Wood. These licenses could be obtained by two methods: (1) Fort Leonard Wood would have to apply for and receive two new licenses from NRC's Region III office in Lisle, Illinois. (2) Alternatively, the Army Chemical School could apply to the NRC's Region II office in Atlanta to amend its current licenses to add Fort Leonard Wood as a second location on its existing licenses. Under either scenario, however, the plans and design for the new nuclear facilities at Fort Leonard Wood must be included with either NRC application. The process of designing and preparing the plans for a new nuclear facility in Missouri is estimated to take twelve months. To date, no such application has been submitted. Once an application is received by the NRC, estimates of the processing time vary from thirty days to one year. Even then, however, a final Full Operations License would not be issued by the NRC until after the facility at Fort Leonard Wood is constructed and inspected. Engineers from Fort Leonard Wood have optimistically estimated it would take three years at the earliest to design, construct, and

move the Chemical School from Alabama to Missouri. This estimate only takes into account the engineering and construction aspects of the relocation. It does not include any possible and highly probable permitting, bureaucratic, or legal delays.

STORAGE OF LOW-LEVEL RADIOACTIVE WASTE

The Bradley Radiological Labs at Fort McClellan currently produce approximately three 55-gallon drums of Low-Level Radioactive Waste ("LLRW") each year. This LLRW consists mainly of surgical gloves, lab trash, and contaminated clothing and equipment used in training that is no longer serviceable. Normal types of equipment carried by a soldier into a combat situation, including uniforms, gas mask covers, rucksacks, entrenching tools, canteen cups, etc. are contaminated with live agent radioisotopes. These items are then used in training Chemical Corps soldiers in the detection, monitoring, and isolation of nuclear contamination. As the items become unserviceable from repeated use, they must be disposed of as LLRW because they have been contaminated. Other items, such as the air filters removed from the lab's ventilating systems, also become part of the LLRW. This LLRW is segregated by like items into 55-gallon drums. When the drums are full, they are shipped (every two to three years) to the regional LLRW disposal facility at Barnwell, South Carolina.

Only LLRW generators whose states are members of the Southeast Interstate Low-Level Radioactive Waste Management Compact, of which Alabama is a member, may ship their LLRW to Barnwell. While Barnwell is tentatively scheduled to close at the end of 1995, work

on establishing a new Southeast regional LLRW disposal facility in North Carolina is well underway. That new facility is projected to be open by late 1998. If Barnwell closes as scheduled, the LLRW generated at Fort McClellan would have to be stored on-site. In that event, the amount of LLRW currently generated at Fort McClellan could be reduced by half using work reduction and compaction techniques, and that reduced volume of LLRW could be stored for five to seven years using the current storage capacity at Fort McClellan under their Part 30 byproduct material license. Moreover, the Part 30 NRC license at Fort McClellan could not be terminated until the LLRW stored there is removed. While it is possible that the LLRW could eventually be shipped to Fort Leonard Wood if a LLRW storage facility is built and licensed there, that LLRW transfer would require approval of the Southeast Compact Commission.

Fort Leonard Wood, Missouri, is in the Midwest Intrastate Low-Level Radioactive Waste Management Compact, which does not have an LLRW disposal site. In fact, the designated Midwest Compact host state of Ohio does not yet even have legislation in place to designate and construct a site. It is estimated it will be ten to twelve years before a Midwest Compact LLRW disposal facility is open once a site is designated. Consequently, Fort Leonard Wood will have to construct a much larger and much more expensive on-site LLRW storage facility capable of holding at least twelve to fifteen years of LLRW before the Chemical School could be moved to Missouri.

OBSTACLES TO RELOCATION OF NUCLEAR TRAINING FACILITIES

The process of moving the Radiological Laboratories which are an integral part of the United States Army Chemical School from Fort McClellan, Alabama, to Fort Leonard Wood, Missouri, would be lengthy, complicated and expensive. Two key actions that must occur are: (1) both a new radiological laboratory and an on-site LLRW storage facility must be designed and constructed at Fort Leonard Wood; and (2) NRC licenses must be obtained for the new facilities at Fort Leonard Wood. The design and construction process alone, not including any highly likely permitting, bureaucratic or legal delays, is optimistically estimated to take at least three years.

The process of obtaining the required NRC licenses is inextricably linked to the construction of the new facilities at Fort Leonard Wood. Preparation of a complete 100+ page application alone could take from several months to more than a year. Moreover, final approval from the NRC for Fort Leonard Wood to begin full-scale operations will not come until after construction of the new facility is completed and it has been inspected and approved by the NRC. As a direct example of how long this process can take, the radiological facility at Fort McClellan received its initial Limited Operations License in 1980, but it was not allowed to begin full-scale operations until its facilities were finally completed and inspected by the NRC in 1988.

While it is conceivable that a Limited License could be obtained in less than a year, this would merely allow the storage but not the use of radioactive materials at Fort Leonard Wood;

hence, both the nuclear and chemical training at the Chemical School would be severely degraded. Moreover, the radiological facility at Fort McClellan would have to remain open at least until the facility at Fort Leonard Wood is built and licensed by the NRC merely to accept and store the radioactive materials from Fort McClellan. Only after the radioactive materials have been removed from Fort McClellan and the facility has been decommissioned may that facility close and its licenses be terminated. During the interim years before a radiological facility is fully operational at Fort Leonard Wood, nuclear training operations using radioactive materials would either have to be continued at Fort McClellan or they could not be done at all.

It must also be recognized that the federal law establishing the base closure process mandates that a base selected for closure must be closed within six years of the submission of the list by the President to the Congress. It would be highly speculative at best to presume that a similar nuclear defense training facility could be built, licensed, and in operation at Fort Leonard Wood within six years. To risk closing the Army's only nuclear defense training facility at Fort McClellan without first having the guaranteed ability to conduct similar training and operations at Fort Leonard Wood would pose a severe threat to both the military capability and the national security of the United States.

Corrected Copy

MATERIALS LICENSE

Amendment No. 9

Pursuant to the Atomic Energy Act of 1954, as amended, the Energy Reorganization Act of 1974 (Public Law 93-438), and Ti Code of Federal Regulations, Chapter I, Parts 30, 31, 32, 33, 34, 35, 39, 40 and 70, and in reliance on statements and representations here made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, possess, and transfer byproduct, source, and nuclear material designated below; to use such material for the purpose(s) and at the place(s) designated below; to deliver or transfer such m to persons authorized to receive it in accordance with the regulations of the applicable Part(s). This license shall be deemed to contain the con specified in Section 183 of the Atomic Energy Act of 1954, as amended, and is subject to all applicable rules, regulations and orders of the N Regulatory Commission now or hereafter in effect and to any conditions specified below.

Licensee	
1. Department of the Army U.S. Army Chemical School	In accordance with letter received January 22,1991 3. License number SNM-1877 is amended in its entirety to read as follows:
2. Fort McClellan, Alabama 36205-5020	4. Expiration date May 31, 1996
	5. Docket or Reference No 070-02934

6. Byproduct, source, and/or special nuclear material	7. Chemical and/or physical form	8. Maximum amount that licens may possess at any one time under this license
A. Plutonium 239	A. Plated alpha sources (Eberline Model S94-1 or AN/UDM-6)	A. 12.5 microcuries (200 micro
B. Uranium 233	B. Plated alpha sources (Oak Ridge National Laboratory custom stainless steel plates)	B. 24 microcuries (25 milligra

9. Authorized use

A. and B. To be used for instrument calibrations and in the training of students.

CONDITIONS

10. Licensed material shall be used only at the U.S. Army Chemical School, Fort McClellan, Alabama.

11. A. The Radiation Safety Officer for the activities authorized by this license is John W. May.

B. Alternate Radiation Safety Officers are Dr. Charles Sondhaus, Juan A. Torres, and James V. Landingha

12. Licensed material shall be used by, or under the supervision of, individuals trained as specified in the letter w attachments received January 22, 1991. The licensee shall maintain records of individuals designated as users

13. A. Sealed sources designed to emit alpha particles shall be tested for leakage and/or contamination intervals not to exceed 3 months.

B. In the absence of a certificate from a transferor indicating that a leak test has been make within months prior to the transfer, a sealed source received from another person shall not be put into use un tested.

(continued) CONDITIONS

13. C. Sealed sources need not be leak tested if:

(1) they contains 100 microcuries or less of beta and/or gamma emitting material or 10 microcuries or less of alpha emitting material; or

(2) They are not designed to emit alpha particles, are in storage, and are not being used. However, when they are removed from storage for use or transferred to another person, and have not been tested within the required leak test interval, they shall be tested before use or transfer. No sealed source stored for a period of more than 10 years without being tested for leakage and/or contamination.

D. The test shall be capable of detecting the presence of 0.005 microcurie of radioactive material on the test sample. If the test reveals the presence of 0.005 microcurie or more of removable contamination, the source shall be removed from service and decontaminated, repaired, or disposed of in accordance with Commission regulations. A report shall be filed within 5 days of the date the leak test result is known with the U. S. Nuclear Regulatory Commission, Region II, Division of Radiation Safety and Safeguards, Nuclear Material Inspection Section, 101 Marietta Street, Suite 2900, Atlanta, Georgia 30323. The report shall specify the source involved, the test results, and corrective action taken. Records of leak test results shall be kept in units of microcuries and shall be maintained for inspection by the Commission. Records may be disposed of following Commission inspection.

E. Tests for leakage and/or contamination shall be performed by the licensee or by other persons specifically licensed by the Commission or an Agreement State to perform such services.

14. The licensee shall conduct a physical inventory every 6 months to account for all sources and/or devices received and possessed under the license. Records of inventories shall be maintained for 2 years from the date of each inventory.

15. The licensee shall maintain records of information important to safe and effective decommissioning at its location specified in Condition 10 in accordance with the provisions of 10 CFR 70.25(g) until this license is terminated by the Commission.

MATERIALS LICENSE
SUPPLEMENTARY SHEET

License number
SNM-1877

Docket or Reference number
070-02934

Corrected Copy

Amendment No. 9

(continued) CONDITIONS

16. Except as specifically provided otherwise in this license, the licensee shall conduct its program in accordance wit the statements, representations, and procedures contained in the documents including any enclosures, listed belo The Nuclear Regulatory Commission's regulations shall govern unless the statements, representations ar procedures in the licensee's application and correspondence are more restrictive than the regulations.

A. Letter received January 22, 1991
B. Letter May 29, 1991

FOR THE U.S. NUCLEAR REGULATORY COMMISSION

SANDRA W. BUTLER

Date JAN 03 1994

By Sandra W. Butler
Region II, Nuclear Materials Licensing Section
101 Marietta Street, Suite 2900
Atlanta, GA 30323

NRC FORM 374
(10-89)

U.S. NUCLEAR REGULATORY COMMISSION

MATERIALS LICENSE

Amendment No. 13

Pursuant to the Atomic Energy Act of 1954, as amended, the Energy Reorganization Act of 1974 (Public Law 93-438), and Title 10, Code of Federal Regulations, Chapter I, Parts 30, 31, 32, 33, 34, 35, 39, 40 and 70, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, possess, and transfer byproduct, source, and special nuclear material designated below; to use such material for the purpose(s) and at the place(s) designated below; to deliver or transfer such material to persons authorized to receive it in accordance with the regulations of the applicable Part(s). This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954, as amended, and is subject to all applicable rules, regulations and orders of the Nuclear Regulatory Commission now or hereafter in effect and to any conditions specified below.

Licensee	In accordance with application dated November 29, 1990
1. Department of the Army U.S. Army Chemical School	3. License number 01-02861-05 is amended in its entirety to read as follows:
2. ATZN-CM-AHP Fort McClellan, Alabama 36205	4. Expiration date February 28, 1997
	5. Docket or Reference No. 030-17584

6. Byproduct, source, and/or special nuclear material		7. Chemical and/or physical form		8. Maximum amount that licensee may possess at any one time under this license	
A.	Any byproduct materials with atomic number 3-83, inclusive	A.	Any	A.	Not to exceed 100 millicuries per radionuclide and 3 curies total, additionally see Condition 16
B.	Cesium 137	B.	Sealed sources (3M Model 4P6S)	B.	Not to exceed 500 millicuries per source and 2 curies total
C.	Cesium 137	C.	Sealed sources (UDM-1A)	C.	120 curies
D.	Hydrogen 3	D.	Any	D.	1 curie
E.	Americium 241	E.	Plated sources	E.	Not to exceed 1 microcurie per source and 10 microcuries total
F.	Polonium 210	F.	Plated sources	F.	1 microcurie

9. Authorized Use:

A. through F. For research and development as defined in 10 CFR 30.4, and for instruction of personnel in the safe use and measurement of ionizing radiation.

CONDITIONS

10. Licensed material shall be used only at The U.S. Army Chemical School, Building 1081, Fort McClellan, Alabama except one Cesium 137 sealed source of 500 millicuries may be used in the licensee's Alpha Field for instructional purposes.

11. The Radiation Protection Officer for the activities authorized by this license is John W. May, and in his absence Juan A. Torres, or James V. Landingham.

12. Licensed material shall be used by, or under the supervision of individuals designated by the licensee's Radiation Safety Committee and trained in accordance with the application dated November 29, 1990 and the letter with attachments dated February 6, 1992. The licensee shall maintain records of the training and experience of individuals designated as authorized users.

13. A.(1) The source(s) specified in Item 7, shall be tested for leakage and/or contamination at intervals not to exceed 6 months. Any source received from another person which is not accompanied by a certificate indicating that a test was performed within 6 months before the transfer shall not be put into use until tested.

(2) Notwithstanding the periodic leak test required by this condition, any licensed sealed source is exempt from such leak tests when the source contains 100 microcuries or less of beta and/or gamma emitting material or 10 microcuries or less of alpha-emitting material.

B. Any source in storage and not being used need not be tested. When the source is removed from storage for use or transfer to another person, it shall be tested before use or transfer.

C. The test shall be capable of detecting the presence of 0.005 microcurie of radioactive material on the test sample. If the test reveals the presence of 0.005 microcurie or more of removable contamination, the source shall be removed from service and decontaminated, repaired, or disposed of in accordance with Commission regulations. A report shall be filed within 5 days of the date the leak test result is known with the U. S. Nuclear Regulatory Commission, Region II, Division of Radiation Safety and Safeguards, Nuclear Material Safety Section, 101 Marietta Street, Suite 2900, Atlanta, Georgia 30323. The report shall specify the source involved, the test results, and corrective action taken. Records of leak test results shall be kept in units of microcuries and shall be maintained for inspection by the Commission. Records may be disposed of following Commission inspection.

D. Tests for leakage and/or contamination shall be performed by the licensee or by other persons specifically licensed by the Commission or an Agreement State to perform such services.

14. Sealed sources containing licensed material shall not be opened by the licensee.

15. The licensee shall conduct a physical inventory every 6 months to account for all sources and/or devices received and possessed under this license. Records of inventories shall be maintained for 2 years from the date of each inventory.

MATERIALS LICENSE
SUPPLEMENTARY SHEET

License number 01-02861-05

Docket or Reference number 030-17584

Amendment No. 13

continued

CONDITIONS

16. The licensee is authorized to hold radioactive material with a physical half-life of less than 65 days for decay-in-storage before disposal in ordinary trash provided:

A. Radioactive waste to be disposed of in this manner shall be held for decay a minimum of 10 half-lives.

B. Before disposal as normal waste, radioactive waste shall be surveyed to determine that its radioactivity cannot be distinguished from background. All radiation labels shall be removed or obliterated.

17. The licensee shall maintain records of information important to safe and effective decommissioning at the location specified in Condition 10 pursuant to the provisions of 10 CFR 30.35(g) until this license is terminated by the Commission.

18. In addition to the possession limits in item 8, the licensee shall further restrict the possession of licensed material as follows:

A. For unsealed sources, to quantities less than 10^5 times the applicable limits in Appendix C, 10 CFR 20 as specified in 10 CFR 30.35(d) and;

B. For sealed sources, to quantities less than 10^5 times the applicable limits in Appendix C, 10 CFR 20 as specified in 10 CFR 30.35(d).

19. Except as specifically provided otherwise in this license, the licensee shall conduct its program in accordance with the statements, representations, and procedures contained in the documents including any enclosures, listed below. The Nuclear Regulatory Commission's regulations shall govern unless the statements, representations and procedures in the licensee's application and correspondence are more restrictive than the regulations.

A. Application dated November 29, 1990

B. Letter dated August 29, 1991

C. Letter with attachments dated February 6, 1992

FOR THE U.S. NUCLEAR REGULATORY COMMISSION

EARL G. WRIGHT

Date FEB 12 1992

By Earl G. Wright

Region II, Nuclear Materials Safety Section
101 Marietta Street, Suite 2900
Atlanta, GA 30323

MATERIALS LICENSE
SUPPLEMENTARY SHEET

Corrected Copy

License number SNM-1877
Docket or Reference number 070-02934

Amendment No. 9

(continued) CONDITIONS

16. Except as specifically provided otherwise in this license, the licensee shall conduct its program in accordance wit the statements, representations, and procedures contained in the documents including any enclosures, listed belov The Nuclear Regulatory Commission's regulations shall govern unless the statements, representations an procedures in the licensee's application and correspondence are more restrictive than the regulations.

A. Letter received January 22, 1991
B. Letter May 29, 1991

FOR THE U.S. NUCLEAR REGULATORY COMMISSION

SANDRA W. BUTLER

Date JAN 03 1994

By Sandra W. Butler
Region II, Nuclear Materials Licensing Section
101 Marietta Street, Suite 2900
Atlanta, GA 30323

Testimony for the Missouri House of Representatives Energy Commission

Repr. Mike Schilling, Chmn. Informational Meeting on the Radiation Lab Proposal for Fort Leonard Wood, May 10, 1995

My name is Kay Drey. I live in University City, St. Louis County. I am here today as a representative of the Missouri Coalition for the Environment to express our concerns about the proposal to move the Army Chemical School from Alabama to the Missouri Ozarks. I have been studying nuclear power and radioactive waste for 20 years, and am a board member of the Nuclear Information and Resource Service, a non-profit organization in Washington, D.C.

Up until now, the people of Missouri have been given no information about the nuclear aspects of the Chemical School. Mr. Chairman: you and the Energy Commission have done Missourians a great service by calling this hearing today and providing an opportunity for an open discussion of this proposal, and a more complete disclosure of the information Missourians need to make decisions about this facility.

As you may know, St. Louis has the dubious distinction of harboring the oldest radioactive waste of the Atomic Age. Starting in April 1942, and continuing for 25 years, uranium was processed near Downtown St. Louis and then at Weldon Spring for nuclear weapons purposes. St. Louis now has over a million cubic yards of radioactive waste which began accumulating in 1942 -- 53 years ago. A million cubic yards, and we do not have a good disposal technology or location for even the first cupful.

We have been struggling for decades to resolve this widespread contamination in our community with virtually no progress. To encourage a new radioactive-waste generating facility to move into our state -- with no solution in sight for any of our existing wastes -- would, I believe, be irresponsible.

Fort McClellan in Alabama is a part of the Southeast Low-Level Radioactive Waste Compact. Wastes from the Army Chemical School can therefore be sent to the Barnwell, South Carolina, radioactive waste facility. However, Barnwell has refused to accept wastes from Missouri and our Midwest Compact for almost a year now. That ban includes so-called low-level wastes from the Callaway nuclear power

plant, from the Midwest Research Institute in Kansas City, from hospitals, universities, and other radioactive waste generators in Missouri. The Midwest Compact chose Michigan to host the first Midwest facility -- and Michigan got itself kicked out of the compact by refusing to come up with a site. Ohio is the new appointed host state, and many citizens and elected officials there are actively opposing the designation. Much legislative wrangling is under way, and absolutely no site in Ohio has even been rumored as yet. There may never be a Midwest site -- or at best, it could be years from now before one is even chosen. Furthermore, none of the compacts nationwide is comfortable about receiving military wastes at all. I was surprised to learn that Fort McClellan's wastes are being accepted at the Barnwell, South Carolina, facility. But Missouri is not in that compact, and Missouri's waste generators have absolutely been excluded from Barnwell.

For these reasons and more, disposal of the radioactive waste from the Army's nuclear training exercises could be a particular problem at Fort Leonard Wood. All of the radioactive waste generated at the school would have to be stored on site for at least 15 years. Some could remain on site virtually forever if no Midwest or National low-level waste site is developed. That's very bad news for the Ozarks, my husband's and my favorite part of the planet! People in the Ozarks need to be made aware that radioactive waste could be stored in their area for a long period of time. Waste will have to be stored for a long time because, as you know (as members of the Energy Commission), many of the radioisotopes currently used at Fort McClellan have very long half-lives. I cannot think people in Ladue would be willing to allow those materials there.

In order to relocate its Chemical Defense Training Facility at Fort Leonard Wood, the Army would have to apply to the Nuclear Regulatory Commission for two licenses: one for fission and irradiated materials (also called "Byproduct Materials," requiring a Part 30 license), and one for Special Nuclear Materials (a Part 70 license for such materials as plutonium-239, and uranium-233 which has a half-life of 160,000 years). More than two dozen radioisotopes are currently in use at the Fort McClellan radiological laboratories -- including some short-lived materials like gold-198 which decays into the highly toxic element, mercury; gold-198 has a half-life of

about three days.

Cesium-137 and strontium-90 have half-lives of about 30 years. Because an isotope continues to give off radioactive rays and particles for at least ten half-lives, the cesium and strontium at Fort McClellan today will still be giving off beta and gamma radiation 300 years from now!.

Other long-lived radioisotopes used at Fort McClellan, in addition to those already mentioned, include: nickel-63 (with a 100-year half-life); radium-226 (1600 years); and thorium-232 (14.1 billion years).

I had hoped to be able to present more specific information to you today about the radiation training that is under way at Fort McClellan. I have only known about this proposed transfer of the Army Chemical School to Missouri for about three weeks. Just this week I submitted a series of questions to Fort McClellan in an effort to get a better understanding of the volume, longevity and uses of the radioactive materials, and of the concentration and radiotoxicity of the resulting radioactive wastes. I am submitting a list of these questions to you (ATTACHED). I was informed yesterday by an official at the school that although the questions are fine, the Missouri Coalition for the Environment will have to re-submit them officially under the Freedom of Information Act, directly to the Commanding General at Fort McClellan, which we will do.

A great deal more information is needed, I believe, if we are to get a full picture of the ways in which radioactive materials are used at the Chemical Defense Training Facility, and of the volumes and hazards of the radioactive wastes generated there. For example: (1) Why is an interlock system needed for high radiation areas at the Bradley Radiological Laboratories? (2) What are "live radiological agents"? (3) The Nuclear Regulatory Commission permits incinerators at its facilities. Are radioactively contaminated wastes ever burned in the incinerator at Fort McClellan? If so, where is the ash discarded?

The NRC requires that all radioactive waste be called "low-level" except irradiated fuel rods or reprocessed fuel-rod wastes. At the Washington University Medical School and its associated institutions, the 1,020 laboratories that use radioisotopes have an inventory at any one time of a total of two curies. At Fort McClellan, the ten radiological laboratories use a total of three

curies. Even tiny fractions of one curie must be carefully handled, as the people at Fort McClellan certainly know.

(The University of Missouri reactors at Columbia and Rolla generate saturated filters and other highly radioactive "low-level" wastes, as well as gloves and booties. Exposure to some so-called "low-level" radioactive waste at nuclear power plants can result in a lethal dose; some has to be handled by remote control equipment.)

When I have read over the years about biological and chemical weapons, I have always been grateful that Missouri was not involved. We could have been, but we weren't. The proposal to move the Army chemical school to Missouri changes that. Alabama allows no more than one liter of Sarin on the Fort McClellan post at one time. Missouri has no legal limits. Sarin, as you know, was the nerve gas released in the Tokyo subway system two months ago. Exposure to a drop as small as the size of a pin head can cause convulsions and even death. Sarin is one of the substances that is included in the training program at Fort McClellan.

Certainly our state needs to protect the jobs we already have and to encourage the creation of many additional jobs. But those jobs should be safe ones and should not place Missouri's citizens and environment at risk.

If Alabama is willing and wanting to continue to host nerve gas, nuclear isotope, and chemical weapons defense, detection and decontamination training, I believe we should thank Alabama, wish it well, and say "no thanks" to the proposal to move this facility to Missouri. Let the experienced, knowledgeable professional crew at Fort McClellan continue to provide the necessary leadership and training skills within the controlled environment of their sophisticated, state-of-the-art radiological laboratories and chemical school facilities.

Not until someone figures out what to do with the radioactive waste we began accumulating here in Missouri -- in St. Louis -- 50 years ago, should we allow any additional major radioactive waste generator to locate here. Thank you.

#

p.s. For the record: I would like to respond to Representative Jim Mitchell's allegation, during his testimony, that I am being funded by the State of Alabama. There is absolutely no truth to that statement. I have been studying nuclear power and radioactive waste issues for over 20 years, very full-time, as a volunteer.

May 8, 1995

To: Lt. Col. Robert Abernathy
Chief of Strategic Plans
FAX: 205-848-6211

From: Kay Drey, Coalition for the Environment
Phone: 314-725-7676
FAX: 314-863-4666

In preparation for a May 10 hearing in Jefferson City, Missouri, I am trying to get an understanding of the volume, longevity and uses of the radioactive materials at the Army Chemical School -- and the concentration and radiotoxicity levels of the resulting radioactive wastes. Some of the questions I have are as follows:

1. Is it correct that only two to three barrels of radioactive waste are generated each year? Is each a 55-gallon drum? Approximately how much radioactivity is in each?

2. Is any mixed radioactive/hazardous waste generated? If so, please describe the composition and volume?

3. Regarding the RADIAC calibrators: When the instrument or its sealed source needs to be discarded or replaced, where is it sent for disposal? Approximately how many calibrators are used or stored at the Chemical School at any one time?

4. Can you please explain briefly how the unsealed sources are used?

5. How and where are the unsealed materials stored?

6. Are any radioisotopes used outside of the radiological laboratories?

7. Are some materials irradiated as a part of the education program?

8. Is there any intermingling of the chemical or biological agent training with radiological training?

Your responses will be greatly appreciated.

DEPARTMENT OF THE ARMY
US ARMY CHEMICAL AND MILITARY POLICE CENTERS & FORT MCCLELLAN
FORT MCCLELLAN, ALABAMA 36205

REPLY TO ATTENTION OF

ATZN-CM-F

12 JUN 1993

Memorandum For SEE DISTRIBUTION

SUBJECT: Assessment Report -- Smoke Trial May 1993

1. The US Army Chemical School conducted large area smoke trials at Fort Leonard Wood, Missouri during the period 23-26 May 1993. There were four objectives centering on the need to determine the feasibility of large area smoke training: (1) replicate training modes used at Fort McClellan; (2) determine the land and ranges requirements; (3) assess potential impacts on other installation activities; and (4) culture environmental awareness for large area smoke operations using fog oil. These objectives were met.

2. Preliminary assessment indicates that "smoke training would be greatly degraded during 6 months of the training year" as depicted on diagram at Encl 1. One Station Unit Training (OSUT) static smoke classes can be conducted with minimal degradation if two or more ranges in the south are used to allow for seasonal variations in weather conditions. This covers approximately 25 per cent of the training requirement. On the other hand, 75 per cent of the smoke training requirement which involves tactical field exercises will not meet standards.

3. Environmental understanding was improved. Conclusions about environmental consequences of smoke training have not been reached and continue under study.

4. The full assessment report is enclosed (Encl 2).

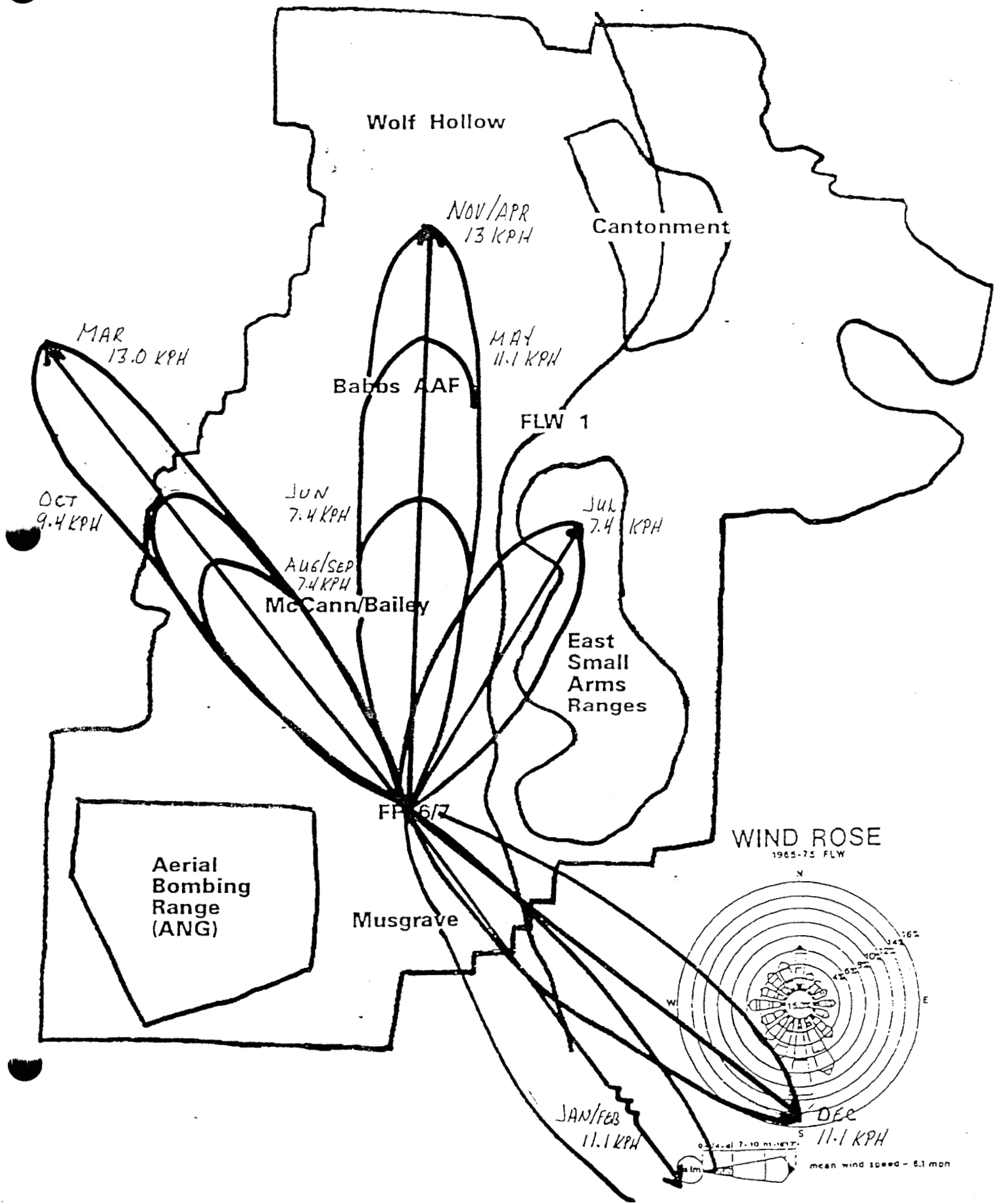
5. Points of contact are Colonel John D. Nelson and Lieutenant Colonel Ted Newing, USACMLS, (205) 848-3855/4712; DSN 865-3855/4712; Fort McClellan, Alabama 36205.

2 Encls

ROBERT D. ORTON
Major General, USA
Commanding

DISTRIBUTION:
HQ DA, ATTN: TABS, WASH, DC 20310
HQ DA, ATTN: DAMO-FDB, WASH, DC 20310
HQ TRADOC, ATTN: BRACO, FT MONROE, VA 23651-5000
HQ TRADOC, ATTN: ATCD-GB, FT MONROE, VA 23651-5000
CG, ATTN: BRAC, FT LEONARD WOOD, MO 65473
Chief, BRAC, FT MCCLELLAN, AL 36205-5020

A schematic of smoke operations training at Fort Leonard Wood from Firing Point 6/7 at monthly prevailing wind directions and mean wind speeds.



Assessment Report -- Smoke Trial May 1993

CONTENTS

ASSESSMENT REPORT -- SMOKE TRIAL 1993

BY

COLONEL JOHN D. NELSON
DIRECTOR OF TRAINING AND DOCTRINE

AND

LIEUTENANT COLONEL TED NEWING
COMMANDER, 84TH CHEMICAL BATTALION

UNITED STATES ARMY CHEMICAL SCHOOL
FORT MCCLELLAN, ALABAMA 36205

11 JUNE 1993

ASSESSMENT REPORT -- SMOKE TRIAL MAY 1993

EXECUTIVE SUMMARY

The U.S. Army Chemical School conducted large area smoke trials at Fort Leonard Wood, Missouri during the period 23-26 May 1993. There were four objectives centering on the need to determine the feasibility of large area smoke training: replicate training modes used at Fort McClellan; determine the land and ranges requirements; assess potential impacts on other installation activities; culture environmental awareness for large area smoke operations using fog oil.

Smoke training represented at Fort Leonard Wood included realistic arrays of static, mobile, and field training exercise training modes for One Station Unit Training, Basic and Advanced Noncommissioned Officer, and Chemical Officer Basic courses. The amount of generators employed were slightly less than a single typical training session at Fort McClellan.

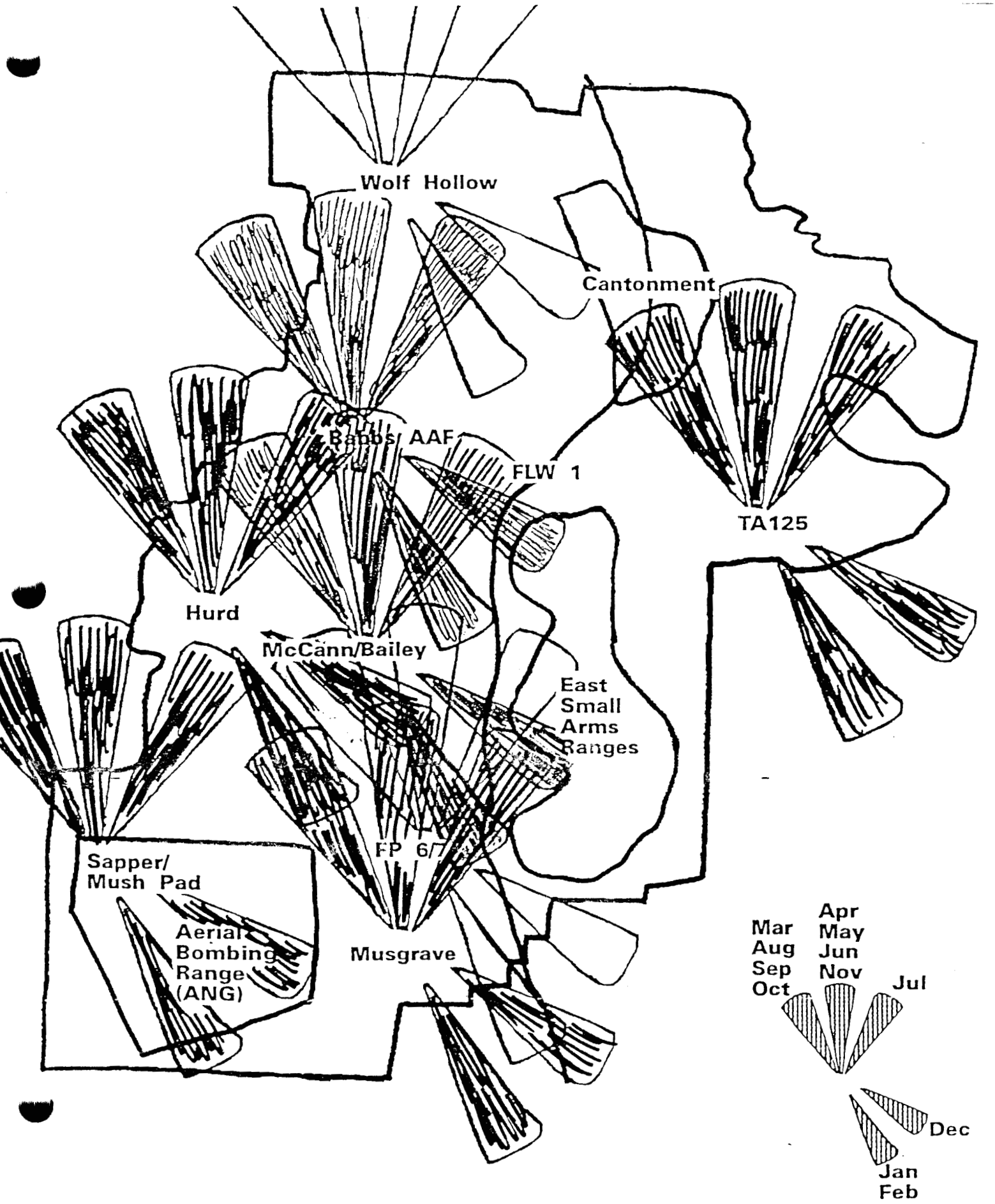
The smoke trial clearly demonstrated the variability of weather conditions at Fort Leonard Wood and frequency in which the variabilities occur. There are six factors that impact on smoke training. These factors are the location of the smoke source, duration of time for making smoke, time of day to make smoke, wind direction, wind speed, and atmospheric stability. The later three factors cannot be controlled. Seven missions were conducted over a 4 day period and only the missions on the first day experienced wind directions (159 to 201 degrees) close to the predicted mean for the month of May (170 to 190 degrees). Additionally, only the afternoon mission had a representative wind speed (10.8 to 9.4 kph) close to 11.1 kph mean for May. Wind directions for the other missions varied greatly from the north northwest and west (347 to 280 degrees) with wind speeds between 6.5 to 2.9 kph. These extreme variabilities will require several large areas being reserved for each smoke class to ensure training will meet the prescribed standards.

The Chemical School requires a full forty-four weeks per year for smoke training. The smoke trial covered only a narrow band of parameters which affect smoke operations but obviously could not accommodate the full intensity and frequency of an annual smoke training program. Using the trial results and annual weather data at Ft Leonard Wood, an assessment of annual training feasibility has been completed. The general assessment is that **"smoke training would be greatly degraded or curtailed during six months of a training year"**. This assessment is based on the high risk of smoke migration to the main road bisecting the installation and partial obscuration of the Fort airport, safety challenges to adjacent small arms weapon ranges and the Air National Guard bombing range. It is also based on the fact that range use will increase with a three branch training installation and subsequently decrease the flexibility of alternative range use due to smoke interference.

The greatest impact is on mobile field smoke training which relates directly to tactical proficiency and involves "warfighting skills" (tactics, techniques, and procedures in producing various kinds of battlefield obscuration--blankets, hazes, and screens). This training requires constant generator operations (normally in excess of 45 minutes) and maneuver space to develop proper smoke densities over a target area. Restrictions of space and time will degrade this aspect of smoke training where technical skills are applied to field operations.

The trials were observed by a variety of environmental agencies. No findings are available on the environmental acceptance of fog oil dispersion or effects on the Post's three endangered species of Indiana bats, Grey bats, and American Bald eagles. An assessment by Federal, State, and local environmental officials is a critical factor to feasibility of smoke operations on the installation.

Schematic of Fort Leonard Wood depiciting 1 hour smoke clouds (average 6 km patterns) at monthly prevailing wind directions



DEPARTMENT OF THE ARMY
CONSTRUCTION ENGINEERING RESEARCH LABORATORIES, CORPS OF ENGINEERS
P.O. BOX 9005
CHAMPAIGN, ILLINOIS 61826-9005

DRAFT DRAFT DRAFT DRAFT

17 January 1995

Potential Impact of Fog Oil Smoke on Selected Threatened and Endangered Species

There is a long history of use of smoke screening in military operations (Muhly, 1983). Proper use of smokes and obscurants is estimated to reduce troop exposure to enemy fires by up to 60% (LTC Harry Sutton, TRADOC Smoke Integration Proponency Office, Ft. McClellan, AL). Effective integration of employment of smoke screens with deployment of combat maneuver units requires close coordination. Thus, use of smokes and obscurants is a critical component of tactical training.

A major problem facing the military in meeting its training objectives is the requirement to comply with environmental regulations during training exercises (COL R. E. Thornton; Memorandum, US Army Chemical School, Ft. McClellan, AL, 1 Jun 1994). This includes the necessity to minimize adverse impacts upon individuals or populations of threatened and endangered species present in training areas. Exposure to smokes and obscurants is perceived to constitute such a potential negative impact.

Owing to human health and environmental concerns, extensive laboratory studies have been conducted regarding toxicological effects of various smokes and obscurants upon given species, dating back to the 1940's (as summarized in Liss-Suter and Villaume, 1978a,b; Muhly, 1983; Shinn, 1985, 1987; Palmer, 1990; Driver, et al., 1992). In addition, models have been generated to predict environmental concentrations and fate of various types of smokes (Liss-Suter and Villamue, 1978a; Muhly,

1983; Shinn, 1987; Driver, et al., 1992). In spite of these efforts, there are inadequate data to provide an accurate assessment of the potential impact of smokes and obscurants, as currently used by the military, on threatened and endangered species occupying training installations. The experimental conditions in most toxicological studies were unrealistic in respect to predicted concentration/duration of exposure that would be incurred during training exercises. Further, the models have not been field-tested adequately; we still do not know the concentrations of smoking materials actually encountered by given species. As a result, in order to comply with Federal regulations regarding avoiding negative impacts on threatened and endangered species, training programs must be conducted under worst-case scenarios. Accordingly, use of smokes and obscurants is severely curtailed on most combat training installations. This places considerable constraints upon training programs, in turn, seriously restricting the ability of units to achieve desired combat readiness (COL F. E. McFarren; Memorandum, HQ XVIII Airborne Corps, Ft. Bragg, NC, 19 Feb 1992).

It is essential that there be a realistic appraisal of the environmental impacts of smokes and obscurants used in training exercises, especially as they might affect threatened and endangered species. Only by obtaining such data can there be a proper balance between ensuring compliance with Federal regulations and minimizing constraints on training programs. In this report we evaluate the available data regarding (1) typical (or desired) usage of smokes and obscurants in tactical training, (2) estimated environmental concentrations, (3) estimated toxicological effects, and (4) the natural history of selected threatened and endangered species. We (1) assess

the degree of risk that might be incurred by each species, (2) specify the conditions which place the species at risk, (3) identify the specific data that are needed to test these assessments, and (4) provide a general research protocol for obtaining these data.

A variety of materials are available for use as smokes and obscurants, including white and red phosphorous, HC (hexachloroethane), diesel fuel, fog oil, and IR obscurants, such as brass flakes and graphite powder. Of these, fog oil (SGF No. 2) is the most commonly available smoke/obscurant material used in general smoking during training exercises. Diesel fuel is no longer used as a vehicle fuel and thus not available for VEESS smoking; JP8 is the only motor fuel in the Army inventory. JP8 cannot be used in VEESS smoking owing to the potential for flashing and danger to vehicle crews from resulting fires. HC smoke is not used in large scale smoking in tactical training exercises owing to human safety problems. White and red phosphorous smokes generally are delivered by munitions and thus cannot be used in close support of tactical training exercises; most phosphorous smoke is released in artillery impact areas. Colored smokes, released from grenades, are used only as marking materials; as such, the quantities released are minimal. There is very little usage of IR screening materials. Brass flake grenades are not deployed in training exercises. Graphite will be used very sparingly owing to the expense incurred in its use.

In this report we limit our analyses to the potential effects of fog oil on threatened and endangered species since (1) fog oil currently is the most commonly employed smoke material in training exercises and will continue to be such in the foreseeable future, (2) there are

detailed models available regarding potential environmental concentrations of fog oil during a smoking operation, (3) the spatial coverage of the smoke screen cloud generated during a smoking operation is more readily defined than for other smoke materials, and (4) extensive data are available as to the toxicological effects of fog oil and related petroleum products on a variety of species.

Estimated impacts of fog oil smoke on threatened and endangered species were derived by (1) extrapolations from published models that estimate concentrations of fog oil in the air and potential precipitation onto the substrate (vegetation, bark of trees, and water), (2) identification of critical life history characteristics of the species that affect the degree of exposure of individuals to fog oil smoke, (3) extrapolations from toxicological studies on the most appropriate species for which data are available, (4) personal interviews with a number of Army personnel and others familiar with smoking operations, and (5) personal observations (LLG) of fog oil smoke screening exercises at Ft. McClellan, AL.

This report addresses only potential short-term or acute effects of fog oil smoke on given threatened and endangered species; it does not attempt to evaluate long-term or chronic environmental effects. The latter is beyond the scope of the current requirements. An overall evaluation of the impacts upon threatened and endangered species should include potential chronic effects, especially as might accrue from long-term exposure of individuals and populations to fog oil residue and its transformation products. However, an accurate evaluation of chronic effects is not possible at this time. Available data are inadequate in regard to formation and accumulation of fog oil and its transformation,

or degradation, products presumed to be released during typical smoking exercises to predict chronic effects on threatened and endangered species. The assumptions regarding short-term effects represent the best estimates of potential effects of fog oil smoking exercises on threatened and endangered species, given the inadequacy of the available data.

The following threatened and endangered species are considered in this report: Red Cockaded Woodpecker (*Picoides borealis*), Indigo Snake (*Drymarchon corais couperi*), Golden-cheeked Warbler (*Dendroica chrysoparia*), Black-capped Vireo (*Vireo atricapillus*), Sage Grouse (*Centrocercus urophasianus phaios*), Gray Bat (*Myotis grisescens*), and Indiana Bat (*Myotis sodalis*). In addition, we have included an evaluation of potential effects of fog oil upon candidate species which may soon be listed as threatened or endangered, including Bachman's Sparrow (*Aimophila aestivalis*), Flatwood Salamander (*Ambystoma cingulatum*), and the Striped Newt (*Notophthalmus perstriatus*). The above species occur in a variety of geographic regions of the U. S., occupy several different habitat types, and represent a number of different guilds within the same group, as in the case of the birds.

There are a number of threatened and endangered, as well as candidate, species of plants on Army installations. However, there is inadequate information regarding the effects of fog oil on plants to estimate accurately the potential acute effects of smoke screening exercises on populations of these plant species (Cataldo, et al., 1989). We provide only a generalized appraisal of the potential effects of fog oil on threatened and endangered plant species.

Assumptions

Several assumptions were made as a basis for predictions of potential impacts of fog oil upon given species: (1) A 2-hr smoking exercise; (2) a release rate of 80 gallons per hour per generator, resulting in a total release of 160 gal/generator; and (3) an area one kilometer wide and one kilometer deep is smoked. According to FM 3-50 and interviews with personnel familiar with smoke screening operations, most smoke training exercises last 30-90 minutes. We have used a 2-hr exercise so as to include the time it takes for the smoke cloud to disappear following termination of smoking under temperature inversion conditions, the worst-case scenario for dispersion of fog oil clouds. A release of 80 gallons per hour is in excess of the estimated 50 gallons total release by the M 157 generator, the model currently in use by active units, during a smoking exercise. However, the best models predicting resulting environmental concentrations (Driver, et al., 1992) were based on a release rate of 80 gal/hr. Again, using these models presents a worst-case scenario. A chemical company can lay down a cloud 500-1,500 m wide and up to 3,000 m deep, depending upon the tactical situation. Most situations call for a smaller area to be smoked. The 1,000 x 1,000 m area into which the complete release of fog oil is concentrated provides a reasonable estimate of an area smoked during a typical smoking exercise.

Estimated Environmental Concentrations

The projections of the six models provided by Driver, et al. (1992) were used to estimate the maximum concentrations of fog-oil expected to occur in the air, on the surface of objects, including the vegetation and trunks of trees, and in water. Other authors have presented estimates of fog oil concentrations in the air and deposition concentrations on the substrate (Liss-Suter and Villamue, 1978a; Muhly, 1983; Shinn, 1987). Most of these estimates do not incorporate the complexity of atmospheric conditions affecting dispersion and deposition of the fog oil as do the models presented by Driver, et al. (1992). All the models, however, including those of Driver, et al. (1992), are based on releases over open areas; as such, they may not predict accurately conditions within forested areas. Predicted concentrations (potential average concentrations and ranges derived from the six models, simulating specific sets of atmospheric conditions) are given for the following distances from the source: 100 m, 200 m, 500 m, and 1,000 m (Table 1). These distances allow for an estimated range of effects on animals occurring within the area encompassed by a typical tactical smoking exercise. Owing to the almost continuous movement of the smoke generating vehicles during an exercise, it is not practical to estimate fog oil concentrations any nearer the generator. Air concentrations and surface deposition values were calculated directly from the model graphs.

The two species of salamanders are the most likely candidate aquatic animals to be impacted by fog oil in the Southeast. Both species utilize shallow temporary ponds. When calculating aquatic concentrations, the average depth of the temporary ponds is assumed to

be one meter. To estimate concentrations of fog oil in the water, the predicted concentrations per cubic meter (mg/m^3) of water area have been assumed to be the same as the depositions per square meter (mg/m^2) of surface area of water. The concentrations would become greater as the water evaporates and the ponds become more shallow.

The values given for air concentrations will apply only for the period of the smoking operation. Observations indicate that essentially all the fog oil in the air will have dissipated from the site within 5 min following termination of the smoking exercise. The actual time required for the smoke to dissipate following any given exercise depends upon wind speed, humidity, and presence of lapse conditions or temperature inversions. Inhalation effects from a given smoking exercise are predicted to be transitory, at most 2 hrs in duration. This assumption needs field verification under a variety of atmospheric, terrain, and vegetation conditions. On a given installation there typically would be approximately 6-8 training periods of one week duration per year involving smoke screening. Smoke screens would be produced about four times each week. Seldom would smoke be deployed more than once in the same site (LTC Harry Sutton, Ft. McClellan, AL).

Position of the bottom of the smoke cloud in relation to the surface depends upon atmospheric conditions and rate of movement of the generator vehicles. Under extreme lapse conditions, the cloud may rise rapidly as it drifts downwind from the release point and not intersect the surface. More commonly the cloud extends down to the surface within 5-10 m of the generator. When inversion conditions exist, the cloud is likely to be depressed against the surface and remain in low depressions for considerable periods of time. The fog oil smoke cloud would also

intersect the surface and all above-ground vegetation on elevated terrain features within the smoked site. As such, bark and leaves of shrubs and trees would be in contact with the smoke material.

Although the fog oil cloud routinely extends down to the ground surface, there is no evidence that any of the fog oil precipitates from the air onto the surface or vegetation (Muhly, 1983, Lillegren, et al., 1988; Bowers and White, 1992; Driver, et al., 1992; L. L. Getz, personal observation). The oil droplets are assumed to be so small (0.5-1.0 micron) that they remain suspended in the air until such time that the oil evaporates. If these assumptions are true, there would be essentially no precipitation of fog oil onto the surface of the substrate. However, if there are dust and other particulates or fog in the air upon which fog oil could aggregate, the resulting larger droplets may precipitate to the surface. Likewise, rain occurring during the smoking exercise may result in precipitation of the fog oil onto the surface. Accordingly, we assume the worst-case scenario, that in which all fog oil precipitates onto the surface and adheres to the vegetation. If such precipitation occurred, fog oil droplets could also adhere to the skin, feathers and fur of target species as well as settle on their food (including insects and other invertebrates) exposed to the smoke material.

Even when one assumes worst-case scenario, i.e., that all fog oil droplets precipitate onto the surface or adhere to vegetation and bark, the predicted concentrations are relatively low (Table 1). It also has been estimated from mathematical models that 30-35% of the fog oil film would evaporate within one hour and 80-90% within a week (Driver, et al., 1992). Thus, the residues that might accumulate on surfaces during

a single smoking exercise soon may be reduced greatly. However, there are no emperical data to test these predictions. For our assessments, estimates of surface concentrations are provided for conditions immediately following termination of the smoking exercise as well as for one hour and one week later.

There is presumed to be little or no translocation of fog oil from the dry surface of the leaf litter to within the moist decomposing zone (Driver, et al., 1992). Oil adheres tightly to the surface of the leaves, remaining there until evaporating or degrading. However, vehicular traffic over sites onto which fog oil had precipitated would tend to mix the fog oil into the substrate. In addition, periods of rain might result in oil being washed down deeper into the substrate.

Most oil that precipitated onto ephemeral vernal pools would also be expected to remain on the surface rather than being dispersed into the water column. Vanderhorst et al. (1976) demonstrated that, unless there was extreme turbulence (well in excess of that expected to occur in nature), no fog oil was detectable within the water column. Owing to the low probability of significant wave action in small vegetation-surrounded bodies of water, there should be little mixing of the water and oil. The surface film of fog oil would soon evaporate (Aiken and Roberts, 1979; Muhly, 1983). Anderson et al. (1974) found when there was mixing of the water and oil, some of the petroleum hydrocarbons of No. 2 fuel oil dissolved into water. Lysyj and Russell (1974), on the other hand, concluded that in comparison to fuel oil, very little SAE 20 motor oil, i.e., fog oil, dissolved into water. Accordingly, the predicted aquatic concentrations in this report most likely represent worst-case scenarios. However, if dust and other particulates were to

settle on the surface of pools with an oil film, it is possible that some of the oil could adhere to these particles, and sink into the water column. Even if such incorporation of fog oil into the water occurs, Aiken and Roberts (1979) found fog oil to be relatively nontoxic to aquatic organisms.

The estimated concentrations of fog oil at various distances from the source and times during and following the release are summarized in Table 1. These values are used in the evaluations of potential effects on the species included in this report. We recognize that atmospheric concentrations of fog oil are dynamic in nature, responding to variation in wind currents, temperature, humidity, and precipitation during and following the smoking exercise. The models do not provide sufficient data to take into account all these effects.

Other authors have presented estimates of environmental concentrations of fog oil resulting from smoking operations, none of which have been verified in the field. Shinn (1987) estimated air concentrations within the area encompassed by a typical smoke cloud to be 5.9-8.9 mg/m^3; Liss-Suter and Villaume (1978a) predicted air concentrations of 13-2,000 mg/m^3, depending upon the area covered by a given release of smoke. A model presented by Muhly (1983) predicted air concentrations of 90-2,000 mg/m^3 at 100 m from the source and 40-1,000 mg/m^3 at 200 m, 10-200 mg/m^3 at 500 m, and 3-700 mg/m^3 at 1,000 m from the source. Liss-Suter and Villaume (1978a) predicted precipitation concentrations of 6-60g/m^2, depending upon the total area covered by a single smoke release. Shinn (1987) presented a formula which predicted concentrations of fog oil in water (assuming that precipitated fog oil on the water surface became incorporated into the water column) in 1 m

2. Fog oil does not penetrate into the underground gopher tortoise burrows used by the Indigo Snake.

3. Prey of the Indigo Snake would not contain toxicologically significant concentrations of fog oil.

Bachman's Sparrow (*Aimophila aestivalis*)

Natural History

Bachman's Sparrow inhabits the longleaf pine habitat as utilized by the RCW, but is most abundant where a dense understory of herbaceous vegetation is present. These birds are ground nesters. Territories average only 0.25 ha. Bachman's Sparrow forages on the forest floor or in grassy openings, feeding mainly on seeds, especially those of grasses. The young are fed insects. Adults forage throughout the day when young are not present; when young are in the nest most foraging takes place during the first 5 hrs following sunrise. The incubation period is 14 days and the young fledge at 10-11 days of age. As for the RCW, Bachman's Sparrows most likely are used (preadapted) to exposure to smoke conditions. If so, adults may not be driven from their territories by the presence of smoke alone. Other disturbances associated with the training exercise, as indicated above, are more likely to scare the birds off their territories.

Inhalation Effects

Even if Bachman's Sparrows remain on their territories, it does not appear they would incur serious toxicological risks. As described for the RCW, air concentrations of fog oil even within 100 m of the generator are estimated to be less than those predicted to result in acute adverse effects, given the typical short periods of smoking.

Ingestion Effects

Since adult Bachman's Sparrows feed primarily on seeds, their food sources may not be greatly contaminated with fog oil. Even should all the fog oil precipitate from the air, we assume insignificant quantities would settle on and be ingested with the seeds. Unfortunately, data are not available to estimate the amount of fog oil that might be ingested when feeding on seeds.

Young Bachman's Sparrows are fed primarily insects and thus may be more susceptible to ingestion effects than are adults. (The adults carry the insects to the young in their bills, rather than ingesting and latter regurgitating the insects, and thus would not ingest fog oil while feeding the young.) Estimates of the maximum quantities of fog oil that might be ingested by nestlings are based on (1) the assumption that all the fog oil present in the smoke cloud precipitates from the air onto the vegetation, (2) precipitation onto the vegetation is the same as that on the substrate surface, (3) fog oil precipitating onto the vegetation would be ingested by and accumulated in the prey insects, (4) an average weight of 10 g for the young (adult weight is approximately 20 g), and (5) ingestion of a total of 0.2 mg/day of fog oil may result in adverse effects on the young (based on an upper level

of tolerance of 20.4 mg/kg/day, as estimated above). Note, this assumption does not take into account any differences in the toxicological effects of fog oil on young and adults; such data are not available.

The data in Table 1 were used in estimating the total potential fog oil accumulation per cm^2 of vegetation. From these data we estimated the square cm of leaf material foliage feeders (eaten each day by the nestlings) would have to consume to accumulate at least 0.2 mg of fog oil. These estimates vary from consumption of approximately 0.1 m^2 at 100 m to 3.0 m^2 at 1000 m from the source at concentrations estimated to be present one hour following the smoking exercise. The equivalent values for one week following smoking would be 0.4 and 13.3 m^2. We do not have data regarding amount of foliage consumed by individual prey, or the number of such prey fed Bachman's Sparrow nestlings per day. However, it does not appear that enough foliage feeders would be consumed for the young sparrows to ingest quantities of fog oil approaching that necessary to elicit toxicological effects.

Other Effects

If the birds avoid the smoke cloud by fleeing their territories, such displaced birds would intrude into the territories of adjacent pairs. Owing to the very small territory size of Bachman's Sparrow, typical smoking exercises would be expected to cloud areas that would encompass the territories of a large number of pairs. The actual number of pairs impacted obviously would depend upon the abundance of the species in the specific site being smoked. If a sufficiently large

number of pairs were displaced for a considerable period of time, the social organization and mating system could be disrupted, thus adversely affecting reproductive success of the population. Under such conditions smoking could, therefore, have an adverse effect on population demography of Bachman's Sparrow. However, such a problem would appear to be minimal, given the short duration of smoking exercises and the rapid dissipation of the fog oil once smoking has ceased.

If nesting adults were driven from the breeding territory during smoking operations, we might expect greater loss of eggs and nestlings to predators, depending upon the amount of time required for the adults to return to their territories in comparison to movement of nest predators into the site. Even if not predated upon, exposure of eggs to ambient temperatures during the time the adults were away may adversely affect hatching success and nestling survival. Also, the exposed eggs may be subjected to oil deposition that may adversely affect hatching success. Young deprived of adult brooding may also suffer from exposure effects, including deposition of fog oil on their bodies.

As indicated above, Bachman's Sparrows have had a long evolutionary history of association with smokes. It is doubtful, therefore, that presence of the smoke per se would result in temporary displacement of territorial birds. The other activities associated with the training exercise are more likely to chase adults from their territories. The net effect could be the same, however, regardless of why the adults leave their territories.

Another factor that must be considered is the potential effects of the fog oil on the insect populations. Oils have been used as insecticides in the past (as summarized by Liss-Suter and Villaume,

1978a); thus, there may be a reduction in insect populations and in turn a reduction in food availability for the adults and young should fog oil precipitate onto the vegetation. This would exacerbate any direct adverse effects of the fog oil on Bachman's Sparrow populations. However, we predict that the amount of fog oil that precipitates onto the vegetation would be insufficient to adversely affect the insect populations.

Assumptions that need tested

The predictions that Bachman's Sparrow would be minimally impacted by fog oil smoke screening are based almost entirely on the assumption that fog oil does not precipitate from the smoke cloud. Only if all the fog oil precipitated from the smoke cloud, could Bachman's Sparrow be impacted by fog oil smoke screening training exercises. Even then the quantities involved are predicted to be too low to elicit toxicological effects. Temporary dislocation of adults from their territories may also have adverse effects upon the population. However, preadaptation to smoke conditions is predicted to reduce the potential for such dislocations by the smoke cloud itself. The following assumptions therefore need to be tested to determine the impact of fog oil smoke screening exercises on Bachaman's Sparrow:

1. Fog oil concentrations are too low and of too short duration to result in inhalation effects.

2. Insufficient fog oil precipitates onto the foliage and grass seeds for there to be ingestion effects.

3. Adults are not displaced from their tertitories by the fog oil cloud itself, but by other activities associated with the training exercise.

4. Foliage-feeding insect populations are reduced in areas covered by the smoke cloud.

Gray and Indiana Bats (*Myotis grisescens* and *Myotis sodalis*)

The natural history of these two species of bats is sufficiently similar that they can be considered together.

Natural History

Both species of bats are nocturnal feeders, emerging at dusk and returning to their daytime roosts at dawn. The Gray Bat spends the day roosting in caves. The Indiana Bat secrets itself under the loose bark of trees or in cavities in trees during the breeding period; at other times it hangs up inside caves. Both species feed on flying insects such as moths, mayflies, and caddisflies.

Inhalation Effects

Since smoking exercises are conducted only during the daylight hours, neither species would be expected to be exposed directly to the fog oil cloud. It is also unlikely that toxicologically significant concentrations of fog oil would penetrate into the roosting sites inside caves. Neither would one expect the Indiana Bat to be exposed to

3. Adults are not displaced from their tertitories by the fog oil cloud itself, but by other activities associated with the training exercise.

4. Foliage-feeding insect populations are reduced in areas covered by the smoke cloud.

Gray and Indiana Bats (*Myotis grisescens* and *Myotis sodalis*)

The natural history of these two species of bats is sufficiently similar that they can be considered together.

Natural History

Both species of bats are nocturnal feeders, emerging at dusk and returning to their daytime roosts at dawn. The Gray Bat spends the day roosting in caves. The Indiana Bat secrets itself under the loose bark of trees or in cavities in trees during the breeding period; at other times it hangs up inside caves. Both species feed on flying insects such as moths, mayflies, and caddisflies.

Inhalation Effects

THIS IS NOT TRUE. BEST SMOKE IS MADE AT DAWN AND TWILIGHT AND ALSO EFFECTIVE AT NIGHT &RR

Since smoking exercises are conducted only during the daylight hours, neither species would be expected to be exposed directly to the fog oil cloud. It is also unlikely that toxicologically significant concentrations of fog oil would penetrate into the roosting sites inside caves. Neither would one expect the Indiana Bat to be exposed to

significant concentrations of fog oil while in the maternity trees. However, there are no data available regarding amount of air exchange within the spaces under the bark or in the tree cavities.

Ingestion Effects

The only way either species of bat could ingest toxicologically significant quantities of fog oil would be through food-chain concentration. Although some of the larvae of the insect prey may be exposed to fog oil if the oil precipitated from the smoke cloud onto the vegetation (and became incorporated in the water, in regard to the aquatic insect prey), the adults would not be expected to ingest significant quantities of fog oil.

Assumptions That Need Tested

Data are needed to test the assumptions that:

1. Fog oil from smoke screening exercises does not enter into caves where the bats hang up during the day or under the bark and into cavities of nursery trees of the Indiana Bat.

2. The prey of the bats does not contain sufficient quantities of fog oil to cause toxicological effects when ingested by the bats.

Flatwood Salamander and Striped Newt (*Ambystoma cingulatum* and *Notophthlamus perstriatus*)

These two species have similar habits and occupy similar habitats and are thus considered together.

Natural History

During most of the year adults of the two species live within the leaf litter and under debris in forested habitats (Dodd, 1993). When temporary woodland pools fill with water in the spring, the adults move into the pools to mate and lay eggs. Adults of the striped newt remain in the pools until they dry up, usually late spring-early summer. Flatwood salamanders move back to the forest floor after mating and laying eggs. The larvae of both species metamorphose and move into the terrestrial habitats as the pools dry up.

Inhalation/Direct Exposure Effects

Adults of neither species should be exposed to air containing fog oil while in the protected air spaces within the leaf litter. Eggs (which are attached to submerged vegetation or debris) and larvae, on the other hand, potentially would be susceptible to fog oil while within the aquatic habitat. However, it is assumed that significant amounts of fog oil do not disperse into the water, even if any were to precipitate onto the surface of the pools. As indicated above, any oil that might precipitate onto the surface of temporary pools is predicted to remain on the surface until it evaporates.

There are no toxicological studies of the effects of fog oil on larval salamanders. The most applicable data are from small fish

(fingerling American Shad and various species of minnows). Unfortunately, most of these experiments utilized No. 2 diesel fuel oil, which is more toxic than SGF No. 2 (Liss-Suter and Villaume, 1978a). Further, the experimental concentrations were well in excess of even the predicted worst-case scenario derived from the models. Assuming all the oil precipitates on the surface and becomes dispersed in the water column, the greatest potential concentration in the field was estimated to be 6 g/m^3; most estimates range from 0.1-3 g/m^3 (Table 1). The experimental concentrations resulting in 50% mortality of small fish ranged from 167-260 g/m^3 with exposure times of 24-96 hr (summarized by Muhly, 1983). Since scales on the fish would reduce absorption of fog oil through the integument, we assume that eggs and larval and adult salamanders would be more susceptible to fog oil than would small fish; there are no data to support this assumption. Given the predictions that (1) fog oil does not precipitate from the air, and (2) if it did, would not become dispersed into the water column, the impact of fog oil smoking on the eggs and larva of these two salamanders is predicted to be minimal.

Ingestion Effects

Adults presumably would not be at risk from ingestion of fog oil within their food. Both species feed on small invertebrates, including small insects and worms, living within the protected moist decomposing leaf litter layer. As indicated above, the substrate, and thus the food of these prey species, is predicted to contain insignificant quantities of fog oil. Owing to the above assumptions that fog oil does not

disperse into the water of shallow pools, it is also unlikely the prey of the larval salamanders would acquire fog oil through food chain concentration.

Assumptions That Need Tested

From the above evaluations, it would appear that there would be no adverse effects of typical smoking exercises on either species of salamander. So long as there were no vehicular traffic within the habitat (that mixed fog oil on the surface of the litter with the decaying litter below), adults living within the leaf litter layer would be isolated from any precipitation of fog oil that might occur. Data are needed to test the following assumptions:

1. Fog oil neither precipitates onto nor penetrates into the leaf litter layer.

2. Fog oil neither precipitates onto nor becomes incorporated into the water.

3. Prey species of the adults and larvae do not contain sufficient quantities of fog oil to elicit toxicological effects.

Golden-cheeked Warbler and Black-capped Vireo (*Dendroica chrysoparia* and *Vireo atricapillus*)

The habitat terrain occupied by these two species and their natural history are sufficiently similar that they have been considered together.

Natural History

Although the Golden-cheeked Warbler (GCW) and Black-capped Vireo (BCV) occupy different habitat types (mature and second growth juniper-oak woodlands, respectively), on Fort Hood (the installation in which they occur which is most like to be used for training exercises employing smoke screening) they both occur primarily on steep slopes and other rugged terrain.

Territory size of the GCW is approximately 2.5 ha. The nests of the GCW are constructed an average of 4.6 m above the ground level. Adults begin arriving at Ft. Hood in early March and have left by the end of July. The nesting period is May through June. The incubation period is 12 days and the young fledge at 9 days of age. Females remain on the nest 75% of the daylight hours during this time. Food consists primarily of insects, including beetles, lepidopteran caterpillars, homopterans, and hemipterans and spiders. Most of these are gleaned from the foliage of trees.

BCV arrive in Ft. Hood in mid March and have left by the end of September; the breeding period is from early April through early July. BCV territories encompass an average of 1.5 ha; nests are located 0.5-1.5 m above the surface. The incubation period and nesting time are similar to those of the GCW. Food consists mainly of lepidopteran and coleopteran larvae gleaned from the foliage of trees; some grasshoppers are also eaten.

Inhalation Effects

As discussed for the RCW, air concentrations of fog oil are predicted to be sufficiently low >100 m from the source as to have little effect on birds remaining within the smoke cloud. Given that the woodland habitat of the GCW and BCV is located on steep slopes and uplands, it is doubtful that much of the more dense smoke cloud from training exercises would encroach into the breeding territories of either species. Most training activities on Ft. Hood involve armored units. Training programs and associated smoking exercises most likely would be restricted to the flat lands; the steep slopes occupied by the warblers and vireos would not be utilized. Generators used in the training would be expected to be maneuvered at least 100 m from the nearest slopes, i.e., breeding territories. If so , there should be little possibility of toxicological effects from inhalation of fog oil for either species.

Only if the generators were operated sufficiently closer than 100 m to the steep terrain habitats of the two species, could either species be adversely affected. If the fog cloud encroached upon the slopes, both adults and nestling might be subject to inhalation effects. The severity of any effects would depend upon the concentration of the fog oil in the cloud.

Ingestion Effects

Should the fog oil cloud cover the territories of breeding pairs, then the calculations used for estimating worst-case ingestion effects for nestling Bachman's Sparrow can also be used for these species. Adults of both GCW and BCV weigh approximately 10 g. Thus, the values

given for young Bachman's Sparrows (which were based on a 10 g body weight) would apply for adult GCW and BCV. Assuming an average body weight of 5 g, nestlings of these two species would have to ingest only half the amount of fog oil as would adults to experience toxicological effects. Whether or not ingestion effects should be considered to have an adverse effect on GCW and BCV depends upon (1) the extent of encroachment of the smoke cloud into the steep slope woodland habitats of the two species, (2) whether any fog oil precipitates onto the vegetation, and (3) whether the fog oil accumulates in the prey invertebrates.

Other Effects

As in the discussion of Bachman's Sparrow, dislocation of adults from the breeding territories has the potential to disrupt social structure, and in turn reproductive success of the population. Unlike the RCW and Bachman's sparrow, neither the GCW or BCV are preadapted for tolerating smoke; vegetation fires are not a characteristic of the habitat of the two species. The territories of these two species are approximately 6-8 times larger than that of Bachman's Sparrow. Thus, fewer individuals of GCW and BCV potentially would be dislocated into territories of adjacent pairs than in the case of Bachman's Sparrow. Further, presence of the fog oil cloud would be so brief as to minimize disruptive effects upon social organization and mating system of the GCW and BCV.

If breeding adults are temporarily displaced from their breeding territories by the smoke cloud, the eggs and nestlings may be exposed to

greater predation risk during the time of abandonment. Also, absence of brooding by the adults may result in disruption of embryonic development or thermal regulatory problems for the nestlings, both of which would adversely affect recruitment of young into the population. Again, it would seem likely that the adults would return so soon as to minimize these potential effects.

Should fog oil precipitate onto the vegetation and reduce foliage insect populations, the food supply for both species may be adversely affected. This could have a negative impact on GCW and BCV population demography and exacerbate any other effects resulting from exposure of the birds to fog oil smoking. As indicated previously, however, there is no indication of precipitation of fog oil onto the vegetation.

Assumptions That Need Tested

Without information regarding the location of smoke screening training exercises, we cannot provide a realistic evaluation of the effects of such activities on either the GCW or BCV. Accordingly, data are needed to test the following assumptions:

1. Training activities and the resulting location of the smoke generators are restricted to lowlands away from the hillsides; the fog oil cloud would not cover the habitat of either species.

2. Even if the fog oil cloud covers the territories of the GCW and BCV, there is little or no precipitation of fog oil onto the vegetation.

Sage Grouse (*Centrocercus urophasianus phaios*)

Summary of Major Assumptions That Need to be Tested

As indicated in the introductory sections, the most critical information needed to test the above assumptions are field measurements of environmental concentrations and fate of the fog oil in the smoke cloud associated with typical smoking exercises. All the predictions in this report are based on models, untested assumptions, and anecdotal observations of fog oil clouds resulting from typical smoke screening exercises. Further, almost all the toxicological data are from studies that utilized inappropriate concentrations and exposure times. Specific data needed to test the assumptions regarding potential effects of fog oil smoke screening exercises on threatened and endangered species are listed at the end of each species account. The following summarizes the most important assumptions that need to be tested and other basic data that are necessary in order to evaluate the effects of fog oil smoke screening on threatened and endangered species:

Environmental concentrations

(1) Air concentrations of fog oil at varying distances from the source are similar to those predicted by the mathematical models.

(2) Fog oil dissipates from the smoked area within a few minutes following termination of the exercise (under usual atmospheric conditions).

(3) Most, if not all, of the fog oil evaporates, rather than precipitating onto the substrate surface, water surface, foliage and bark of trees, or onto the fur and feathers of animals.

(4) There is rapid evaporation of any fog oil that does precipitate onto the surface of litter, vegetation, water, or animals.

(5) Fog oil does not become incorporated into the water column of small shallow pools.

(6) Very little, if any, fog oil penetrates into the nest cavities of RCW.

(7) Very little, if any, fog oil enters the underground burrows of the gopher tortoises used by the Indigo Snake.

(8) The litter layer and bark of trees are effective in reducing the exposure of litter- and bark-dwelling animals (including the Indiana Bat) to fog oil.

In addition, the following data are needed:

(1) Amount of fog oil present in foliage-feeding invertebrates.

(2) Amount of oil film that would be deposited on exposed bird eggs, both in open nests and those in RCW cavities.

Toxicological Data

Inhalation/direct effects

Data are needed regarding:

(1) Toxicological responses of surrogate species to fog oil concentrations recorded within the smoked area and for duration of exposure as would be encountered by individuals in the field.

(2) Effects of oil film, utilizing quantities presumed to precipitate onto exposed eggs, on hatchability of bird eggs.

(3) Toxicological tolerance data for larval salamanders utilizing fog oil concentrations recorded in the field, (but, only if it is found that fog oil becomes incorporated into the water of temporary pools).

Ingestion effects

If field data show that fog oil does precipitate onto the vegetation, is incorporated into the water column, and/or is taken up by invertebrate prey of the various species, obtain ingestion toxicity data utilizing the range of environmental concentrations recorded from field studies.

Behavior of Birds

If the toxicological studies indicate possible detrimental effects under the actual exposure regimes, the following field data are needed regarding the behavior of the various species of birds in response to smoke screening operations.:

(1) Avoidance of the fog oil smoke cloud by temporarily fleeing the smoked site.

(2) If the birds do avoid the smoked area, the length of time until individuals return to their home ranges.

(3) If adults remain in the smoked area, record whether on the nest or flying around within the smoke cloud.

Acknowledgments

We wish to thank the following individuals for providing information regarding smoking exercises: CPT Alberts, Commanding Officer of the 91st Chemical Company, 24th Division, Ft. Stewart, GA; Sgt Paul Wakefield, 378th Chemical Company (Res), Urbana, IL; LTC Harry Sutton, Ft. McClellan, AL; John Allen and James Wheeler, Dugway Proving Ground, UT; and Brian Loche, Advanced Science Institute, Las Cruces, NM. We also thank Leslie Jette for compiling natural history information regarding the birds and Indigo Snake.

Table 1. Estimates of fog oil concentrations resulting from typical smoke screening operations at given distances from the source. The values represent the midpoints ("Average") of the lowest and highest ("Range") estimated concentrations predicted from models based on six sets of environmental conditions Driver, et al. (1992). The models are based on a two-hour release at a rate of 80 gallons (302 litters) per hour.

1a. Air Concentration (Estimates of concentrations present during the release)

Distance	Average	Range
100 m	64 mg/m^3	25-102 mg/m^3
200 m	56 mg/m^3	8-105 mg/m^3
500 m	46 mg/m^3	1.3-90 mg/m^3
1 km	13 mg/m^3	0.8-25 mg/m^3

1b. Surface deposition (Total accumulation based on the untested assumption that all the fog oil released precipitates from the air into an area of 1 km x 1 km)

At end of the smoking period

Distance	Average	Range
100 m	3,080 mg/m^2	160-6,000 mg/m^2
200 m	1030 mg/m^2	960-2,000 mg/m^2
500 m	243 mg/m^2	6-480 mg/m^2
1 km	101 mg/m^2	2.4-200 mg/m^2

One hour after stopping smoking (Assuming 35% evaporation)

Distance	Average	Range
100 m	2,000 mg/m^2	104-3,900 mg/m^2
200 m	670 mg/m^2	40-1300 mg/m^2
500 m	158 mg/m^2	3.9-312 mg/m^2
1 km	66 mg/m^2	1.6-130 mg/m^2

One week after stopping smoking (Assuming 85% evaporation)

Distance	Average	Range
100 m	462 mg/m^2	24-900 mg/m^2
200 m	154 mg/m^2	9-300 mg/m^2
500 m	36.5 mg/m^2	0.9-72 mg/m^2
1 km	15 mg/m^2	0.4-30 mg/m^2

1c. Aquatic Concentrations (Based on the assumption that all the fog oil released precipitates onto the surface of the water and becomes incorporated into the water column; pools are assumed to be 1 m deep)

Distance	Average	Range
100 m	3,080 mg/m^3	160-6,000 mg/m^3
200 m	1,030 mg/m^3	60-2,000 mg/m^3
500 m	243 mg/m^3	6-480 mg/m^3
1 km	101 mg/m^3	2.4-200 mg/m^3

ROUGH DRAFT

ENVIRONMENTAL AND HEALTH EFFECTS REVIEW FOR OBSCURANT FOG OIL

May 1992

C.J. Driver
M.W. Ligotke
J.L. Downs
B.L. Tiller
E.B. Moore Jr.
D.A. Cataldo

Supported by:

Joint Program Office
Naval Surface Warfare Center
Dahlgren, Virginia 22448

Project Order Number

Contract Officer's Representative: Randall S. Wentsel
U.S. Army Chemical Research, Development, and Engineering Center
Aberdeen Proving Ground, Maryland 21010-5423

Pacific Northwest Laboratory
Richland, Washington 99352
Operated for the U.S. Department of Energy
by Battelle Memorial Institute

inside title page

Report Documentation Page

inside report documentation page

FOREWORD

Opinions, interpretations, conclusions, and recommendations are those of the authors and are not necessarily endorsed by the U.S. Army.

_____ Where copyrighted material is quoted, permission has been obtained to use such material.

_____ Where material from documents designated fro limited distribution is quoted, permission has been obtained to use the material.

_____ Citations of commercial organizations and trade names in this report do not constitute an official Department of the Army endorsement or approval of the products of services of these organizations.

_____ In conducting research using animals, the investigators adhered to the "Guide for the Care and Use of Laboratory Animals" prepared by the Committee on Care and Use of Laboratory Animals of the Institute of laboratory Animal Resources, National Research Council (NIH Publication No. 86-23, revised 1985).

_____ For the protection of human subjects, the investigators have adhered to policies of applicable Federal law 45CFR46.

_____ _____

PI Signature Date

this page intentionally blank

ENVIRONMENTAL AND HEALTH EFFECTS REVIEW FOR OBSCURANT FOG OIL

TABLE OF CONTENTS

LIST OF FIGURES

1.0 PURPOSE AND NEED

Modern warfare conditions and tactics require that land, sea and air forces be trained with and have at their disposal a wide variety of offensive and defensive systems and materiels. Among these systems, smokes and obscurants have long been employed to mask both troop and mechanized equipment movements. Smokes, which have been employed since the first world war, are widely used to visually mask the movements of both ground and sea forces. Fog oils are used to obscure the visible spectrum. Vehicle exhaust systems and smudge pots are used to produce white obscurant smokes from liquid fog oil. A new generator (currently designated the XM56) enables the use of fog oil in combination with other materials such as graphite flakes, and is an effort to improve the efficiency of smoke generation and to extend the effectiveness of the resulting obscurant cloud to include the infrared spectrum. The use of infrared-obscuring smokes will not decrease the need for conventional visible wavelength obscurant smokes such as fog oil because the infrared-obscuring smokes do not function well in the visible range. Of the conventional smoke materials, fog oil is likely to remain heavily used for reasons of low cost, ease of handling and smoke generation, dispersion characteristics, and safety (Eberhard et al. 1989). Full-scale tests of prototype generation systems and multiple-generator training activities performed under actual field conditions are a necessary step in the process of development and implementation of fog oil as an obscurant smoke.

2.0 DESCRIPTION OF PROPOSED ACTION

Review of the use of fog oil aerosols includes the consideration of the physical and chemical nature, dissemination, aerial transport, deposition, fate, and potential health and environmental impacts of the aerosols. Health concerns center primarily around dermal and inhalation risk, and environmental concerns include potential terrestrial, aquatic, and wildlife impacts.

2.1 BACKGROUND

Fog oil smoke must be produced and disseminated in air to be effective as an electromagnetic obscurant in the visible spectrum. The efficacy of fog oil aerosols under battlefield conditions depends on air concentrations, temperature, fog oil droplet sizes, and other physical properties. In contrast to the mechanical dissemination of graphite flakes, fog oil is disseminated by vaporization and subsequent recondensation as the vapors cool in the atmosphere immediately beyond the exhaust pipe of the generation system. In the XM56 smoke generator, fog oil and graphite flake obscurants are released from the back of a single vehicle and mix in the air column downrange of the vehicle.

2.2 HISTORY

Fog oil is a middle distillate product of crude petroleum oil used in industry which has been adapted by the U.S. military for use in producing obscurant smoke screens.

2.2.1 Commercial Applications

Rather than being the result of specific processing for the military, fog oil is drawn from a lubricant stock sold as a raw material to various industries. Fog oil has been used as a diesel engine lubricating oil (Lushbaugh et al. 1950). Further refinement of SGF-2-like lubricating oils may be performed to transform the pale oils to white oils. White oils are used for a variety of purposes which, depending on refining procedures, include metal working and cutting oils, newspaper ink (suspension of carbon black in white mineral oil), and agricultural pesticide and livestock sprays. Further refinement can produce medicinal mineral oil that has been used in various forms as a lubricant, laxative, and for other purposes (Liss-Suter and Villaume 1978)

2.2.2 Military Applications

Dense black smoke from incompletely burned crude oil was used to conceal U.S. Navy vessels during maneuvers in 1913 (U.S. Army 1986). Military uses of white fog oil obscurant smoke date from World War II and Korean conflict when it was used to conceal troop movements, beach landings, and supply lines from ground and aerial reconnaissance. Initially, military applications used industrial oil burners to produce smoke, however, each succeeding generation of smoke generator has been either more effective, lighter, or more mobile than earlier models (Liss-Suter and Villaume 1978).

Fog oils and other petroleum products have been used to provide white obscurant smokes. Products that have been used include standard grade fuel No. 1 (SGF-1) and SGF-2 fog oil, diesel fuel, jet fuel JP-4, and kerosene. SGF-1 has not been supplied to the US Army since the mid-1970s (Liss-Suter and Villaume 1978). SGF-2 fog oil is currently used for year-round obscuration needs (U.S. Army Workshop 1986). It is also designated by NATO Code No. F-62 (MIL-F-12070C, Amendment 2).

The SGF-2 fog oil currently used by the U.S. Army is little changed from that used in the 1940s with the exception that fog oil procured at or some years prior to promulgation of MIL-F-12070C was designated "new" because the refining process was modified to reduce quantities of some of the potentially harmful components of the material. Generally smoke is generated from pure SGF-2 fog oil, however, quantities of kerosene may be added when the ambient temperature is below freezing (U.S. Army 1975), with the quantity of kerosene increasing with decreasing temperature (see Section 2.4.1).

2.3 PHYSICAL AND CHEMICAL NATURE OF FOG OIL

Fog oil is a liquid consisting of a large number of organic compounds. The military specifications were likely selected based on both performance and availability needs, with the result that an exact formulation of SGF-2 fog oil is not possible to define. However, the general characteristics of the liquid are discussed below.

In this and subsequent sections the generic use of the term "fog oil" will refer to general fog oil compounds or SGF-2 fog oil. References to SGF-1 fog oil and other materials will made by specific name.

2.3.1 Physical Characteristics

The physical characteristics of fog oil are listed in Military Specification MIL-F-12070C. SGF-2 fog oil is a middle distillate product of crude petroleum oil. It is drawn from stocks of a raw industrial lubricant oil. It is a light viscosity lubricant, sometimes called "100 pale oil" because it has a viscosity similar to SAE 20 motor oil and is a pale or straw-colored liquid (Liss-Suter and Villaume 1978). Distillates having no additives and, when meeting the following requirements, may be used: 320 °F (minimum) flash point; Saybolt universal viscosity at 100 °F between 110 (maximum) and 100 (minimum); 0.1% maximum carbon residue; 0.1 maximum neutralization number; and -40 °F maximum pour point. Because of the variety of crude oil source compositions, distilling and processing procedures, and the range of acceptable physical characteristics, individual batches of fog oil may differ in composition and appearance. The density of liquid SGF-2 fog oil is about 0.92 g/cm^3.

It is reasonable to assume that battlefield smoke will not consist exclusively of fog oil droplets. Because of dust from mechanical movements and explosions, and graphite flakes from generators based on the XM56, it is likely that fog oil may coat these and other aerosols present in the battlefield. Although data are lacking on the interaction of fog oil and other windborne materials, it is possible that one result of such a mixture of materials is an increase of fog oil deposition to skin, eye, and upper respiratory tract surfaces relative to a pure fog oil aerosol. This would be expected because fog oil coating the larger dust and graphite particles would deposit to such surfaces at increased rates.

2.3.2 Chemical Characteristics

SGF-2 fog oil contains many hydrocarbon compounds, most of which are present in quantities less than 0.1%. Although the composition of fog oil may vary with batch, an analysis of one sample indicated it to be about 50% aliphatic and 50% aromatic compounds (Ballou 1981). However, the extent of the overlap between the compounds on the gas chromatography/mass spectroscopy chromatogram was so large as to preclude identification of all but a few actual compounds. Katz et al. (1980) identified 42% to 60% of samples as aliphatics that included both straight and branched chain compounds with carbon numbers between C_{12} and C_{22}. The same study measured 2- and 3-membered ring aromatic compounds also ranging between C_{12} and C_{22}. Substituted indans, tetrahydronaphthalenes, naphthalenes, and biphenyls were the principal 2-

membered ring compounds. Phenanthrene, dihydrophenanthrenes, fluorenes, and acenaphthene were the 3-membered ring compounds identified.

Kerosene is a pale yellow or water-white oil liquid mixture of petroleum hydrocarbons. Constituting the fifth distillation fraction of petroleum, most of the hydrocarbons are of the methane series (10 to 16 carbon atoms per molecule) and commonly include n-dodecane, alkyl derivatives of benzene, napthalene, and 1- and 2-methyl 5,6,7,8-tetrahydronapthalene. Kerosene is insoluble in water; has a boiling point between 175 and 325 °C; has a flash point that ranges between 65 and 85 °C; and is used in lamps, stoves, flares and as a degreaser and cleaner. A deodorized and decolorized form of kerosene, called Deobase, is used in cosmetics and as an insect spray (MERCK 1983). The density of kerosene is about 0.80 g/cm^3.

Data characterizing the chemical condition of field-generated mixed aerosols of fog oil and dust or graphite flakes are not available. The chemical stability, on surfaces and in the atmosphere, of fog oil coatings on graphite flake particles is not known.

2.4 MODE OF DISSEMINATION AND DISPERSION

Fog oil aerosols are generally disseminated using long-term ground-based systems. Because the aerodynamic sizes of recondensed fog oil particles are small, downwind dispersion is dependent on local meteorological conditions. Deposition rates exceed the settling velocities of the particles.

Currently under design, the XM56 smoke generator for producing graphite flake and fog oil smokes (the separately produced smokes mix downwind of the generator), like most fog oil smoke generators, is also based on long-term releases. These provide support for the obscuration reinforcing system (ORS) or the large area screening system (LASS). In contrast, smoke pots provide small-area coverage, and are generally only used in the early stages when establishing large-area screens.

2.4.1 Mode of Dissemination

Fog oil aerosols are disseminated by the recondensation of vaporized liquid fog oil. Liquid fog oil is vaporized in the hot exhaust gases from smoke-generating engines or within self-contained smudge pots that function for about 10 min. In addition to the XM56 for mixed graphite flake and fog oil smokes, other fog oil smoke generators include the XM16, M3A3, XM52, M52 (helicopter), VEESS, AN-M7 (floating smoke pot), and AN-M7A1 (floating smoke pot). Typical generation rates for the devices range between about 24 and 80 gal/h. Exceptions to this range include the 900 gal/h M52 (900 gal/h) and the smoke pots (1.5 to 2 gal are vaporized in 8 to 13 min (U.S. Army 1986). The VEESS is used to disseminate diesel fuels as obscurants using vehicle exhaust systems and requires various grades of diesel fuels to operate effectively. The nominal fog oil generation rate using an XM56 smoke generator is 80 gal/h (77 g/s); this value was used in all calculations herein.

For use in arctic conditions, fog oil is sometimes mixed with kerosene, or kerosene-like products such as diesel fuel and jet fuel, to improve the flowability of the resulting liquid at temperatures below 32 °F (U.S. Army 1975). The recommended JP-4 or kerosene volume concentration is 0% above 32 °F, 25% between 0 ° and 32 °F, 40% between -25 ° and 0 °F, and 50% between -40 ° and -25 °F. In addition, the use of kerosene without a paraffin base (preferably JP4) is recommended at temperatures below 0 °F. As an alternative, paraffin lumps can be strained out of kerosene prior to mixing with fog oil (U.S. Army 1975).

2.4.2 Aerodynamic Characteristics and Settling Velocity

The aerodynamic behavior of fog oil particles is not difficult to determine. This is because fog oil particles are spherical liquid droplets having aerodynamic sizes which are simply equal to their physical diameter multiplied by the square root of the specific gravity of fog oil (SG_{SGF2} ~ 0.92). Aerodynamic particle size distributions of fog oil aerosols vary with generation method and concentration. Generation method influences the temperature at which liquid fog oil is vaporized and the dynamics of condensation. Concentration influences the rate of coagulation of droplets. The physical or count median diameters (CMD) of fog oil aerosols typically range between 0.5 and 1.0 μm; the mass median diameters (MMD) are inherently greater because of the log-normal distribution of particle sizes about the median. Given the specific gravity of fog oil, the aerodynamic mass median particle diameter (AMMD) is about 4% smaller than the MMD. In addition to AMMD, the second parameter required to identify the aerodynamic size distribution of a log-normally distributed aerosol is the geometric standard deviation (GSD).

The aerodynamic particle size distribution of fog oil aerosols have been measured by several investigators. The AMMD (GSD) ranged between 0.6 μm (1.6) and 1.3 μm (1.6) during measurements made in inhalation aerosol chambers (Ballou 1981). Measurements made by Cataldo et al. (1989) in a wind tunnel under field-simulated conditions, but using less dilution air in the vapor condensation zone, ranged from 1.6 μm (1.7) to 3.1 μm (1.7). Katz et al. (1980) measured MMD between 0.7 and 1.7 μm using a similar (inertial) sampling technique.

Assuming a CMD between 0.5 and 1.0 μm and a GSD of 1.65, a "typical" aerodynamic size distribution of fog oil aerosol may have AMMD between 0.9 and 1.9 μm. Because this estimate agrees well with actual measurements made in the laboratory and field, an aerosol having an AMMD of 1.4 μm and a GSD of 1.65 was used in this document in calculations of coagulation, dispersion, and deposition. Based on 90% of the aerosol mass, this particle size distribution contains particles having aerodynamic diameters between 0.6 and 3 μm, and settling velocities ranging roughly between 0.001 and 0.03 cm/s.

The particle size distribution of mixed graphite flake and fog oil aerosols are not available in the literature. However, because most fog oil coagulation will occur close to the XM56 generator, it is possible to estimate the particle size distribution of the mixed aerosol. The AMMD of such a mixed aerosol was estimated to be 2.2 μm (Driver et al. 1992a). Other parameters describing the estimated aerosol distribution include D_{16} ~ 1 μm, and D_{84} ~ 7.5 μm, resulting in a GSD of about 2.5 and 3 to 3.5 for particle sizes less than and greater than the AMMD, respectively. Based on the estimated particle size distribution of a mixed graphite flake and fog oil aerosol, the range of particle settling velocities is approximately 0.002 to 0.7 cm/s. This range of settling velocities corresponds to aerodynamic particle sizes of 0.7 to 15 μm, a range that includes 90% of the mass of the mixed aerosol particles. Thus the settling and deposition rates of oil-coated graphite flakes would be roughly 2 to 20 times greater than for fog oil particles in the absence of graphite flakes. The impact of battlefield dust is not as simple to estimate because of the greater variability in the characteristics of suspended dust.

Although it is possible to estimate the resulting size distribution of a mixed graphite flake and fog oil aerosol, it is not possible to estimate the compositional characteristics of the particles by size. This is because determination of the coagulation of fog oil on larger graphite flakes depends on many parameters than include dissemination procedures, aerosol characteristics, and meteorological conditions. The primary influence of coagulation may be to provide a partial or complete coating or film of fog oil on graphite flakes. This could alter the deposition of fog oil to the nasal regions of the respiratory tract and could influence transport, weathering, and fate of the particles in the environment.

2.4.3 Windborne Plume Dispersion

A detailed description of windborne plume dispersion of fog oil aerosols is presented in Appendix A. In the case of a mixed aerosol, the aerodynamic size and settling velocity of mixed graphite flake and fog oil particles would be approximately similar to that of graphite flake aerosols, and the atmospheric distribution and surface deposition would also be similar. If coagulation occurs and the graphite flakes become coated with fog oil, the surface loading of the fog oil component close to the generator will potentially be greater than for a fog oil-only aerosol.

2.5 CONCERNS AND POTENTIAL IMPACTS

Concerns and potential impacts of the windborne dispersion of fog oil aerosols include direct health effects and environmental fate and effects.

2.5.1 Direct Health Effects of Fog Oil

The aerodynamic size of fog oil droplets generated as obscurant aerosols is sufficiently small that inhalation is a route of exposure for humans. The health effects of fog oil aerosols are discussed in Section 4.2.

2.5.2 Environmental Fate and Effects

Fog oil is degraded in the environment by chemical reactions, photochemical degradation, and microbial action. At single or rarely used sites, the effects of fog oil are expected to be transitory. At regularly used sites effects to plants and animals may occur. The environmental fate and effects of fog oil are discussed in detail in Sections 4.1, 4.3, and 4.4.

2.5.3 Secondary Impacts of Fog Oil Use

Fog oil aerosols may impact visibility. If smoke is generated near roadways, an analysis of visibility impacts should be made (Appendix A and Section 4.1.3. Accidental spills of bulk fog oil liquid are possible. Contingency plans to contain spills should be prepared when the material is transported near sensitive areas (Section 3.2).

3.0 ENVIRONMENTAL LAWS AND REGULATIONS

3.1 AIR QUALITY

Fog oil and kerosene are not subject to regulation as a criterion pollutant under the Clean Air Act. There are no NESHAPs for fog oil or kerosene under the existing regulations of the Clean Air Act. Also, cyclic alkanes are also not listed as pollutants to be regulated in the 1990 amendments to the Clean Air Act. Constituents of fog oil in sufficient quantity may cause fog oil to be regulated; however, obscurant tests generating even very large amounts of fog oil are unlikely to result in regulated emissions. For example, emissions of volatile organic compounds from a point source in excess of 40 tons/yr are regulated under the prevention of significant deterioration regulations in 40 CFR 52.21. Standards of performance for vessels storing petroleum products that emit volatile organic compounds may be applicable if the capacity of the storage vessel is sufficiently large (40 CFR 60.110).

Reactions involving hydrocarbons, nitrogen oxides, oxygen, and sunlight produce chemically and biologically active compounds that are potentially harmful to health and environment. Air-quality standards are related to ozone, the major toxic product of these reactions. The national standard for ozone is 235 $\mu g/m^3$ (not to be exceeded for more than 1 h/yr) (40 CFR 50.9). Although concentrations of fog oil/kerosene in air are unlikely to reach levels high enough to directly impact air quality, these hydrocarbons can enter into a series of complex chemical reactions that lead to the formation of ozone, a major constituent of photochemical air pollution. Ozone production from hydrocarbons is limited by amount of nitrogen oxides (NOx) available. Because activities (e.g. air and vehicular traffic) introduce air pollutants such as NOx into the airshed, specific knowledge of the amount of activity, NOx concentrations, and the atmospheric conditions during fog oil/kerosene releases will be needed estimate potential ozone production. If generation tests were conducted in an ozone attainment area (relatively pristine) during a prolonged air inversion while a large-scale military maneuver is conducted, it is conceivable that sufficient NOx emissions would be released to cause a brief diminution of air quality from ozone production.

Presuming continuous generation of fog oil for a 24 h period, the 150 $\mu g/m^3$ NAAQS for particulates (including liquid aerosols) would be exceeded at distances within about 2 to 40 km of the source, depending on atmospheric conditions (see Appendix A). For a single 30-min release of fog oil smoke in a 24 h period, the NAAQS would be exceeded within about 0.2 to 3 km of the source, again depending on atmospheric conditions.

3.2 WATER QUALITY

Discharges of oil into or upon the navigable waters (to include interstate wetlands, rivers, and streams) of the United States that violate water-quality standards or cause a film or sheen on the surface of the water are prohibited (40 CFR 110.3-110.6). However, procedures and other requirements have been established to prevent the discharge of harmful quantities of oil into navigable waters from facilities that store and consume oil (40 CFR 112.1). A determination must be made to assess whether the facility that stores the fog oil could, because of its geographic location, discharge oil into navigable waters. Further investigation is required to determine whether a Spill Prevention Control and Countermeasure Plan is required.

Runoff to a sewer may create a fire or explosion hazard (Occupational Safety and Health Act). A "point discharge" of pollutants to waters of the United States could occur as a result of testing and demonstrating the fog oil. Therefore, a national pollutant discharge elimination system (NPDES) permit under the Clean Water Act may be required. Given that the fog oil will be tested on a military reservation, it is not likely that the fog oil will affect any community water supply system. Therefore, the Safe Drinking Water Act national primary drinking water regulations are

not applicable. An underground injection control permit is not required because underground injection of the fog oil is not planned.

3.3 HAZARDOUS SUBSTANCES AND HAZARDOUS WASTES

Under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) regulations, Section 101(14)(F), the definition of hazardous substance excludes "petroleum, including crude oil or any fraction thereof." Under Resource Conservation and Recovery Act (RCRA), mineral oil (similar to fog oil) does not meet any of the characteristics of a hazardous waste and is not a listed constituent in the TCLP.

Mineral oil is not listed as a hazardous material under regulations of the Hazardous Materials Transportation Act (HMTA). However, under the HMTA, oil is classified as a flammable and combustible liquid subject to the labeling, packaging, and transportation requirements.

An assessment of the region where the fog oil is demonstrated and tested should be conducted to determine whether any threatened or endangered species or their habitats will be affected.

3.4 STATE REGULATIONS

State regulations may differ from federal regulations. Therefore, state regulations should be consulted in locations where activities occur that involve fog oil.

4.0 ENVIRONMENTAL AND HUMAN HEALTH EFFECTS

Fog oil obscurant smokes are dispersed by wind and become sources of exposures to the environment and man. Exposure to fog oil may affect human health and the well being of wildlife, aquatic biota and terrestrial systems. Recommended mitigation approaches to field-dispersed fog oil material are not extensive because of the natural degradation of fog oil with time and the low levels predicted to impact downwind areas. Other environmental impacts of the manufacture, use, and disposal of the material are likewise not expected to be severe with the exception of smoke generation in confined spaces and accidents or spills involving large quantities of the bulk material.

4.1 NATURE OF SOURCE TERM

Source terms for exposure to fog oil aerosols include the windborne smoke (inhalation and visibility effects) and terrestrial and aquatic deposits of materials (dermal exposures, water quality, and plant and animal effects). Another potential source term is the release of large quantities of bulk liquid fog oil via accidental spills. Resuspension and redistribution of materials deposited by wind are less likely than for other obscurant materials such as brass or graphite flakes.

4.1.1 Environmental Source Term (Deposition and Resuspension)

Windborne fog oil aerosols deposit on ground and other surfaces at rates that are influenced by atmospheric conditions and surface characteristics. Deposits are distributed in a downwind direction and are generally greatest near the source and quickly decrease as downwind distance increases. A detailed description of estimated rates and magnitudes of fog oil deposition for downwind distances between 0.1 and 40 km is presented in Appendix A. Estimates of surface mass loading for several types of atmospheric conditions range from 50 to 1300 mg/m^2 at a distance of 1 km downwind of the source to less than 0.001 to 0.5 mg/m^2 at a distance 40 km downwind. Even under worst-case atmospheric conditions, fog oil deposition was estimated to be less than 10 mg/m^2 at downwind distances greater than about 3 km from the source. Unless the ambient wind is very steady in direction, the actual deposition levels predicted above will be conservative as the windborne plume will tend to meander. The area potentially impacted by fog oil deposition should be estimated based on expected or actual fluctuations in wind direction. Often this may be ± 45° from the expected mean wind vector. For example, if the mean wind direction is known to be from the northwest, then it might be reasonable to assume that the area potentially impacted by fog oil will be bounded by the directions south and east of the source.

Fog oil droplets will deposit on soil, vegetative, water, or other surfaces. After deposition, the material will likely remain on or be incorporated into the surface; resuspension and redistribution of deposited fog oil is not likely because of the natural adhesion of the material on most surfaces. One case in which resuspension and subsequent redistribution of fog oil could occur if deposits on dry soil were resuspended during a post-exposure dust storm. In nearly all cases of resuspension, the subsequent redistribution of fog oil would be to a larger area than the original deposit and would result in deposition levels much smaller than the levels at the original deposit site. Deposition of fog oil on moving bodies of water such as streams poses a second case in which the material could be transported away from the original deposit site. Estimated deposition rates (Appendix A) combined with specific knowledge of the stream flow characteristics will allow determination of fog oil concentrations in the stream. These concentrations will be limited to the period following smoke generation, and will be greatly attenuated shortly thereafter.

Most fog oil will remain at the location where it is deposited. The rate of incorporation and chemical, photochemical, and microbial degradation of the material will vary greatly depending on the characteristics of the surface and site. Volatilization of fog oil exposed to air will also occur and will result in a 30% to 40% decrease in fog oil mass within a 1 h period at temperatures between 0 and 40 °C (Appendix A). Within one week, about 80% to 90% of the fog oil mass may

have been evaporated. At lower temperatures, volatilization rates are much slower. These estimates of fog oil volatility were based on the assumption of 1.5 μm particles suspended in air, the actual evaporation rates of deposited particles may vary.

4.1.2 Human Inhalation Source Term

Inhalation of windborne fog oil smoke poses a potential health risk. The air concentrations of fog oil aerosols were estimated (Appendix A) based on a single XM56 smoke generator operating under uniform atmospheric conditions. Concentrations produced by multiple, co-located generators will be roughly a scalar value of the number of generators in operation. Actual meteorological conditions will likely result in lower time-averaged air concentrations as real smoke plumes will tend to meander downwind of the generator. Based on the estimates provided in Appendix A, windborne fog oil concentrations will generally decrease from between 7 to 140 mg/m^3 at downwind distances between about 0.1 and 0.2 km, to between less than 0.003 and 0.3 mg/m^3 at a distance of 40 km. Air concentrations exceeding 10 mg/m^3, the short term exposure limit (STEL) for fog oil (see Section 4.2) were predicted to potentially occur within downwind distances of 0.4 km of the source during five of six meteorological cases. During the sixth case, the relatively rare moderately stable atmospheric conditions, the STEL could be exceeded within about 2 km of the source.

The primary determinant of inhalability of aerosols is the aerodynamic diameter of the individual particles (Miller et al. 1979). Fog oil particles are spherical and have aerodynamic sizes ranging from about 0.6 to 3 μm (see Section 2.4.2). Particles having aerodynamic diameters less than roughly 3.5 μm can penetrate effectively to the gas-exchange, or aveolar region of the lungs, and are generally considered to be respirable (ACGIH 1985). Thus, all or nearly all of the mass of fog oil aerosols are inhalable and respirable, and most inhaled fog oil particles have the potential to become deposited in all regions of the human respiratory system. Because some inhaled particles are exhaled, the total deposition of fog oil particles in the human respiratory system may range roughly between 30% and 90% of the total amount inhaled. This conclusion is based on deposition fraction versus aerodynamic particle size data (ACGIH 1985).

4.1.3 Visibility Reduction Source Term

Fog oil smoke poses the potential for causing visibility reductions. These may be significant, especially if smoke drifts across public-access roadways during testing periods. The results of an analysis of the potential of a mixed fog oil and graphite flake smoke under arctic conditions are available (Driver et al. 1992a) and are presented in detail in Appendix A. It is likely that these results will be somewhat conservative because of the low temperatures assumed and the reliance on estimated plume centerline aerosol concentrations. The distances from the source for which the estimated transmittances were less than 5% (at a crosswind range of 1 km) extended from 0 to about 20 km, depending on weather conditions. This indicates that the potential for visibility reductions may exist at extended downrange distances, and should be evaluated for each location having roadways within about 25 km downwind of the test site.

4.2 HUMAN HEALTH EFFECTS

A review of the human health effects of fog oil exposure via respiratory, dermal, and oral routes are presented in this section. Because toxicity and carcinogenicity data are limited for SGF-2, information on the health effects of other lubricating oils was used to evaluate the health hazards associated with field generations of fog oil smokes. The risk of inhalation, ingestion, aspiration, and dermal exposure are discussed and the potential for explosion, fire and visibility hazards are also addressed.

Fog oil can be co-generated with electromagnetic obscurants such as graphite flakes or brass to produce smokes with broader screening ability. The potential health effects of mixed smokes of fog oil and graphite flake or brass are discussed by Driver et al. (1992 a, 1992b and 1992c).

4.2.1 Direct Inhalation Hazards

In general, the respiratory toxicity of a petroleum hydrocarbon is inversely proportional to its viscosity (Klaassen et al. 1986). Hydrocarbons with viscosities ≤ 35 Saybolt universal seconds (SUS) pose an extreme health risk when inhaled; high viscosity hydrocarbons (viscosity ≥ 150 SUS) such as heavy oils and greases present only a very low respiratory risk. The viscosity of SGF-2 (100 to 110 SUS at 100 °F) appears to be in the low to moderate respiratory toxicity range. This is borne out by toxicity studies using fog oils and other lubricating oils. Although concentrations of airborne lubricating oils in the range of 60 to 200 mg/m^3 have resulted in systemic pathologic changes that include oil pneumonitis, immunodepression, and hepatic, lung and cardiac lesions (Selgrade et al. 1987, Brahmachari 1958, Muhly 1983), most of these lesions may have been caused by additives or other contaminants in the oils. Only moderate, largely reversible, respiratory changes have been observed in animals exposed to uncontaminated fog oils. Repeated exposures to airborne SGF-2 (3.5 h/day, 4 days/week for 4 to 13 weeks) at concentrations below 500 mg/m^3 resulted in minimal systemic and pulmonary changes in rats (Grose et al. 1985, Grose et al. 1986, Selgrade et al. 1987 and 1990). Reduced body weight gain (Grose et al. 1985), increased sleep time, elevated erythrocyte count, and mild inflammatory edema in the lungs were observed in animals exposed to ≥ 500 mg/m^3; however, pulmonary function and gas exchange were not compromised (Grose et al. 1986, Selgrade et al. 1987 and 1990). The subchronic exposure to 1,500 mg/m^3 resulted in a progressive granulomatous lesion after the exposure had ceased. The lesion was more pronounced in male rats than in females (Grose et al. 1986, Selgrade et al. 1987). Accumulation of macrophages in alveolar spaces of the lung is the major histopathologic effect reported in a variety of species exposed to oil mists (Lushbaugh et al. 1950, Stula and Kwon 1978, Osmitz et al. 1987). Although the acute LC_{50} (the concentration that is lethal to 50% of the rats tested) of SGF-2 aerosols in rats is relatively high, 5,200 mg/m^3, for a single 3.5 h exposure, the concentration response curve appears to be very steep. Exposure at 1500 mg/m^3 for 5 h/day resulted in 60% mortality after only 2 days. Exposure to as little as 2000 mg/m^3 for 3.5 h/day for 4 days also resulted in mortality (Selgrade et al. 1990). Inhalation studies using SGF-1 showed that chronic exposure to 63 mg/m^3 for 30 minutes a day for a year produced only minimal pulmonary effects in mice, rats, and rabbits. However, monkeys exposed to this concentration of SGF-1 mist suffered oil pneumonia, severe hyperplastic gastritis, and alopecia and died within 100 days (Lushbaugh et al. 1950). Whether a similar sensitivity exits for SGF-2 in primates is unknown.

Exposure standards for military materials are not well defined because military materials and exposure conditions are uniquely different from those in the industrial workplace. To establish safe levels for fog oil exposure, a standard substance (mineral oil) that is chemically and toxicologically similar to fog oil (Liss-Suter et al. 1978) is used as a point of reference. The Threshold Limit Value (TLV) for chronic industrial exposure to mineral oil mist during an 8 hour work day is 5 mg/m^3. The Short Term Exposure Limit (STEL) for oil mists is 10 mg/m^3. Exposures at the STEL concentration should not exceed 15 minutes and should not be repeated more than four times per day (ACGIH 1986). Fog oil aerosols become visible at 5 mg/m^3 and workers exposed to oil aerosols begin to complain of discomfort at about 15 mg/m^3 (ACGIH 1986). It should be noted that mineral oil mists differ from fog oils in that the particle size distribution for mineral oil is submicron to about 20 µm (Hinds 1982), whereas particles in fog oil

smokes typically range between submicron to 5 μm in diameter (Young et al. 1989). Mineral oils may also contain additives that are not introduced in fog oils.

Extrapulmonary effects of fog oil inhalation include the induction of a specific isoenzyme of the cytochrome P450 system which may have significant implications in xenobiotic metabolism of exposed animals (Grose et al. 1986).

Humans within about 2 km downwind of the test site during smoke-generating periods may inhale potentially harmful levels of fog oil (i.e, ≥ 10 mg/m^3, see Section 4.1.2) if weather conditions result in a shallow mixing depth . Under conditions favoring a greater mixing depth, harmful levels are limited to less than 0.4 km downwind of the generator. Exposures above 500 mg/m^3 are unlikely except for, possibly, personnel operating or standing very near the generator during test generations (Appendix A). This is in agreement with measurements of breathing zone concentrations of fog oil obtained during military training missions to determine the field exposure of military personnel to fog oil smoke (Young et al. 1989). For military personnel in close proximity to the generators, concentrations often exceeded safe levels, reaching about 130 mg/m^3-h under certain testing scenarios (Young et al. 1989). It should be noted that smoke generator unit personnel and military operating in constant smoke screens during WWII did not show any adverse effects from the oil exposures (Butler, 1963 as reported in Liss-Suter et al. 1978). However, the medical review was limited to short-term health impacts and lacked information on exposure protection (e.g, the use of respirators).

4.2.2 Ingestion Effects and Aspiration Hazard

The health effects of fog oil ingestion have not been investigated. However, the toxicity of petroleum products, including lubricating oils, via the oral route is generally low. The acute oral LD_{50} for diesel oil is 16 mL/kg in rats (Starek et al. 1975). Between 5 and 20 ml/kg of white mineral oil (a similar, though more refined oil than SGF-2) are required to cause mortality in laboratory mice (Brahmachari 1958). The oral LD_{50} for kerosene is 30 ml/kg for rats (Ashkenazi and Berman 1961), 28 ml/kg for rabbits (Deichmann et al. 1944), and 20 ml/kg for guinea pigs (Deichmann et al. 1944). Oral ingestion of 5 to 20 ml/kg of mineral oil by rodents resulted in weight loss and histopathological lesions of the liver, spleen, and kidney (Brahmachari 1958). Although ingestion of harmful amounts of fog oil is unlikely, aspiration of the oil into the lung during or after consumption can be very hazardous. Indeed, the most serious consequence of oil ingestion is aspiration pneumonia (Buck et al. 1982). Aspiration of a petroleum product is often many times more lethal than ingestion of the oil in the absence of aspiration. For example, intratracheal administration of 0.2 ml/kg of kerosene results in about 50% mortality of the test group (Gerade 1959) whereas, 30 ml/kg are required to cause death by ingestion alone (Berman 1961). Aspirated oil pathology includes bronchopneumonia, acute pulmonary edema, and visceral congestion (Brahmachari 1958, Buck et al. 1982). The pulmonary lesions are distributed bilaterally and are usually observed in the caudoventral apical, cardiac, cranioventral diaphragmatic and intermediate lobes (Buck et al. 1982, Gerarde 1959). Multiple pulmonary abscesses are found in animals surviving several days after aspiration (Buck et al. 1982). Children suffering from kerosene and crude oil aspiration toxicosis experience central nervous system derangement in the form of incoordination, shivering, head shaking, and confusion. Anorexia and weight loss and low blood glucose are common in animals that have aspirated petroleum products. In addition, the hematologic and blood chemistry changes associated with pneumonia are present. These include elevated PCV and hemoglobin levels, increased BUN and serum transaminase enzymes, leucopenia, and accumulation of macrophages in alveolar spaces of the lung (Lushbaugh et al. 1950, Stula and Kwon 1978, Buck et al. 1982, Osmitz et al. 1987, Selgrade et al. 1990).

4.2.3 Dermal Effects

Repeated or prolonged (e.g continued wearing of oil soaked clothing) dermal exposure to petroleum products can breakdown the protective defences of the skin barrier causing inflammation, acanthosis, and eczema (Liss-Suter et al. 1978a, Smith et al. 1987). Skin conditions such as acne are common among industrial workers exposed to lubricating oil mists (Liss-Suter and Villaume 1978). Petroleum product dermatitis commonly regresses spontaneously if exposure is discontinued (Hayes and Law 1991). Fog oils used for obscuration are not considered to be skin sensitizers or eye irritants (Manthei et al. 1980, Smith et al. 1987).

4.2.4 Carcinogenicity/Mutagenicity

Fog oils include classes of refined oil that have been shown to induce skin tumors in laboratory animals and increase incidence of skin squamous cell carcinomas in nonmilitary workers (Liss-Suter and Villaume 1978, U.S. Army 1986). According to the mineral oil classification by the International Agency for Research on Cancer (IARC 1984), SGF-2 appears to be derived from solvent-refined oils (class 3) and from hydrotreated oils (class 4). Both these classes of oils have produced dermal cancer in experimental animals (Liss-Suter and Villaume 1978). However, the carcinogenicity of napthenic and paraffinic stock oils appears to be related to the concentration of polycyclic aromatic hydrocarbons in the oil (Pereira 1983) and the military now limits purchase of SGF-2 to oils with minimal potential for containing these carcinogenic compounds. It should be noted that no carcinogenic or mutagenic effects have been detected in troops exposed for several weeks to fog oil smoke screens (McNamara 1963, Butler 1974, as reported in Liss-Suter et al. 1978b). This epidemiological evaluation, however, is lacking in documentation and medical follow-up on exposed personnel.

Although it is difficult to induce pulmonary cancer in experimental animals with polycyclic hydrocarbons and the incidence of lung cancer in humans exposed occupationally to these compounds is low (Falk et al 1964), the noncarcinogenicity of chronic respiratory exposure to fog oils has not been established.

Mutagenic substances are formed during the enzymatic breakdown of some aromatic hydrocarbons found in SGF-2 type oils (Liss-Suter and Villaume 1978). The SGF-2 specifications apparently eliminate these compounds as the laboratory mutagenicity tests for SGF-2 are negative (Lee et al. 1989). However, SGF-2 has been found to be weakly mutagenic in native rodents exposed in the field (Yanders et al. 1985).

4.2.5 Visibility Hazard

Hazardous driving conditions can be produced by fog oil plumes within about 25 km of the test site depending on weather conditions (Driver et al. 1992a and 1992b). Within this range it is possible for transmittance to be reduced to 5% or less, the point at which a target is always obscured.

4.2.6 Explosion Hazard

Although fog oil is a flammable and combustible liquid, a smoke cloud comprised of fog oil droplets will not ignite. A typical fog oil obscurant cloud has a fuel-air ratio that is about four orders of magnitude below the lowest amount of vaporized fuel in air that will give a combustible mixture (Sullivan and Reitz 1980). Risk of explosion is also minimal because the lean deflagration limit of fuels is smaller than the lean explosive limit and, in general, fuels are not detonable in an unenclosed state.

4.3 TERRESTRIAL EFFECTS

The use of fog oil aerosols as obscurants will potentially impact three major components of the terrestrial system: the vegetation,the soils, and the vertebrate fauna. Fog oil residues eventually will be deposited on the surfaces of leaves and in and on the soils, which function as a major sink for these materials. Wildlife may uptake harmful levels of fog oil from consumption of contaminated vegetation and soil, inhalation of airborne oil droplets or from ingestion of fog oil residues from grooming or preening.

4.3.1 Fate in Soils and Depuration

Fog oil aerosol residues deposited to soil surfaces are apparently volatilized rapidly (Cataldo et al. 1989). Depuration rates may differ in soils of differing porosity; finer textured soils with higher surface area may allow higher sorption and thus a high rate of initial volatilization. Coarser soils may allow more downward leaching of deposited residues and less initial volatilization (Cataldo et al. 1989). Thus, the relative retention of fog oil may vary by soil type. The hydrocarbons composing the fog oil residue are biodegradable and would be attenuated over time.

4.3.2 Soil Microbial Effects

The soil microbial population plays a critical role in decomposing organic matter and in the cycling of important nutrients (nitrogen, phosphorus, sulfur, and some trace metals). Microbial decomposition processes in the soil can also detoxify xenobiotic chemicals. Any physical or chemical perturbation to the soil system that impacts the microbial processes impacts the soil system and the plants growing in that substrate. Some obscurant smokes adversely affect soil microbe processes (Van Voris et al. 1987). However, Cataldo et al. (1989) reported no deleterious effects of fog oil residues on soil microbial activity. High cumulative doses (1,100 µg fog oil/cm^2) of fog oil exposure had no effect on soil respiration, and only slightly increased the activity of nitrobacter populations in one soil. The cumulative dose of fog oil greatly increased soil dehydrogenase activity. These results indicate that fog oil has no deleterious effects on soil microbes at levels far exceeding predicted worst-case surface deposition (i.e., up to 130 µg/cm^2 for fog oil) (Section 4.1.1).

4.3.3 Invertebrates

The earthworm is an important soil invertebrate in many soil systems, functioning to maintain soil aeration, increase water infiltration, and breakdown soil organic matter. Earthworm bioassays conducted with fog oil residues (Cataldo et al. 1989) showed no adverse effects of fog oil on cocoon hatch, or survival of young or adults at surface deposition rates of up to 800 µg/cm^2. Earthworm survival was 100% in soil uniformly amended with over 285 µg/g fog oil which is equivalent to an aerial-deposition dose of about 3,600 µg/cm^2. These no effect levels are 2 to 28 fold higher than maximum deposition rates for fog oil or mixed graphite/fog oil.

Impacts to invertebrates above-ground might occur if the insects are coated with fog oils. Such impacts to insects would be limited to the immediate area of the fog oil generating source and would not likely impact insect populations in the community. The volatile nature of the constituents of fog oil aerosols suggests that any impacts rapidly would be attenuated.

4.3.3 Fate and Effects in Plants

The deposition of fog oil to plant surfaces appears to be species dependent according to canopy type (Cataldo et al. 1989). Values for mass loading and deposition velocities of fog oil

were higher for pines and sagebrush than for fescue and bush bean. However, as reported for soils, the depuration rate of fog oil residues from plant surfaces is high; rapid losses result from volatilization from relatively large foliar surface areas.

Phytotoxicity of Deposited Fog Oils

Fog oils deposited to foliar surfaces cause moderate toxicity responses, i.e., chlorosis, necrotic spotting of foliage, and leaf or needle burn (Cataldo et al. 1989). These responses occur after deposited doses of 100 to 500 µg fog oil/cm^2 on soil. In general, older growth is affected more severely than younger growth. Results of Cataldo et al. (1989) indicated that the effects of fog oil exposure were more severe for a perennial grass species than for woody species tested.

Aliphatic and aromatic hydrocarbons are constituents of fog oil. The aliphatic hydrocarbons, which are the major constituents, are less phytotoxic than the aromatic hydrocarbons; however, the aliphatic hydrocarbons can affect membrane/cell permeability and probably account for the observed damage to foliage. The toxicity responses probably result from osmotic damage.

Other tests showed that once fog oil is deposited, subsequent rain events are not effective in washing the material from the foliage. However, at high humidities when leaf cuticle materials are fully hydrated, fog oil residues apparently cannot penetrate the cuticle as easily and toxic responses are less severe.

The cumulative effects to foliage of repeated doses of fog oil (low dosage=17 to 32 µg fog oil/cm^2 foliage; high dosage=242 to 754 µg fog oil/cm^2 foliage) at two to three day intervals caused less damage to plants than expected (Cataldo et al. 1989). In this case, the rapid volatilization of fog oil from foliar surfaces appears to decrease the impact of deposited materials by decreasing the end dosage. However, they did not observe any evidence that the species tested were able to acclimate or compensate for repeated chemical insult.

Residual and Indirect Effects of Fog Oil Deposition on Plant Growth

The deposition of fog oil on foliar surfaces results in foliar absorption and transfer of smoke constituents to below ground plant tissues. Cataldo et al. (1989) indicated that this accumulation and transfer impacted subsequent biomass production in a perennial grass. Because the causative hydrocarbons are normally biodegradable, these residual effects should attenuate with time.

Deposition and accumulation of fog oil on soils can cause indirect effects on plant growth (Cataldo et al. 1989). Although few visual symptoms of toxicity appeared, plant biomass production was reduced when plants were grown at low relative humidity (20%) in soils exposed to fog oils. It may be that leaf surfaces not fully hydrated from water stress are more easily penetrated by fog oil, resulting in damage to cell membranes. Some evidence exists that plants under water stress may be subject to increased toxic effects if the fog oil residues in the soil inhibit transport of water from roots to leaves. The observed biomass effects were also dependent on soil type (i.e., soil texture). In addition, the studies showed no effect of fog oil residues on seed germination or soil nutrient levels.

4.3.5 Wildlife Effects

Wildlife remaining within about 2 km downwind of the test site during smoke-generating periods may inhale potentially harmful levels of fog oil (i.e, $\geq$ 10 mg/m^3, see Section 4.1.2) if weather conditions result in a shallow mixing depth. Under conditions favoring a greater mixing

depth, harmful levels are limited to less than 0.4 km downwind of the generator. This assumes that wild animals have about the same sensitivity to air pollutants as humans and receive (on a body-weight basis) equivalent doses in the environment. However, it has been shown that the volume of air breathed per minute per unit of body weight (i.e., the weight-specific minute ventilation) varies greatly among mammals (Phalen 1984). Generally, the smaller the animal, the more air per minute per gram is inhaled. Compared to humans, rabbits ventilate 3 times and small rodents ventilate 8 to 13 times greater volumes of air on a per-body-weight basis (Phalen 1984). Larger animals such as deer and moose receive smaller doses than humans during inhalation exposures. Birds may be at even greater risk than represented in the human STELs because their respiratory rates are generally higher than mammals of comparable size. In addition, seasonal physiological changes, activities (e.g., flying), and breathing-zone differences (e.g., near the turbulent ground surface) further complicate the extrapolation of the human STELs to wild animals. Therefore, the STELs for humans should be viewed as only relative estimates of the safe limits for wildlife in field situations.

There are no specific data available on the toxicity of fog oil aerosols to wildlife. Information on the toxic effects of petroleum products in wild mammals and birds is generated from oil spill studies. The acute oral LD_{50} of diesel oil is 16 mL/kg for rats (Starek et al. 1975). Oral ingestion of 5 to 20 mL/kg of mineral oil by rodents resulted in weight loss and histopathological lesions of the liver, spleen, and kidney. Death occurred in all animals by 10 days (Brahmachari 1958). However, intragastric administration of 24 mL/kg of diesel fuel did not result in mortalities to ducks (Hartung and Hunt 1966). Under temperature stress, the intragastric LD_{50} in ducks was lowered to 4 mL/kg (Hartung and Hunt 1966). Pollution of water systems with oil can harm waterfowl by coating their feathers resulting in cold shock , loss of buoyancy, increased vulnerability to predation, starvation, and drowning (Hunt and Ewing 1953). Contamination of bird feathers with oil can cause the bird to expend much greater energy to maintain body temperature. At 15°C, the basal metabolic rate of a 900 g black duck with only 20 g of lubricating oil on its feathers will double (Hartung 1967). This rate of energy consumption is equivalent to that of an uncontaminated bird living at -10°C. Therefore, a bird that is moderately contaminated with a lubricating oil would have to double its food intake to offset to loss of thermal insulation (Hartung 1967). Aquatic mammals vary in their dependence on fur insulation and, thus, their vulnerability to water. Because fur does not contribute significantly to the overall insulation of phocid seals, no thermoregulatory problems occur in adult seals contaminated with oil. However, otariid seals, otters, and very young pups of phociid seals are more dependent on the insulative property of fur than blubber for thermoregulation (Hartung 1967, McEwan et al. 1974) and may be more susceptible to loss of thermal insulation.

The average oily bird has about 7 g of oil on its feathers and ingests, from preening, about 1.5 g (2 to 3 g/kg) of oil in one day (Hartung and Hunt 1966). In birds ingesting this amount of oil, lipid pneumonia, gastrointestinal irritation, diarrhea, anemia, altered liver function, internal hemorrhage, severe pancreatic damage, and toxic nephrosis have been observed (Hartung and Hunt 1966, Chia 1971). These clinical signs have been observed in both wild ducks killed in oil spills and in waterfowl receiving intragastric doses of 1 to 12 mL/kg of diesel fuel (Hartung and Hunt 1966). At levels above 5 mL/kg, nervous system effects (including inhibition of plasma cholinesterase) mimic those induced by anticholinesterase agents and may be caused by phosphorus compounds in the oils (Holmes and Cronshaw 1977). Other investigators have not been able to induce most of these pathological changes in waterfowl dosed with various crude or lubricating oils (Clark and Kennedy 1968, Crocker et al. 1974 and 1975). However, they have observed some gastrointestinal injury and a hyperadrenocortical condition that may account for the high mortality in cold-stressed birds (Clark and Kennedy 1968, Crocker et al. 1974 and 1975, Holmes and Cronshaw 1977). A review of bird mortalities following oil spills suggests that refined petroleum products such as lubricating oils, may be more hazardous to birds than crude oil (Holmes and Cronshaw 1977).

Ingested oil may also affect the fecundity of birds. Oral administration of 3.5 mg/kg No. 2 diesel fuel oil to quail interrupted egg production and produced egg yolk deposition anomalies (Grau et al. 1977). But, ingestion of the more refined petroleum product, mineral oil, did not effect the rate of egg laying or the hatchability of eggs. Embryonic development is arrested in pheasant, gull, and duck eggs sprayed with diesel fuel (Bourne and Devlin 1969, Kopischke 1972). Eggs contaminated from feathers of incubating parents also do not hatch (Birkhead et al 1973). To determine if the embryonic mortality from external exposures to oils was caused by a reduction in gas exchange from the coated egg surface or from the toxicity of the oil constituents, several studies were conducted that limited the oil exposure to small volumes applied over different percentages of the surface area of the dosed eggs. Significant mortality was observed when 1 µL of No. 2 fuel oil was applied to less tan 2% of the shell surface (Albers 1976, Szaro and Albers 1976) indicating the embryotoxic capacity of the lubricating oils.

Like birds, water-living mammals (e.g., otters and seals) appear more vulnerable to oil exposure when they are stressed (Geraci and Smith 1977). Stress conditions typically include disease, heavy parasitization, advanced age, vulnerable life cycle stages, nutritional status and social status (e.g. isolation). The increased vulnerability from stress is probably related to adrenal insufficiency (Geraci 1972). Eye damage has been observed in seals exposed to oil spills and is a function of exposure time and concentration of volatile components (Geraci and Smith 1977). The impact of oil exposure on cetaceans is not well documented. Surface accumulation of oil is unlikely in cetaceans, however, eye damage and the influence of oil on stress may impact these mammals. Ingestion of oils by seals results in minimal, transient liver damage (Smith and Geraci 1975, Geraci and Smith 1976 and 1977). On the other hand, liver damage is well documented in domestic animals (Cornelius and Kaneko 1963). The most serious consequence of oil ingestion in terrestrial mammals is aspiration pneumonia. This lethal condition occurs in cattle following multiple doses that total more than 56 ml/kg for kerosene and 74 ml/kg for crude oil high in gas oil and lubricating distillates (Rowe et al. 1973). Anorexia and weight loss for several days or weeks are common clinical signs in mammals exposed orally to petroleum oils (Buck et al. 1982). Blood glucose levels are correspondingly decreased and hematologic changes associated with pneumonia (see Section 4.2.2) are typical (Buck et al. 1982). Central nervous system dysfunction has been observed in young animals exposed to petroleum oils (Buck et al. 1982).
Acute enteritis, enteric edema, renal hepremia and acute cystitis have been observed in bovids which, lacking much gustatory discrimination, will consume large amounts of oil (Jones and Hunt 1983). Aspiration of petroleum oils is the major hazard of oil ingestion and results in lung lesions and death at much lower concentrations than are required to adversely impact the health of an animal ingesting oil without aspiration (see Section 4.2.2).

Lubricating oils such as SGF-2 have been shown to bioaccumulate in aquatic food chains with mammalian top consumers (Smith et al. 1987). Palatability of the tainted food source is greatly affected for human consumers (Mackie et al. 1972) and may imply reduced palatability and, thus, reduced food source for wild mammals. Birds, however, do not avoid oil-contaminated food or habitats (Holmes and Cronshaw 1977). Oils also concentrate fat soluble compounds such as pesticides and may make these compounds available at much higher concentrations than would occur in the absence of the oil and to animals not typically exposed to them (Blumer et al. 1971). If all the surface-deposited fog oil were deposited on edible biomass, oral uptake of fog oil by wildlife feeding on oil-contaminated plants may be estimated using a forage consumption factor of 3% of the body weight (Buck et al. 1982) and the edible biomass estimate of the relevant plant communities (This estimate of oral uptake does not take into account indirect ingestion via grooming/preening activity). Depending on the weather conditions and amount of fog oil generated, the consumption of deposited oil near the source may exceed toxic levels. These levels may pose a threat to foraging wildlife until deposits are diminished by evaporation and degradation. However, areas having sufficiently high deposits would likely be small and, consequently, the number of potentially impacted animals would also be small (Driver et al. 1992a). Loss of aquatic food sources (see Section 4.4) may affect the survivability of aquatic

wildlife such as waterfowl young that are dependent on limited local resources and high nutrient requirements during their initial growth period.

Seabird deaths associated with marine oil spills range between 0.3 birds/ton of oil to >90 birds/ton of oil spilled (Holmes and Cronshaw 1977). The number of deaths is dependent on presence of colonial species and seasonal migrants (i.e. large numbers of birds congregated in a small area), weather, and, possibly, fuel type (Homes and Cronshaw 1977). Typical generations using the XM56 emit about 310 lbs of oil per 30 min. If all the fog oil needed for one 30-min generation were spilled into a waterway (and assuming that the toxicity of fog oil is similar to that of the diesel fuels), about 15 or more birds could be killed. It is unlikely, however, that aerosol deposition from one generation, even if conducted near a waterbody, will result in significant bird loss. Surface deposition under (worst-case generation conditions, Appendix A) to a one-acre lake located near the source and following 9 h and 30 h of generation is estimated to potentially cause about 9 and 31 waterfowl deaths, respectively. The impact of these deaths depends on the population status of the species. For example, the population stability of species with critically low populations (endangered species) can be affected by a small increase in mortality, therefore, environmental releases of fog oil should be avoided when such species are present. Under more favorable generation conditions (i.e., Cases 1 and 2, Appendix A), deposition of fog oil to water near the generators after 9 h or 30 h of emissions would likely result in less than 1 waterfowl death. Fog oil deposition to water systems greater than about 1 km form the source (see Section 4.1.1) should not be sufficient to cause significant impact to aquatic wildlife from coating of fur or feathers. However, evaporative loss of the oil may be greatly reduced under climatic conditions of extreme cold and the deposition of fog oil to water systems at greater distances increased. There is also a potential in cold regions for fog oil to enter water systems during spring thaw from the run-off of winter-deposited oil.

Carcinogenicity of fog oils in wildlife populations has not been addressed. However, SGF-2 has been shown to be weakly mutagenic to native rodents exposed in the field (Yanders et al. 1985).

4.4 AQUATIC EFFECTS

The effects of fog oils on the aquatic environment depend upon the solubility of the material in water, the toxicity to aquatic life, and the amount of material deposited into the body of water (Shinn et al. 1985). This section reviews published data regarding the impacts of fog oil obscurant on freshwater and marine environments. Little information is available on the effects of SGF-2 on aquatic systems, however, SGF-2 is physically and chemically similar to No. 2 fuel oil, and to diesel fuel (Liss-Suter et al. 1978b). Literature regarding the effects of No. 2 fuel oil and diesel fuel was reviewed to further evaluate the environmental fate and the effects of fog oils on aquatic organisms.

4.4.1 Occurrence, Dispersion, and Persistence

An evaluation of the effects of fog oil on aquatic systems is dependent on the amount of oil and the way that oil enters a body of water (Shinn et al. 1985). Many processes such as photolysis, dissolution, sedimentation, biological transformation, bioconcentration of hydrophobic constituents, and food chain transport influence the fate and disposition of the deposited oils in the environment (Liss-Suter and Villaume 1978).

Deposition of Fog Oil in Aquatic Systems

The mode of deposition into a body of water may influence the effects of the fog oils. Two basic scenarios are possible; an event that leads to a spill where bulk oil enters a water body, or an aerosol application resulting from a smoke generating device where the oil becomes vaporized and

settles on the surface of the water body. For example, vaporized fog oil generated from one M3A3 smoke generator for one hour could, hypothetically, deposit of 6 to 60 g/m^2 on the surface of a body of water (Liss-Suter and Villaume 1978). Meteorological factors such as wind speed and direction, temperatures and humidity are known to affect the amount of material deposited on a given surface. Additionally, smoke screening operations may be repeated at a single location, thus increasing the fog oil that accumulates in a particular area. Smoke materiel deposited on the ground also could wash into a body of water. The constituents in the run-off may be radically different than that resulting from direct deposition of an aerosol.

Oil Behavior in Water and Sediments

The short term and long term mobility of fog oils in aqueous environments have been ranked relative to other obscurant materials (Shinn et al. 1985). The results indicate that the dissolved organic components (presumably aromatics) in SGF-2 fog oil would be slightly mobile when compared to White and Red Phosphorous smokes, which are highly mobile, and to IR (EA-5763 and EA-5769), which is very immobile. The solubility of fog oil is 14-52 mg/L (Shinn et al. 1985).

Soon after oil has been applied to an aquatic system, physical and chemical mechanisms interact to selectively fractionate or disperse the individual constituents of the oil. The fractionation of oil is significant to both its toxicity and fate in the environment. For example, although the fairly soluble aromatic hydrocarbons occur in small quantities in the original oil, the water soluble fraction will be predominantly low molecular weight aromatic hydrocarbons (e.g., benzene, napthalene, phenanthrenes) that generally are more acutely toxic to aquatic organisms than the soluble saturated hydrocarbon components (Jacobson and Boylan 1973, Anderson et al. 1974, Blumer et al. 1972, Coleman et al. 1984). Poston et al. (1988) conducted a series of toxicity tests with SGF-2 fog oil and demonstrated that fog oil contains mostly water-insoluble components. The soluble fraction of 0.19 to 0.35 mg/L total oil was primarily low molecular weight aromatic hydrocarbons.

The deposition of the insoluble constituents into the sediment may lead to greater persistence of that oil fraction in the environment and increase exposure of benthic organisms to hydrocarbons. However, the availability of fog oil constituents to aquatic organisms inhabiting the water column would decrease. The insoluble constituents also may inhibit particular animal functions such as chemotaxis or feeding activity.

Weathering Processes

Regardless of the mode in which fog oil is deposited or the quantity that is deposited, complex weathering processes associated with the liquid and solid (adsorbed) phase selectively partition the constituents of the oil. (Standard acute toxicity test protocols generally ignore fractionation caused by weathering. This, in turn, results in unrealistic exposure conditions.) Water concentrations of fuel oils in seawater were directly related to the amount of mixing energy to which they had been subjected (Vanderhorst et al.1976). When oil was added to a water column with very little turbulence, trace amounts of the oil were detected in the water column. When the fuel oil was added to water under highly turbulent conditions and maintained for a 24-h period, the water concentrations of oil was linearly related ($r=0.99$) to the volume of oil added. It should be noted that various researchers have used different systems to produce oil-water mixtures. Consequently, there is not a clear-cut distinction between what is truly soluble and what is a dispersion. Zucher and Thuer (1978) studied the influence of weathering processes on No. 2 fuel oil. These experiments used kaolinite as the suspended solids in the oil-water aliquots.

The water was saturated mostly with one- and two-ring aromatic hydrocarbons within 15 minutes of mixing whereas the suspended solid became almost completely saturated with higher boiling hydrocarbons (mol wt >250) within 10 hours.

The two most important processes for the removal of volatiles from a water body are evaporation and dissolution (Coleman et al. 1984). Oils entering bodies of water will usually form a surface film or slick where evaporation may be significant. Regnier and Scott, (1975) investigated the evaporation rates of No. 2 fuel oil at 5, 10, 20, and 30° C at a constant wind speed of 21 km/min). In a darkened chamber, fuel oil samples were poured into petri dishes to a 2 mm thickness. The evaporation rates were curvilinear with the remaining oil concentration at a given temperature. Components with vapor pressures higher than n-octane evaporated more readily than those with lower vapor pressures. The alkanes appeared to evaporate in proportion to the total oil evaporation rate.

Persistence

Persistence of the soluble components of fog oil in natural waters depends upon many complex factors, such as the amount of oil, water temperature, sunlight, mixing energy, presence of organic matter that can absorb oil hydrocarbons, and the degree of biotransformation (Liss-Suter 1978 and Villaume, Poston et al. 1986). The insoluble fraction usually accumulates in the sediment.

Gearing et al. (1980) investigated partitioning of No. 2. fuel oil in sediments and suspended particulate matter in an estuarine environment. Two experimental tanks and a control tank (5.5 m in height and 1.8 m in diameter) held 13 m^3 of flowing seawater and 0.8 m^3 of silt clay sediment and the associated benthic biota. Untreated marine water was pulsed at 10 L/min for 12 min every 6 h to maintain populations of zooplankton that are representative of mid-Narragansett Bay. No. 2 fuel oil was added as an oil-water dispersion to the experimental tanks twice weekly for 4 months.

Initially, the oil, dispersion, and exposure water contained 70-75% saturated hydrocarbons and 25-30% aromatic hydrocarbons. The oil accumulated in the test systems at a steady rate while dispersions were being added. The concentrations of oil found in the sediments also increased, but at a much slower rate for 10 weeks, after which the oil sediment concentration increased rapidly. The maximum percentages of total oil added to the ecosystems that were found in the sediment occurred seven days after the last dosing (at 4 months) and contained 48% saturated hydrocarbons and 17% aromatic hydrocarbons in one tank and 56% saturated hydrocarbons and 9% aromatic hydrocarbons in the other. A rapid decrease of sediment oil was observed over the next 6-10 weeks. At ten weeks, both tanks contained 14% saturated hydrocarbons and 8% aromatic hydrocarbons of sediment oil.

These proportions indicate a change from the original combination of saturated and aromatic hydrocarbons. Additionally, the aromatic constituents in the sediment were mostly the high molecular weight hydrocarbons whereas the saturated hydrocarbons remained basically the same. The researchers attribute this change to the aqueous solubility of aromatics as compared to the saturates. Evaporation loss of hydrocarbons was negligible.

The concentration of oil in sediments was inversely related to the sediment depth with the greatest amounts occurring at the sediment-water interface which was nearly 1 cm thick after 6 months. The maximum depth of oil permeation was 3 cm.

Oil associated with the suspended particulate matter samples from the control tank approached the lower concentrations reported for mid-Narragansett Bay. The saturated

hydrocarbons associated with particulates in the experimental tanks were always higher than their aromatic counterparts. The higher molecular weight aromatic constituents were found in the oiled sediments. The particulate bound hydrocarbons in water sorbed to suspended matter in an inverse proportion to their degree of aqueous solubility. Settling of the particulate matter results in deposition of about 50% of the relatively insoluble saturated hydrocarbons and less than 20% of the more soluble aromatic hydrocarbons.

The study described above also noted that biodegradation of hydrocarbons begins almost immediately after they enter the sediment and many of the compounds disappear soon after the oil source is removed. Microbial activity appeared to more readily degrade the saturated hydrocarbons as compared to the aromatic hydrocarbons. However, a residue (10-20% of the hydrocarbons originally present in the sediment) of branched alkanes, cycloalkanes, and aromatics and an unresolved complex mixture remained for at least one year thereafter.

4.4.2 Toxicity

Fog oil may exert acute or chronic toxic effects on aquatic organisms Only acute effects, however, have been extensively examined. The toxicity of the individual constituents in fog oil are highly variable. Two types of adverse effects to organisms could result from the release of fog oil into an aquatic system; physical effects caused by contact with the oil, and toxicity caused by the chemical constituents of the oil. In general, the aromatic hydrocarbon fraction, particularly the polycyclic aromatic hydrocarbons (PAH) such as the naphthalenes and phenanthrenes of the oil pose the greatest hazard to the aquatic environment with respect to both toxicity and persistence (Poston et al. 1988; Anderson et al., 1974; Scheier and Gominger, 1976; Rossi et al., 1976). Figure 1 summarizes selected data from this review to show the range of acute and sub-acute toxic responses in routinely tested aquatic species for both No. 2 Fuel Oil and SGF-2.

Shinn et al. (1985) evaluated the relative toxicities of several smoke and obscurant materials on aquatic systems. The ranking was performed by using the aquatic toxicity quotient (A.T.Q). The A.T.Q was defined as the ratio of 3.6 mg/L to the median tolerance limit for 96-h LC_{50} fish bioassays. The 3.6 mg/L was an estimate of the amount of smoke products deposited in water 1-m deep from a one-hour exposure to a smoke/air concentration of 1000 mg/m^3 of aerosol. The 96-h LC_{50} is that concentration of the substance in water which results in 50% mortality of a given population of an organism after 96 hours of exposure to the solution. Fog oil was found to have borderline aquatic toxicity with a 96-h LC_{50} of 2 to 50 mg/L and an A.T.Q of 0.72 to 1.8. Diesel fuel was identified as having the same 96-h LC_{50} and A.T.Q values as fog oil. The validity of this approach is suspect when one considers the complex nature of these different aerosols and the reported range of solubility of the individual constituents in fog oil.

In many cases, researchers report toxicity of fuel oils at concentrations exceeding their solubility. This practice may cloud the interpretation of their research with respect to pure toxicity and physical effects. Some studies report toxic concentrations of the petroleum in "total oil" and others report them as the "water soluble fraction". The total oil concentration is that total amount of oil added to water, whereas the water soluble fraction is the fraction of total oil which presumably goes into solution.

The water soluble fraction (WSF) of petroleum oil has been associated with sublethal effects in aquatic organisms. Lee et al. (1977) reported a loss of feeding activity by the planktonic shrimp, *Lucifer faxoni*. Percy and Mullin (1977) reported minute dispersions (25 µL of oil in 500 ml seawater) reduced locomotor activity of the Arctic amphipod, *Onisimus affinis* , by about 42%. The dissolved components of oil, particularly the PAH, inhibited chemoreception in several marine animals (Takahashi and Kettredge, 1973; cited by Lee et al. 1981). Some laboratory studies also

demonstrate that swimming behavior, growth rates, and feeding behavior are adversely affected by the WSF of petroleum hydrocarbons (Lee et al. 1981).

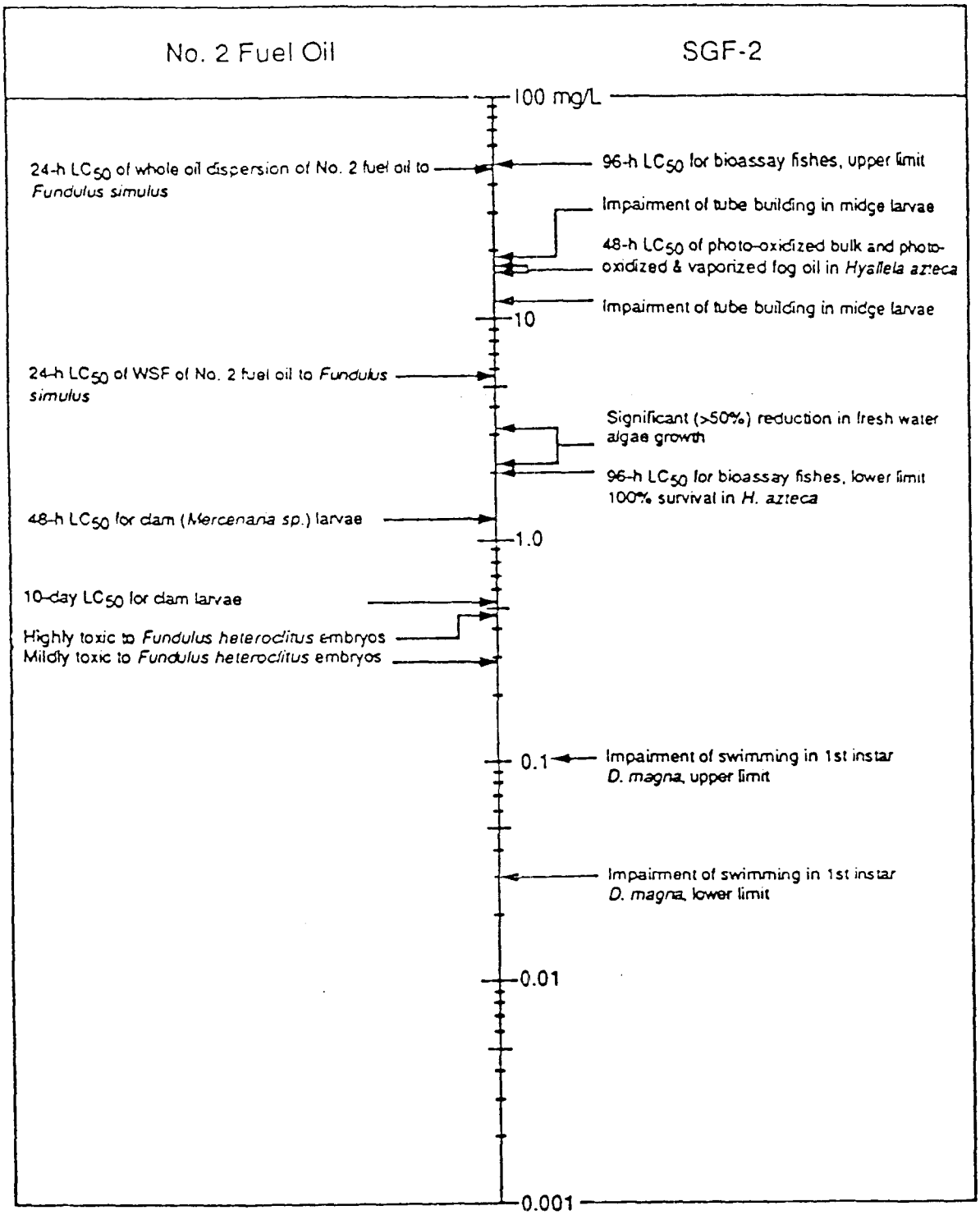


Figure 1. Range of acute and subacute toxic responses of routinely tested aquatic organisms to No. 2 fuel oil and SGF-2 fog oil.

Due to the lack of data on environmental concentrations of fog oils and associated effects, laboratory toxicity testing provides the basis for evaluating toxicity. The following review is divided into freshwater and marine organisms.

Freshwater Organisms

Algae : Poston et al. (1986) performed toxicity tests with *Selenastrum capricornutum* on oil-water dispersions of bulk and vaporized SGF-2 fog oil. Bulk fog oil is defined as unused fog oil taken straight from the barrel. Vaporized fog oil was process through a device simulating the operation of a M3A3 fog generator and collected after condensation on stainless steel trays. Three batches of SGF-2 fog oil were tested. Five exposure solutions and a control solution were prepared for testing from each batch of stock oil. Oil-water mixtures (OWM) were prepared in 10-L amounts using a standard low-energy mixing system. Tests were conducted at 22-26 °C. In all but one of the algal tests, differences in treatments did not become apparent until 96 h of exposure. Concentrations between 2.15 and 3.23 mg/L total oil resulted in a 65% reduction in growth. Vaporized fog oil and bulk fog oil showed no discernable differences in growth inhibition.

Invertebrates: Poston et al. (1986) performed acute, static toxicity tests with four species of freshwater invertebrates (*Daphnia magna*, *Paratanytarsus dissimilus*, *Hyallela azteca*, *Hexagenia* sp.). During the tests, if the oil was mixed with water at concentrations greater than 1 mg/L total oil, the fog oil separated and floated to the surface. The most significant effect of the fog oil was that of physically impeding the movement of the organisms. Impairment of swimming was observed in first instar *Daphnia magna* at nominal concentrations of 0.03 to 0.10 mg/L total oil. These filter feeding organisms entrained fog oil microdroplets which increased their buoyancy causing them to float to the surface.

Toxicity of vaporized fog oil to *D. magna* was compared to those caused by bulk fog oil (Poston et al. 1986). Concentrations of 8.96 mg/L total oil were observed to be 100% lethal in the vaporized form, whereas bulk oil concentrations as high as 30.6 mg/L were only 80% lethal. This suggests that the vaporized oil form has more toxic to *D. magna* than bulk oil form. These exposure concentrations greatly exceed the estimated solubility of the oil in water and associated effects may not be totally attributable to chemical toxicity. In contrast, tests with midge fly larvae (*Paratanytarsus dissimilus*) indicated that bulk fog oil was more toxic than vaporized fog oil. A marked decrease in the number of larval tubes constructed as well as a decrease in the length of tubes were noted with increasing fog oil concentrations in both forms. Mortality and tube construction were noticeably effected at approximately 12 mg/L total oil in bulk form and 17 mg/L total oil in the vaporized form. Tests with *Hyallela azteca* indicated no toxicological differences between vaporized and bulk fog oil. Concentrations up to 14.8 mg/L bulk form were not acutely toxic and the highest vaporized concentrations tested (5.58 mg/L) only produced 5% mortality after 48 hours. Toxicity tests with *Hexagenia* sp. were inconclusive because the highest concentration tested was about 3 to 5 mg/L total oil and the observed mortality was non dose dependent.

Dauble et al. (1983) compared the relative toxicity of fog oil and several other organic liquids to *D. magna*. SGF-2 fog oil was comparable to or less toxic than Prudhoe bay Crude oil or No. 2 diesel fuel oil. This comparison was based on toxicity test in the same facility under similar situations.

Fish: A series of screening tests with fog oil were conducted with fathead minnow (*Pimephales promelas*) at concentrations ranging from 0.16 mg/L to 2.37 mg/L (Poston et al. 1986). Other species were not tested with fog oil because the screening tests were negative. After 24 h, fog oil slicks formed in all test exposure solutions indicating that the amount of oil present at the start of the tests exceeded the solubility of fog oil in water. This observation suggests that soluble components of fog oil are not present in toxic quantities. Additionally, dissolved oxygen

did not appear to change during acute exposures up to 96 hours, indicating that fog oil has a very low potential for creating a chemical oxygen demand, and there was no indication of increased microbial growth causing a biological oxygen demand in the static exposure results.

Scheier and Gominger (1976) studied the toxic effects of irradiated and non-irradiated water soluble fractions (WSF) of No. 2 fuel oil on five aquatic species. Of these five species, two were freshwater teleosts, the channel catfish (*Ictalurus punctatus*) and the bluegill sunfish (*Lepomis macrochirus*). The WSF of the fuel oil was prepared in a water to oil ratio of 10:1. Mortality of *I. punctatus* and *L. macrochirus* was 20% in 100% (v/v) of the non-irradiated WSF and 10 % in *I. punctatus*. The researchers did not quantify the amount of oil in the WSF; therefore, actual exposure levels are not known.

Marine Organisms

Studies addressing the effects of fog oil on the marine environment are lacking. No. 2 fuel oil and diesel fuel have been identified as being a chemically and toxicologically comparable to SGF-2 fog oil (Dauble et al. 1983, Shinn et al. 1985). These similar oils have been studied extensively and selected references are reviewed.

Algae: Exposure of No. 2 fuel oil to marine algae cultures has enhanced or inhibited growth rates (Dustan et al. 1975). The volatile fraction of oil containing alkylbenzenes and toluenes was the most biologically active. For the diatom, *Skeletonema costatum*, 0.10 mg/L was toxic to growth in a tightly stoppered flask and 1.0 mg/L was toxic when evaporation was allowed. For the green flagellate, *Dunaliella tertiolecta*, growth was enhanced in a tightly stoppered flask. When evaporation was allowed, no growth stimulation occurred. The reason suggested for enhancement of growth increased permeability of the plasma membrane and nutrient availability.

Invertebrates: The effects of oil on marine invertebrates includes studies on annelids, mollusks, crustaceans, and coral.

Effects of the WSF of No. 2 fuel oil on marine worms have been reported (Rossi et al. 1976). Two species of marine annelids, *Neanthes arenaceodentata* and *Capitella capitata*, were tested. The response of *N. arenaceodentata* was further broken down into age classes. The 24-h LC_{50} for both species and all age classes exceeded 8.7 mg/L of No. 2 fuel oil dissolved in water. The 96-h LC_{50} ranged from 2.3 mg/L to 2.7 mg/L for the two species, and values for age classes of *N. arenaceodentata* ranged from 2.6 mg/L in 60-segment mature males to 8.4 mg/L in 4-segment juveniles. Controlled reduction of the oxygen levels did not effect No. 2 fuel oil toxicity in the marine annelids.

The mollusks are a group of invertebrates have been extensively studied because of their broad distribution and commercial value. Tarzwell (1971; summarized by Liss-Suter and Villaume 1978) exposed mature scallops to 12.5 mg/L No. 2 fuel oil and observed 100% mortality in a 24-h period. The embryonic and larval stages of mollusks, however, are among the most sensitive to petroleum oils (Byrne, 1989).

Eggs and larvae of the quahog clam (*Mercenaria* sp.) were exposed to No. 2 fuel oil water soluble fractions by Byrne and Calder (1977). Oil was added to 27% saline saltwater in a gyratory shaker for 12 hours. A period of 24 hours was allowed for the solution to equilibrate and the aqueous phase was then removed and used in concentrations ranging from 1% to 100%. The shellfish eggs experienced 50% mortality after 48 h exposure time to 0.43 mg/L. Two-day-old larvae exposed to solutions of No. 2 fuel oil experienced LC_{50} values of 1.3 mg/L to 0.53 mg/L after 2 days and 10 days respectively.

Byrne (1989) examined the cytokinetic effects from exposure to the WSF of No. 2 fuel oil in the embryonic development of the quahog clam (*Mercenaria mercenaria*). The WSF was prepared with a gyratory shaker followed by equilibration for 24 h. The dissolved hydrocarbons were quantitated gravimetrically in the aqueous fraction. Test solutions were prepared in 10 ml aliquots containing 1% (0.23 mg/L), 5% (1.15 mg/L), 10% (2.3 mg/L), 25% (5.75 mg/L), 50% (11.5 mg/L), 100% (23 mg/L), and four untreated controls. Three hundred embryos were exposed to each concentration at 25 °C.

Normally, a free-swimming, straight-hinged larva should develop after the 48 h test period. In the control solutions after 48 h, 297 of the 300 embryos developed into free-swimming, straight-hinged larvae. In the test solutions containing the WSF of No. 2 fuel oil greater than 5 mg/L (ppm), 270 of the 300 embryos experienced cellular disruption within the first 3 hours of exposure. At the end of the 48-h test period, 100% mortality occurred for those WSF concentrations of 5.75 mg/L or greater. Percentage survivorship (± 95% C.I.) in the less concentrated WSF were; 0.23 mg/L = 85% (± 4.9%), 1.15 mg/L = 34.5% (± 31.1%), and 2.3 mg/L = 8.5% (± 10%).

The nesting behavior, lipid content, and survival of the marine amphipod, *A. valida*, were studied during and after an acute exposure to the WSF of No. 2 fuel oil (Lee et al. 1981). The exposure lasted six days and then the organisms were transferred to clean seawater for 7 days for subsequent observations.

Twenty amphipods were added to each of the following duplicate dilutions of the WSF of the fuel oil; 0% as a control, 5%, 10%, 15%, 20%, and 25%. The experiments were conducted at 20 °C. Lipids were extracted from the animal residues and weighed to determine total crude lipid content.

Lipid content in control *A. valida* was about 2.8% dry weight and did not vary with age. The lipid content in exposed *A. valida* (5% to 25% WSF) ranged between 57.6% and 98.5% of the control value. At 7 days post-exposure, lipid content *A. valida* had declined further. These results imply that organisms exposed to WSF solutions reduced their feeding and used their lipid reserves to survive.

Mortality rates during the six day exposure period for all WSF concentrations were low. Higher mortality was reported during the depuration phase at concentrations 15% and higher. The relationship between WSF concentrations and mortality, however, was not linear as the 15% WSF concentration produced the highest mortalities. Others have also reported delayed mortality following exposure to sublethal levels of No. 2 fuel oil (Wright 1976, Beck et al. 1983).

Nest construction was adversely affected during exposure and depuration phases of the study. Persistence of impaired nest construction during the depuration phase indicates a potential reduction in recruitment rate in natural populations.

The cause of lower lipid content, nest construction and survival was attributed to impairment or damage of tactile sense for substratum, chemoreception of food, mucus secretion for nesting, and mobility.

Atlas (1975) studied the effects of diesel fuel oil slicks on the amphipod, *Boeckosimus affinis*. Oil water mixtures containing 5 ml of oil were mixed with 5 L of water for exposure solutions. In some of the test containers, a nylon mesh screen was placed beneath the oil slick to prevent the organisms from physically entering the slick. The other test containers would allow the amphipods to enter the slick. The times required to kill 50% and 100% of the organisms were 13

days and 15 days, respectively. For amphipods with access to the slick,1 and 2 days were required to attain 50% and 100% mortality, respectively.

The copepod, *Tigriopus californicus*, was exposed to mixtures of diesel fuel and saltwater and observed for 5 days (Barnett and Kontogiannis 1975). An ultrasonic probe and a magnetic stirrer was used for mixing. Separation of the mixture was noted 30 minutes after the mixing process. Complete mortality (n=25) was observed within 3 days, 4 days, and 5 days in dispersions of 1 mg/L, 0.5 mL/L and 0.25 mL/L respectively. Dispersions of 0.10 mL/L caused 98% mortality after 7 days. The control group had approximately 50% mortality after 7 days, compromising the interpretation of the data.

Survival, development, and growth were measured in the mud crab (*Rhithrapanopeus harrissii*) exposed in a static-renewal system to WSF of No. 2 fuel oil over 6 months (Laughlin et al. 1978). Larvae were exposed to 2.5%, 5%, 10%, 15%, and 20% dilutions of the 6.3 mg/L WSF. Measured exposure concentrations, however, ranged from 30% to 50% of nominal concentrations. Survival of the larvae was reduced in all dilutions after six months. The most pronounced impact was on the two highest exposures (15% and 20% WSF concentrations); their respective percentage of survival was 37% and 6%. The mean duration of larval development to the megalopa stage increased significantly with increasing exposure levels. Subsequent developmental stages had no relationship with exposures concentrations, suggesting that the first larval stage is the most sensitive life stage of *R. harrissii*.

Sublethal effects of diesel fuel has been studied on four species of coral, *Porcillopora* cf. *damicornis*, *Povona gigantea*, *Psammocora* (*stephanaria*) *stellata*, and *Porites furcata* (Reimer 1975). After acclimation to the exposure chambers, 1 to 4 ml of diesel fuel was added and behavior was monitored. In all four species, mouth opening responses were sustained much longer in the experimental groups as compared to the control groups. In two of the four species, no ingestion response was observed for as long as 17 days post-exposure. Similar oil exposure tests have led to delayed feeding responses in lobsters and barnacles (Artema and Stein 1974, Smith 1968).

Vertebrates : Juvenile American shad (*Alosa sapidissima*) were exposed to oil-water mixtures of diesel fuel (Tagatz 1961). Known amounts of oil were added to a circulating aquarium. Dissolved oxygen levels were controlled and held above 6.0 mg/L. Total mortality occurred after 96-h exposure at concentrations as low as 84 mg/L. Fifty percent mortality occurred in 24-h and 48-h exposures at concentrations of 204 mg/L and 167 mg/L, respectively. Low dissolved oxygen concentrations increased the toxicity of diesel fuel to the exposed shad.

Dissolved oil was more toxic than whole oil dispersions to three species of marine or estuarine fish; the sheephead minnow (*Cyprinodon variegatus*), silversides (*Minedia beryllina*), and *Fundulus similus* (Anderson et al. 1974). The most tolerant species was *C. variegatus*, with a 24-h LC_{50} for a whole oil dispersion and the water soluble fraction of 250 mg/L and >6.9 mg/L, respectively. The most sensitive of the three species was *F. similus*, that had a 24-h LC_{50} of 48 mg/L for whole oil dispersions and 5.6 mg/L of the water soluble fraction. The fraction of dissolved No. 2 fuel oil in the artificial seawater was 8.7 mg/L after 20 hours.

Linden et al. (1979) described the combined chronic effects of salinity, temperature, and exposure to sublethal levels of WSF of No. 2 fuel oil on the estuarine killifish, *Fundulus heteroclitus*. Killifish embryos were exposed at 3 salinities (10, 20, 30 ‰ S) and 3 temperatures (20, 25, 30 °C) to three different WSF dilutions (15%, 20%, 25%, and a control group). These three WSF concentrations were noted to equal approximately 0.28, 0.38, and 0.47 mg/L total naphthalenes.

The 10% dilution was mildly toxic to embryos at optimal salinity and temperature (20% S, 23 °C), while the 25% dilution was very toxic in all combinations of temperature and salinity. Greater than 50% mortality occurred under optimal conditions for the 25% dilution. Salinity mildly affect the animals development rate while temperature markedly affected development. Interaction of temperature and salinity with exposure to No. 2 fuel oil inhibited normal development.

4.4.3 Transformation

Transformation of fog oils and surrogate oils in soil and aquatic habitats includes both microbial degradation and photolytic (photooxidation) processes. Photolysis of petroleum products can produce compounds of greater toxicity than the original hydrocarbon constituents. Aquatic microbial degradation of petroleum has been extensively examined; however, little information regarding the degradation of fog oils exists.

Biotransformation

Biotransformation of oils by microorganisms can effect its persistence, mobility, and toxicity. Soil biotransformation is addressed because oil deposited on vegetation and soil may be washed into aquatic habitats. Factors aiding this pathway include: soil properties, ground water level and gradient, rainfall, temperature, and other meteorological conditions (Liss-Suter and Villaume 1978).

Soil Biotransformation: Raymond et al. (1976) studied the biotransformation of No. 2. fuel oil in three soil types, Pennsylvania Glenville silt loam (pH 5.4), Oklahoma sandy loam (pH 6.3), and Texas black clay loam (pH 7.6). The oil was poured on 1.7 x 3.0 meter plots of each soil type in 2.5 kg/m3 amounts and was readily absorbed. Soil was aerated by tilling the top 15 cm in each plot. During the winter months, little transformation was noted. Fertilizer also did not significantly stimulate transformation. After one year, the average oil reduction in the soils ranged from 48.5% to 90%. Silica gel fractionation of oil extracted from the soil indicated selective transformation. The more polar hydrocarbons degraded slower than those with less polarity. Transformation rates did not exceed 500 g/m^2 per month. No significant differences between soil types were noted and microflora colonies increased greatly after oil application. Microflora exposed to oil developed a black pigment. The hydrocarbon utilizing microflora were primarily composed of fungi and the aerobic *Nocardia* species.

Aquatic Biotransformation: Biotransformation of oils mainly results from microbial activity in water and sediments (Atlas 1981, Liss-Suter and Villaume 1978, Koerting-Walker and Buck 1989; Blumer et al. 1970). Petroleum biodegradation has been observed in marsh sediments up to a depth of 60 cm from the sediment-water interface (Blumer and Sass 1972).

Koerting-Walker and Buck (1989) examined the potential petroleum-degrading ability of bacteria using a forty-day, shaker flask test. A cultured medium composed of artificial seawater and trace metals inoculated with a mixed bacterial suspension derived from marine sediment and to which was added No. 2 fuel oil to monitor oil degradation with time. The fuel oil/cultured medium solution without the bacterial inoculum was used as the control to measure oil concentrations over time in the absence of bacteria. In both treatments, the aromatic oil concentration decreased significantly over time Comparison of oil loss for both treatments indicated that bacterial degradation was not significant. Although the bacteria population increased over the forty day period in the inoculated test solution, the removal of aromatics was attributed to evaporation. Because the researchers only evaluated aromatic concentrations, the aliphatic constituents may have been selectively used by the bacteria. The researchers noted that this selective degradation agrees

with the fact that these species of bacteria require organic sources of carbon rather than inorganic carbon.

The rate of biodegradation may be influenced by other aquatic animals. For example, bioturbation of sediment by the tube worm, *Clymenella torquata*, enhanced microbial growth (Koerting-Walker and Buck 1989). Gardner et al. (1979) also observed enhanced microbial degradation of polycyclic aromatic hydrocarbons in the upper sediment as a result of *Capitella capitata* activity. Bauer et al. (1988); cited by Koerting-Walker and Buck (1989) also observed increased microbial degradation as a result of bioturbation by benthic organisms. Bioturbation by the tube worm *C. torquata* influenced the removal of No. 2 fuel oil from sediment and enhanced bacterial colonization (Koerting-Walker and Buck, 1989). This particular tube worm has a wide distribution, unique feeding behavior, and predominates during late stage succession following sea floor disturbances (Yingst and Roads, (1980); Roads and Boyer (1982). *C. torquata* ingests sediment from the bottom of its tube 15 cm to 20 cm below the sediment-water interface and defecates directly into the water column. Additionally, *C. torquata* collects surface sediment in a hoeing action for ingestion or tube construction (Dobbs, 1981; Dobbs and Whitlatch, 1982).

To determine the effect one worm had on distribution of oil on its immediate environment, the change of oil concentrations over time were monitored in oiled sediment, oiled sediment plus a worm and oiled sediment stratified to which was added a worm (Koerting-Walker and Buck 1989). All treatments were conducted under three temperature regimes (4.5 °C in March, 7.5 °C in April, and 21 °C in July-August) to evaluate any seasonal differences associated with oil degradation. The burrowing and feeding behavior of *C. torquata* had a significant effect on the removal of oil form the sediment. The proportion of the two-ring aromatics remained about the same in both treatments indicating that the oil constituents were not selectively removed nor microbially degraded. Temperature/season differences were not attributed to increased worm activity, but were attributed to physical effect the solubility of light weight aromatics. The presence of *C. torquata* for March and July treatments showed significant oil removal as compared to treatments in those months with out the animal, but no difference was observed in April. The differences in oil concentration between seasons, specifically spring and summer, was significant ($p < 0.01$). July had the greatest removal.

4.4.4 Photolysis

Photolytic reactions caused by exposure to sunlight may increase the soluble fraction and toxicity of hydrocarbons in oils. Ultraviolet light is responsible for the formation of free radicals and subsequent oxidation reactions involving oil constituents. Larson et al. (1977) simulated and characterized an environmental exposure of No. 2 fuel oil to ultraviolet radiation. The No. 2 fuel oil was 77% C-10 to C-22 n-aylkalenes and other saturates, and 23% aromatic hydrocarbons. Irradiation of the oil for 24 h simulated a bright sunny day at 40 degrees N latitude with the oil temperatures ranging from 21 to 23 °C. A second oil tray was kept dark for a control.

After twelve hours of irradiation, the oil had become visibly turbid, a process that continued for three days, after which a fine particulate material settled on the bottom. The fine particulate was highly oxidized organic compounds and contained alcohols, carbonyl compounds and carboxylic acids. Peroxide formation persisted at a linear rate for 90 hours, whereas the phenolic compounds increased linearly for 165 hours. The carbonyl compounds were largely derived from the benzylic hydrocarbons. The control oil tray did not change in its turbidity and acidity, nor did the content of peroxides, phenols or total carbonyl compounds. These chemical changes have also been documented with irradiated vaporized and bulk fog oil with some minor differences (Poston et al. 1988)

Poston et al. (1986) compared the effects on toxicity and chemical composition by photolysis of vaporized and bulk SGF-2 fog oil. In 48-h acute exposures of *H. azteca*, there was

no difference between vaporized and bulk oil in toxicity. The 48-h LC_{50} was about 11.5 mg total oil/L for photooxidized fog oils. Photooxidized vaporized and bulk fog oil were more toxic than there unexposed fog oil. Photolysis was responsible for the production of polar materials that act as emulsifiers and result in higher concentrations of water soluble constituents in the irradiated oils. Additionally, photolysis resulted in the production of chemicals such as aromatic ketones which have toxic properties apart from those of the original bulk oil.

Scheier and Gominger investigated the effects of irradiation on the toxicity of WSF of No. 2 fuel oil to five species of fish. The WSF of the fuel oil was prepared in a water to oil ratio of 10:1. The amount of oil in the WSF was not measured, consequently, actual exposure levels are not known. After mixing was completed, the water soluble portion was removed and split into two glass test containers. One container was then exposed to a continuous light source from a Sylvania 275 watt sunlamp. The LC_{50} concentration for *I. punctatus* exposed to the irradiated solution was 75% v/v (+ 3.8% @ 95% C.I.) of the WSF whereas 90% survival occurred in 100% v/v WSF by volume when exposed to the non-irradiated solution. The *L. macrochirus* was more sensitive to both solutions. The group exposed to the irradiated solution had a LC_{50} of 39.6% v/v (+ 2.8% @ 95% C.I.) of the WSF and 80% survival occurred in 100% of the WSF by volume for the group exposed to the non-irradiated solution.

A transformation toxicity test was performed on grass shrimp *Palaemonetes pugio* under a relatively accurate simulation of natural estuarine conditions (Scheier and Gominger 1976). The preparation process included floating 1 liter of No. 2 fuel oil over 360 liters of brackish water replenished at 3 liters/h. Two sunlamps provided ultraviolet (UV) irradiation for water solutions exposed for 24 h, 72 h, and 6 days. A chemical comparison between vat water exposed to UV irradiation for 6 days and vat water unexposed to UV irradiation for 6 days revealed that the UV exposure promoted increases in phenols, aromatic hydrocarbons and aliphatic hydrocarbons of 0.52 mg/L, 2.35 mg/L, and 2.9 mg/L, respectively. Concentrations in 6 day old non-U.V. exposed oil-water mixtures was 0.23 mg/L, 0.35 mg/L, and 1.4 mg/L, respectively. Increased mortality was attributable to the increase in soluble, photochemically generated constituents in the seawater.

4.4.5 Bioaccumulation

No information on the uptake and accumulation of fog oils by freshwater or marine organisms was found in the literature; however, there is some data addressing accumulation of organic constituents of fuel oil. In most studies, bioaccumulation factors have not been reported because of highly variable exposure concentrations. Liss-Suter and Villaume (1978) reviewed several studies addressing bioaccumulation of No. 2 fuel oil constituents. Green algae, filter feeding mollusks, fish, and herring gulls accumulated hydrocarbons from an oil spill in Buzzards bay. The oil contained in shellfish persisted for up to a year. Marine annelids have also shown the ability to concentrate substituted benzene, naphthalene, alkylated naphthalene, aromatic hydrocarbons, and paraffins for fuel oil contaminated water. There is also evidence that freshwater fish can accumulate hydrocarbons, tainting the flavor of the flesh. This was supported in part by column and gas chromatography and U.V. and fluorescence spectroscopy.

4.5 MITIGATION

Fog oil droplets are inhalable, and surface deposits can accumulate in terrestrial and aquatic systems as a result of Research & Development and performance testing. In some instances, mitigation approaches are recommended.

Mitigation approaches that involve reducing the amount of material disseminated during tests by reducing dispersion rates, the number of tests per site, altering the physical characteristics of the material, or the use of new (replacement) materials involve research and development and

performance considerations and are beyond the scope of this review. Mitigation approaches are limited to activities that may reduce the impact on health and the environment of fog oil aerosols as they are currently disseminated.

When possible, research and development and performance tests involving fog oil aerosols should be performed in wind tunnels (such as the BREEZE wind tunnel in Edgewood, Maryland) or in other facilities having particle filtration capabilities. The BREEZE tunnel can be used to test full-scale systems, however, its capability to handle full-scale fog oil releases in not known. Other wind tunnels are available to test reduced-scale dissemination systems for environmental deposition, resuspension, fate, and effects, and for bioavailability and toxicity to animals.

4.5.1 Human Health

Because fog oil smokes are largely respirable, and because data suggest an occupational risk for workers after acute or repeated exposures to oil mists, the inhalation of mixed fog oil aerosols should be limited. Respiratory protection should be provided to personnel during plume dispersion. Eye protection should also be provided to reduce the risk of eye irritation. Frequent washing of skin and clothing will minimize the potential for acute and chronic adverse dermal effects and protective gloves, hats, etc. should be provided to reduce the amount of oil contact with the skin. Prior to smoke generation tests, personnel should be screened for chronic skin disease, organic diseases of the lungs, heart, kidneys or liver, and history of allergy to hydrocarbons.

4.5.2 Terrestrial Systems

A key factor in mitigating the effects of fog oil aerosols in terrestrial systems concerns the timing of testing activities. Oil effects in plants are less severe in the absence of actively growing foliage (Clark and Finley 1977) and timing of generation tests relative to growing seasons may reduce adverse impact on plant communities. As discussed in Section 4.3, abiotic factors such as temperature greatly affect the volatilization and fate of fog oil aerosols. Temperature also affects biodegradation rates of hydrocarbon materials. Thus, if tests can be conducted during spring and summer months in most climatic regions, impacts of fog oil aerosols on vegetation might be reduced and the persistence of hydrocarbons in the soils might be decreased. This approach may not be as viable for application in arid and semiarid climatic regions. In those ecosystems, impacts may be lessened if testing is conducted during early spring months when temperatures are rising, but when water stress is less than will be experienced during summer months.

Some evidence (Warner et al. 1984) indicates that impacts from hydrocarbon contaminants (diesel fuel) on plants are greater if the contaminants are mixed in the soil profile and readily available to the entire root system for absorption. Warner et al. (1984) found that barley growing in soils that were amended with diesel fuels showed greater toxic responses than plants growing in soils where fog oils were deposited on the surface or in a subsurface layer. Thus, mitigation approaches that might involve plowing or mixing of soils to distribute the hydrocarbons may not be effective in minimizing impacts to terrestrial vegetation.

Temporally separating applications by several hours or days (depending on ambient temperature) will also greatly reduce the potential risk to terrestrial systems by preventing fog oil accumulation through evaporative loss. When test objectives permit, deposition to soil and plants may also be minimized by reducing smoke down-wash. This may be accomplished by elevating the ejector to a more vertical position or ejecting the aerosol at an angle to the mean wind direction. Reduced smoke deposits will reduce potential exposure of wild animals to toxic levels of fog oil. In addition, mitigation of wildlife impacts may best be accomplished by avoidance of areas where sensitive animals (e.g. waterfowl) or endangered species may be exposed to the smoke by inhalation, ingestion or dermal deposition. Sensitivity of some wildlife species to disturbance (Klein 1976) may limit the number that would be exposed to high airborne levels of fog oil that

occur near the generators and the mobile course. Noise generators could be used at more distant locations if harmful levels are projected in areas where wildlife have retreated. If a protected species occurs on the selected site, compliance with the Endangered Species Act of 1973, as amended, must be ensured and the project modified, if necessary, to prevent jeopardy to the protected species.

Limiting excessive use of the road courses by heavy equipment will greatly reduce potential ozone production from the generation tests. Tests should not be conducted coincident with large-scale maneuvers when air stability is high.

4.5.3 Aquatic Systems

Fog oils have the potential to accumulate in the aquatic environment while they are being routinely used and could reach acutely toxic levels for some benthic organisms. However, after cessation of the use of fog oils, biological and, to some degree, chemical degradation of fog oil constituents would likely occur. Over a protracted length of time, conditions would likely revert to normal for a particular habitat. The time frame for these processes could be on the order of years. Therefore, fog oil aerosol should not be generated in areas that will result in deposition of the smoke in aquatic systems. Generating the smoke under high ambient temperatures will reduce the deposit and run-off to water surfaces. Also, generation when daylight periods are long may accelerate photolytic degradation of oil constituents and facilitate biodegradation by increasing the aqueous solubility of fog oil constituents. However, this must be weighted against the increase in toxicity of the photooxidized oil. Oil spill containment and cleanup procedures designed for mop-up protocols for oil spills in water ways are somewhat effective in mitigating aquatic effects and may decrease impacts on aquatic wildlife as well. It is not known how effective these measures will be on oil-coated particulates such as brass and graphite.

4.6 ENVIRONMENTAL IMPACTS OF RESEARCH AND DEVELOPMENT, MANUFACTURE, TRANSPORTATION, STORAGE, AND DISPOSAL

Safety issues are typically addressed in specific test plans and are not present in this review. Personnel safety is the responsibility of the test site safety officer. The following will address the general aspects related to health and environmental impacts of fog oil or other lubricating oils.

4.6.1 Environmental Impacts of Research & Development

The environmental dissemination of fog oil materiel results in two levels of contamination. The first is the relatively large area of soil or water surface on which dispersed oil is deposited. Even under worst-case conditions, surface deposits are estimated to be less than 10 mg/m^2 at all distances greater than 2 km from the source. At these levels, terrestrial, and aquatic risks from fog oil exposure are minimal. Airborne concentrations at > 2 km from the generator are also harmless to humans and wildlife. The second level, where higher accumulations of oil occur around generators or point sources (0.05 to 1.5 g/m^2), physical removal is recommended. However, mechanical clean-up methods are counter-indicated in areas where ground disturbance will result in erosion (e.g., arctic and subarctic test sites where permafrost degradation may occur, Hunt et al. 1973) or greater incorporation into the soil during plant growing season.

Personnel protection is recommended for individuals within the airborne fog oil clouds. At a minimum this should include use of full-face particle masks for respiratory protection and prevention of eye irritation. Skin should be protected from exposure and appropriate hygiene followed to remove oil deposits from skin and clothing. Respiratory exposure to airborne fog oil

may also be harmful to other vertebrate species, particularly small mammals and birds. The population stability of species with critically low populations (endangered species) can be effected by a small increase in mortality, therefore generation of the smoke where such species are present should be avoided. Also, populations of animals may be impacted by respiratory exposures to airborne fog oil when they are concentrated within a small area. Dispersion of fog oil should be avoided in areas or at times when migrant species are congregating in high risk exposure areas.

4.6.2 Manufacture and Transportation

Fog oil has a flash point of 320 °F and is therefore not a flammable or combustible liquid under the Department of Transportation's hazardous materials transportation regulations (49 CFR 173.120). However, cyclohexane is classified as a flammable liquid and petroleum is classified as a flammable liquid (40 CFR 172); thus making these materials subject to the labeling, packaging and transportation requirements of the HMTA.

4.6.3 Storage

Storage of unused fog oil is subject to the regulations relating to federal employee occupational safety in 29 CFR 1960. Fog oil is not subject to the reporting requirements from releases of hazardous substances in 40 CFR 302, although release of fog oil on waters of the United States may be subject to Clean Water Act requirements in Section 311(b)(1).

4.6.4 Disposal

Fog oil is not listed as a hazardous waste under the RCRA.

5.0 CONCLUSIONS

Evaluations based on modeled estimates and scientific studies of the environmental and toxicological impacts of the fog oil smoke plumes have been reviewed and are summarized in this section. Where insufficient data exist to provide summary conclusions, or where additional data would serve useful purposes in expanding the environmental assessment of fog oil aerosols, such data needs are identified.

5.1 ENVIRONMENTAL AND TOXICOLOGICAL IMPACTS

The environmental toxicity, human health risk, and effects of fog oil aerosols on terrestrial and aquatic systems are summarized in relation to the predicted dissemination and deposition of the aerosols and resultant exposures in the downwind environmental compartments.

5.1.1 Environmental Dissemination and Deposition

Potential impacts from the dissemination of fog oil depend on air concentrations in the case of human inhalation or dermal exposure, or the mass loading of ground, vegetative, and aquatic surfaces in the case of environmental impacts. Fog oil aerosols are dispersed by vaporization/condensation methods, and windborne droplets are similar in composition to the bulk material. Periods of generation generally range between 10 and 30 min, however, long-term and large-area use of the material as an obscurant smoke is accomplished using multiple or sequential generators. The aerodynamic size of fog oil droplets range between about 0.6 and 3 µm, with settling velocities between roughly 0.001 and 0.03 cm/s. These aerodynamic characteristics strongly influence the dispersion, deposition, and inhalation potential of fog oil smoke.

Estimates of downwind air concentrations and surface deposits were made by assuming operating and atmospheric conditions. The model used in Appendix A may be sufficient for most applications, however, the use of more sophisticated models or actual field measurements during fog oil tests or trials may also be employed to identify the source term related to health and environmental impacts. Estimates of fog oil air concentration, for a single 30 min XM56 test, generally decrease from between 7 to 140 mg/m^3 at downwind distances between about 0.1 and 0.2 km, to between less than 0.003 and 0.3 mg/m^3 at a distance of 40 km. Potentially harmful air concentrations of fog oil ($\geq$ 10 mg/m^3) were predicted to occur within 0.4 km to 2 km of the source, depending on atmospheric conditions. The impact of these concentrations on visibility was predicted to potentially degrade visibility within roughly 0 to 25 km of the source; with the actual light transmittances depending greatly on atmospheric conditions. Estimates of surface deposition range from 50 to 1300 mg/m^2 at a distance of 1 km downwind of the source to less than 0.001 to 0.5 mg/m^2 at a distance 40 km downwind. Even under worst-case atmospheric conditions, fog oil deposition was estimated to be less than 10 mg/m^2 at downwind distances greater than about 3 km from the source. Resuspension or redistribution of of fog oil should be limited to areas susceptible to soil erosion and flowing streams.

5.1.2 Material Toxicity

The contaminating constituents of fog oils may be toxic to aquatic organisms, plants and animals. Fog oils can accumulate in the food chain and provide a vehicle for uptake of other oil-soluble xenobiotics. A cancer risk may be associated with repeated dermal and, possibly, respiratory exposure to constituents of some fog oil stocks.

5.1.3 Human Health Risk

Fog oil concentrations over most of plume area are not expected to reach levels that have been shown to cause an adverse pulmonary response from either acute or subchronic exposure.

However, hazardous levels may be present within up to 2 km of the source, depending on environmental conditions. Under all conditions, personnel within about 0.1 km of the generators may be exposed to concentrations above the Short Term Exposure Limit of 10 mg/m^3. Because of the carcinogenic compounds contained in some fog oil stocks, there is a potential risk of pulmonary and skin cancer. The risk is probably minimized by the military procurement requirements for refined fog oils and can be further reduced by attention to worker respiratory protection and personal hygiene. SGF-2 may to be weakly mutagenic but dose not appear to pose an acute genetic risk. The most serious consequences of oil exposure result from aspiration of ingested oil, but exposure by this route is unlikely. Induction of the cytochrome P450 system may impact xenobiotic metabolism in exposed individuals. There is little risk of deflagration or explosion of fog oil or mixed fog oil/flake smokes. However, visibility is diminished in and through the plume and hazardous driving conditions may develop in areas of public access.

5.1.4 Terrestrial Impacts

The potential risks from recurrent use of fog oil aerosols as obscurants are believed to be moderate and effects are not expected to persist in the environment. The major portion of discernable effects would be expected to occur within a 0.1 km radius of the point of generation of the fog oil aerosols. Moderate phytotoxic effects are observed in a variety of plants exposed to fog oils and none of the species appear to acclimate to or compensate for repeated oil exposure. Biomass production is also decreased in some species, but seed germination is not effected. Soil invertebrate and microbial components do not appear to be adversely affected by fog oil exposure; however, changes would be expected in the species composition of the soil microbial community. Impacts at the community level resulting from increased populations of those microbial species that are capable of utilizing fog oil hydrocarbons are not known. Wildlife inhabiting areas near the source may encounter levels of fog oil that cause adverse health effects or reproductive dysfunction in wild animals. The contaminated area would be relatively small and no population impacts are expected unless congregations of animals or sensitive endangered species are exposed. Because the effects of fog oil aerosols in birds are extrapolated from mammalian data, and because birds are generally much more sensitive to airborne pollutants than mammals, the impact of fog oil smokes on wild birds may be greatly underestimated in this evaluation. Waterfowl casualties are high in water systems contaminated with oil.

Although the low mass loading rates and the high rates of volatilization of fog oil from soil and plant surfaces will minimize toxic effects to most terrestrial systems, extreme environments, such as those used for desert and arctic weather performance tests may be more sensitive to fog oil releases. For example, plant damage is greater under desert conditions of high temperature and low humidity. Also, extreme cold can greatly reduce volatilization of fog oil and deposited oil can re-deposit on sensitive growing plants or into aquatic systems during the summer melt cycle. Fog oil can also be resuspended on blowing snow and accumulate in drift areas that may be critical habitats for wildlife reproduction or migration.

5.1.5 Aquatic Impacts

Research concerning the aquatic fate and effects of fog oil is limited, therefore, studies that on the effects of analog petroleum oils in aquatic systems were used in this assessment. In particular, diesel fuel and No. 2 fuel oil were reviewed because they have been identified as being chemically and physically similar to SGF fog oils. Emphasis was placed on data from studies using No. 2 fuel oil which has also been identified as being toxicologically similar to SGF-2 fog oil.

Both chemical toxicity and physical impairment caused by fog oil contributes to mortality in toxicity tests. The relative significance of each, however, depends upon the specific species tested and the methodology. In the field, little direct chemical impact to aquatic organisms is anticipated after a single 30-min generation of fog oil smoke. However, deposition of fog oil from a 30-min generation onto a 1-m deep body of water near the source will result in oil concentrations that are physically detrimental to aquatic invertebrates. Multiple smoke generations are likely to result in significant algal growth reduction and mortality of aquatic organisms. Particular animals, such as filter feeding and benthic organisms, may be at greater risk due to increased exposure to either suspended microdroplets or oil-impacted sediment. Although short-term episodic releases of fog oil on its own are not acutely toxic, aquatic life can be impacted if concentrations reach levels in excess of fog oil's true solubility. Several physical and chemical mechanisms act to selectively fractionate or disperse individual constituents of the oil in water systems. The soluble fraction of SGF-2 is largely low molecular weight aromatic hydrocarbons which are acutely toxic to aquatic organisms. Insoluble constituents have been shown to inhibit functions such as chemotaxis or feeding in benthic organisms. The toxicity to aquatic life for both marine and freshwater systems can be exacerbated by irradiation with sunlight resulting in photolytic reactions primarily attributable to the ultraviolet spectrum. Oil constituents are known to accumulate in aquatic organisms, however, chronic exposures are not well documented and long-term effects are inferred from studies with No. 2 fuel oil. Biological and chemical degradation of fog oil constituents are likely to occur, but the processes may take many months to complete. Also, a surface film or slick may form and impose physical stresses on aquatic organisms. To avoid these chemical and physical impacts, fog oil aerosol should not be generated in areas that will result in deposition of the smoke on aquatic systems.

5.2 DATA NEEDS

The existing set of data related to the environmental fate and toxicological effects of fog oil aerosols is not complete. Suggested research tasks are identified here where additional information would aid the environmental assessment of the military use of the material.

5.2.1 Aerodynamic Characteristics and Plume Dispersion

The aerodynamic characteristics of individual fog oil droplets are well understood. In addition, the characteristics of windborne fog oil plumes do not pose unusual difficulties in estimating air concentrations. However, data on the deposition rates of fog oil smokes to typical surfaces are limited to wind tunnel studies. Field measurements have been reported to result in undetectable fog oil residues. This may be caused by difficulties in analyzing fog oil residues or by reflection of fog oil plumes from surfaces. Additional wind tunnel studies could provide additional information on fog oil deposition rates to various surfaces and in the presence of graphite flake aerosols (the XM56 produces both types of obscurants). The possibility of performing controlled field experiments should also be studied to determine whether or not useful surface deposition information could be obtained.

5.2.2 Fog Oil Fate in the Environment

It is known that fog oil degrades in the environment. Studies should be performed under natural or simulated field conditions to investigate the processes and rates of degradation. These processes may include evaporation and chemical, photochemical, and microbial degradation. The studies should include soil, plant, and water surfaces. Rates of degradation under typical field conditions would aid site-specific environmental assessments.

5.2.3 Human Health Risk

In light of the mutagenic potential observed in wild rodents exposed to field releases of fog oil smoke, additional studies should be conducted to more completely evaluate the mutagenic potential of SGF-2 in humans. The carcinogenicity of SGF-2 as currently procured by the military should be evaluated for both skin and respiratory exposures. Because inhaled, aspirated, ingested, and dermally absorbed oils become distributed to many organs, the distribution and effects of subchronic SGF-2 exposure on organ function should be investigated. Additionally, information on the effects of SGF-2 on central nervous function, behavior and reproduction, fertility and teratogenesis is also lacking.

No data are available on the health impacts of inhaled mixed aerosols containing fog oil. Acute, subchronic, and chronic studies using surrogate laboratory animals are needed to adequately assess the effect of respiratory burdens of mixed aerosols on pulmonary tissue and function. Studies are also needed to determine the threshold effect levels of the mixed smoke compared to concentrations that induce nontransient pathologies from the single component aerosols.

5.2.4 Bioavailability and Toxicity of Fog Oil Aerosols in Terrestrial Systems

Information is lacking concerning the impacts of fog oil aerosols on above-ground insect populations. Although the impacts to vegetation and insects are expected to be limited to the area surrounding the generation source, a screening study to determine the mass loading rates at which insects begin to experience negative impacts would be helpful.

No information is available to adequately assess the effects of repeated exposures to fog oil aerosols on native vegetation. No information is available concerning the possibilities of change in plant community structure induced by repeated fog oil exposures or the impacts of repeated exposures of plants in stressed conditions (i.e., vegetation in arid or semiarid areas that experience water stress for much of the year).

Potential wildlife impacts can, in part, be inferred from laboratory data gathered on lubricating oils and field studies in the aftermath of oil spills. However, the effects of different types of petroleum hydrocarbons on the health of wild animals can vary from no effects to significant reproductive reduction. More direct information on the response of wild mammals, birds, and reptiles to fog oil exposure are needed and include dose-response data on respiratory toxicity of fog oil and mixed fog oil/flake aerosols in birds, pathological and reproductive impacts of ingested fog oil and mixed aerosols in birds, reptiles, and wild mammals, and the effect of fog oil deposition on avian egg hatchability.

5.2.5 Bioavailability and Toxicity of Fog Oil Aerosols in Aquatic Systems

There is limited information about the effects of fog oil on freshwater organisms. Most of the available information comes from one or two studies. Diesel fuel and No. 2 Fuel Oil are reasonable surrogates for fog oil, however, most of the available aquatic toxicity data on these chemicals deal with marine organisms. Because fog oil has such limited solubility, additional testing should be directed towards evaluating sub-lethal effects of SGF-2 on freshwater organisms, in particular, sediment toxicity, effects on reproductive success and behavior, and embryo larval toxicity of different aquatic organisms. To the extent that it is determined that fog oil may be introduced into marine or estuarine habitats, additional testing should be done to corroborate the conclusions extrapolated from marine studies on diesel and fuel oil in marine systems. Here the emphasis should be on sub-acute effects. Of particular importance is potential the impact of fog oil exposure on the recruitment of salmonid species to original stream beads.

5.2.6 Mitigation Approaches

Mitigation approaches that involve reducing the amount of material disseminated during tests by reducing dispersion rates, the number of tests per site, altering the physical characteristics of the material, or the use of new (replacement) materials are beyond the scope of this review. Mitigation approaches are limited to activities that may reduce the impact on health and the environment of mixed fog oil/flake aerosols as they are currently disseminated.

When possible, Research & Development and performance tests involving and fog oil and mixed fog oil/flake obscurant aerosols should be performed in wind tunnels (such as the BREEZE wind tunnel in Edgewood, MD) or in other facilities having particle filtration capabilities. The BREEZE tunnel can be used to test full-scale flake systems, however, its capability to test full-scale fog oil releases is not known. Other wind tunnels are available to test reduced-scale dissemination systems for environmental deposition, resuspension, fate, and effects, and for bioavailability and toxicity to animals. When possible, procedures that reduce down-wash of smoke to the surface should be instigated to reduce graphite and fog oil deposition to soil and plants. Avoidance of areas or time periods when sensitive or protected species are within about 2 km of the source will minimize impact of smoke generations on wildlife populations. Deposition to water systems should be avoided. Personnel potentially exposed to the smoke should be equipped with and use safety equipment to reduce respiratory, ocular and dermal exposure.

GLEN BROWDER
3rd District, Alabama

COMMITTEE ON NATIONAL SECURITY
COMMITTEE ON THE BUDGET

Congress of the United States
House of Representatives
Washington, DC 20515-0103

WASHINGTON OFFICE:
2364 Rayburn Building
Washington, DC 20515-0103
(202) 225-3261

DISTRICT OFFICES:
104 Federal Building
Post Office Box 2047
Anniston, AL 36202
Phone: (205) 236-5655

107 Federal [illegible]
Opelika, AL 36801
Phone: (334) 745-6221

115 East Northside
Tuskegee, AL 36083
Phone: (334) 727-6390

April 27, 1995

The Honorable Molly H. Beattie
Director, U.S. Fish and Wildlife Service
3256 Interior Building
1849 C Street, NW
Washington, DC 20240

Dear Director Beattie:

The purpose of this letter is to request your assistance in providing information to me regarding compliancy with the Endangered Species Act at Fort Leonard Wood, Missouri.

As you may know, the Army proposes to close Fort McClellan, Alabama, and relocate its current activities and missions to Fort Leonard Wood. This recommendation is currently under review by the independent Defense Base Closure and Realignment Commission.

It is my understanding that the Endangered Species Act requires federal agencies to consult with the Fish and Wildlife Service on any proposed action that may affect a listed endangered/threatened species. It has been determined that breeding populations of two listed species, Indiana and Gray Bats, are found at Fort Leonard Wood.

Among the many activities being proposed for transfer to Fort Leonard Wood is smoke/obscurant training for U.S. Army Chemical Corps soldiers. A key aspect of this training is dissemination into the atmosphere of large quantities (77,000 gallons per year) of a smoke-producing material known as fog oil. Fog oil is a petroleum derivative that is disseminated by means of mechanical smoke generators and in typical training exercises, areas as large as 20-25 square kilometers may be covered with a dense cloud of the material. Smoke training also involves the dissemination of colored smoke containing dyes, brass flakes and carbon fibers. It would seem to me that dissemination of these materials on a large scale would have an adverse impact on the bat population.

It is also my understanding that Army installations (Fort Leonard Wood, in this case) must formally consult with the Fish and Wildlife Service on an action that may affect a listed species or critical habitat unless the listing service agrees in writing that the action is not likely to adversely affect any listed species or critical habitat.

My question to you is this: Has there been any consultation (formal or informal) between the Army and your Service regarding the proposed move of activities from Fort McClellan to Fort Leonard Wood? If so, please provide me with copies of all related correspondence, decision or other communications and documentation. If not, do you anticipate any consultation on this issue in the future?

Thank you for your assistance with this matter, and because of base-closure deadlines, I would appreciate receiving your reply by May 10, 1995.

Sincerely,

Glen Browder

Glen Browder
Member of Congress

GB/vfp

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Bishop Henry Whipple Federal Building
1 Federal Drive
Fort Snelling, MN 55111-4056

IN REPLY REFER TO:

FWS/AES-TE/CCU95-01360

MAY 19 1995

MAY 12 1995

Honorable Glen Browder
House of Representatives
Washington, D.C. 20515-3261

Dear Mr. Browder:

This responds to your April 27, 1995, letter which requested information regarding Endangered Species Act compliance and the possible relocation of Fort McClellan, Alabama, military training missions and activities to Fort Leonard Wood, Missouri. Specifically, you asked whether informal or formal section 7 consultation had occurred on the proposed relocation and, if so, you asked us to provide related documents and other administrative records. Secondly, you asked whether we anticipated a future consultation on the relocation action if consultation had not occurred.

Consultation has not been initiated by the Army with the U.S. Fish and Wildlife Service (Service) on the proposed relocation action. Based on discussions between our Columbia, Missouri, Ecological Services Field Office staff, Fort Leonard Wood, and the Corps of Engineers, we understand that the proposed action is only a Base Realignment and Closure Commission recommendation at this time. Until Congress makes a final decision, there is no Federal action (and site-specific details) on which to consult. However, installation and Corps staff have assured our Field Office that informal or formal consultation for the proposed new activities will be requested if and when a final decision to relocate these activities to Fort Leonard Wood is made.

Since 1992, our Field Office has been in informal section 7 consultation with Fort Leonard Wood on their ongoing military training and natural resource management activities. At our Field Office's request, the installation is conducting extensive studies of the effects of these activities on the gray and Indiana bat and bald eagle populations which occur on the post.

Field staff inform me that Fort Leonard Wood has been very forthright and cooperative in working with the Service to ensure that installation training and management activities comply with the Endangered Species Act and do not detrimentally affect the Indiana bat or gray bat populations. They expect this relationship to continue and are confident that section 7 consultation will be initiated by the Army for any new training activities which may affect the bats or bald eagle.

I hope this answers your questions. Please feel free to contact me or Mr. Gary Frazer, Columbia, Missouri, Field Office Supervisor (314-876-1911), if you have any questions or if we may be of further assistance on this matter.

Sincerely,

Thomas [illegible]
Acting Regional Director

The Anniston Star - The Front Page
Saturday - May 13, 1995

Chemical school move might not occur soon

☆*In Missouri, groups intensify opposition to the school/Page 2A*

By Eric Larson
Star Military Writer

Even if the Army gets all the permits it needs from the State of Missouri to move its chemical training to Fort Leonard Wood, federal regulations could delay the move for one year, if not several, environmental officials said this week.

"These permits are really just the first step," said Scott Murrell, environmental coordinator at Fort Leonard Wood. "The Army definitely has to do an impact statement."

Members of the Calhoun County Chamber of Commerce Military Affairs Task Force have argued that moving the chemical school will hurt training during a time when chemical defense is necessary to fight terrorism.

The Army has said it has reduced the time it takes to shut down a base and move operations elsewhere, but the process of studying environmental impacts of moving a mission can take a while, said Gene Gunn, with the Environmental Protection Agency in Kansas City, Mo.

"If there are no impacts or if the impacts are small, it goes rather rapidly," Gunn said. "If the impacts are more serious, it can take much longer, two or three years ... That project would be put on hold."

The National Environmental Policy Act requires that federal agencies study the effect of projects on an area before they start them.

When Congress wrote the laws governing the Base Closure and Realignment Commission, it exempted the commission from having to do an environmental impact study before closing or realigning a base.

However, the Army would have to perform an impact study after the commission's decision before a mission can actually move.

Such studies often delay mission moves, but they don't stop them completely, said Marguerite Duffy, who works in the EPA's office of federal activities.

"We've been through a hundred of these and haven't had something like that happen. With all the environmental planners and engineers in the world today, in most cases, (impacts) can be reduced," Ms. Duffy said. "The law is meant to help decision-makers. It's not meant to stop projects."

An impact study would have to turn up some serious problems before a project would be stopped. For example, "something in which you knew you was going to kill off an endangered species. That would be environmentally unsatisfactory."

Two endangered species, the Indiana bat and the gray bat, live near Fort Leonard Wood.

Very few cases actually make it to the Council on Environmental Quality, the executive arm that ultimately resolves disputes between the EPA and agencies proposing projects. Between 1974 and 1989, out of the hundreds of environmental impact studies performed, only 24 were sent to the council, according to an EPA brochure.

Generally, the agencies can agree on alterations to the original plan that satisfy environmental concerns but still get the job done, said Ken Mittelholtz, an EPA official in Washington.

"There's a whole lot of mitigation that goes on," he said. One example of a mitigation, he said, is building bridges over streams so tanks don't pollute the water. "It doesn't say that you can't build a project that doesn't have environmental impact. It just says you have to go through the process."

Murrell, who is in charge of environmental management at Leonard Wood, is positive that his base will be able to accommodate the chemical school.

"We are going to have to answer a lot of questions. From what I've learned, I have a high degree of confidence that we can do the impact statement and proceed with doing the mission."

'The Move" at town hall meeting

Held on may 9, 1995

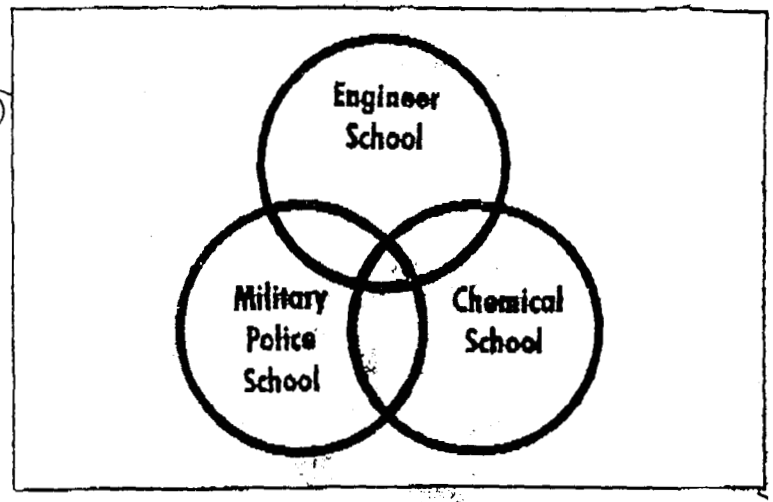
By Eric Cramer
Staff writer

Much of the information distributed at Rolla's town hall meeting to discuss the move of the Army chemical defense training and military police schools last night was a rehash of information presented at Waynesville's town hall meeting Monday.

The question and answer session following the presentation, however, included comments from several people who are apparently opposed to moving the chemical defense training being moved from Fort McClellan, Ala., to Fort Leonard Wood.

Among these was Rolla resident Tom Sager who took exception to comments made by Keith Pritchard, treasurer of Friends Concerned for Fort Leonard Wood's Future. Sager indicated Pritchard's comments said most of the opponents of the move were funded by interests from Alabama.

"I live in Rolla, and receive no funding from Alabama," Sager said. "I have a number of questions, but your format only allows me to ask one. We've heard a lot about the chemical defense training, but I understand the school also trains biological and nuclear agents. Could you tell us about the biological and nuclear components of training?" he said.



Lt. Col. John Johnson, base realignment and closure team leader for Fort Leonard Wood, answered Sager's question. "There is still some confusion in your question sir, about the chemical defense training facility. In that facility, chemical defense and only chemical defense is taught. There is no nuclear or biological training in that facility. In other elements of the nuclear, biological and chemical training there are hundreds of areas where biological and nuclear defense are taught. There are no live biological agents used in training, and only small amounts of nuclear elements," he said.

"The nuclear dimension is merely to protect soldiers on the battlefield. What is trained is detection equipment and neutralization procedures," he said.

First Lt. Juan Torres, post radiation detection officer for Fort Leonard Wood, who spent 10 years at Fort McClellan, said there is more radiation in most hospital nuclear medicine departments than in training at the Army's radiation lab.

Pritchard answered Sager by saying he feels anyone has a right to be opposed to the move. "I don't want to give the impression that all of the opposition is

See "THE MOVE"
Continued on Page 8A

Rolla Daily News
May 10
P. 5

P.6

Rolla Daily News May 10

The move

Continued from Page 1A

funded by Alabama, but there is certainly a large element that is. Anyone from Missouri has the right to be opposed," he said.

Phelps County Presiding Commissioner Randy Verkamp asked a question concerning smoke training conducted at the chemical school that prompted a long answer by Fort Wood environmental specialist Emily Brown.

"We've been told that the smoke is made of oil, what happens to the oil after the smoke training is finished," Verkamp asked.

Brown explained that the "smoke" used in training is not actually smoke. "A very lightweight oil, that is like mineral oil, is atomized into very small particles that appears like normal weather related fog," she said. "The particles are very small, on the order of one micron in diameter."

Brown said the oil is known as "clean" oil because it contains no additives. "In the past, other agents, including diesel fuel, have been used. They are not being used at Fort McClellan, and will not be used at Fort Leonard Wood," she said.

Brown said that state environmental regulation restrict the fort to only 135 days of smoke training each year, and only one hour of smoke training in a 24-hour period.

She said that the post will complete a detailed environmental impact statement, but the formal process cannot begin until the move of the school is approved by the BRAC commission.

Rolla resident Carol Ann Smith asked how the oil would affect the ground water in an area with the limestone-based geology of the Ozarks. Brown said the Department of Natural Resources restrictions, and the post environmental policy, address the region's geology.

"We have karst topography here, and we're aware of that. In some areas we have sediment basins, and we have one that is near a karst feature -- a sinkhole," she said. "In that case, we are sealing the karst feature and installing a new basin."

Brown said the DNR regulations restrict the post to 10 parts per million of petroleum, lead and zinc in its runoff water.

Johnson said it is [illegible] people to think it would be easy to meet environmental requirements at the fort. "These thing are going to require some effort. When it comes to the training, people need to understand why the Army needs to do this. Why do we need smoke training? It's simple, if you can't see it you can't shoot it," he said.

"If we can defeat a weapons system, whether it's a man with a rifle or a tank, we would like to do that occasionally. We have a saying – the more we sweat in peace, the less we bleed in war," Johnson said.

Waynesville Daily Guide Publisher Tim Berrier asked if smoke training had ever been conducted in the past at Fort Wood. Brown said test smoke training was conducted successfully as part of the 1993 BRAC process.

One man who refused to give a *Rolla Daily News* reporter his name after the meeting, asked what guarantees people in the surrounding areas have that Fort Wood will obey the environmental law.

"In a time of distrust, how are you going to instill trust in the surrounding communities. You've said the MP school trains the ATF and the FBI, and I've heard the IRS has been at the fort for pistol training. You're talking about bringing nerve gas here. I haven't slept well since I read about this in the paper. I don't want one mistake. Why bring nerve gas down here?" he asked.

Larry Sexton, of the Association of the United States Army and the Friends Concerned for the Future of Fort Leonard Wood, said the man should realize that the people who were making the presentation have to live at the fort.

"There are reasonable restrictions applied by reasonable people," he said. "They are going to meet the safety specifications," he said.

Rolla resident Ed Owsley, a retired colonel, said he understood the fear the man expressed but, "It isn't the Army's job to teach civilian mores. If we don't take control of the government we'll have militia in all 50 states, not just 38. It's time to get back to basics and make this country safe like it was when I was a kid."

Johnson said the Army takes its training seriously. "There's a high degree of checks and balances on everything we do. It will be checked and double checked, as has been said, by reasonable people," he said.

Johnson said that under new laws, environmental authorities can levy fines against the commanders of military installations that fail to comply with environmental regulations.

"If someone were to come to (Maj.) General (Joe) Ballard's door with a bill for $15,000 a day for every day the installation wasn't in compliance, big dollars every day, then you'd see rapid changes," he said.

Johnson said that other agencies train with the military both for reasons of interagency cooperation and because it's efficient. "We have facilities they don't have for training," he said.

He added that he was not required by the Fort Wood commander to attend the town hall meeting.

"I told Gen. Ballard I felt this was something we should do, and I made myself and my team available for town meetings here and in Waynesville and Lebanon. I'm not required to be here," he said.

In response to a question, Sgt. 1st Class David Wellmaker, a nuclear, biological and chemical instructor, explained the differ-

F.7

Rolla Daily News May 10

ROLLA DAILY NEWS
Wednesday, May 10, 1995 - Page 8A

ent types of nerve agent used in the chemical defense training center. He said there is never more than one milliliter of agent mixed at one time.

He added that the chemicals are safe because the primary agent, called GB 2 evaporates harmlessly in an uncontrolled environment, and the secondary agent, called VX, does not evaporate, but stays in one place where it can be neutralized.

The man who refused to identify himself again took the microphone on the subject of flame training. "Since I read the papers about chemical training I haven't slept very well. When it comes to flame training we had a little flame training down in Waco, Texas. Is that the kind of training we'll have here, where you pump a building full of CS gas and light it up?"

Johnson said Fort Wood currently conducts flame training to teach soldiers to use flame defensively, and the training involves no CS gas (tear gas) or nerve agents.

Rolla resident Ed Tenes took the microphone to explain that flame training is essentially the burning of gasoline with a thickening agent. Tennis said he is a nuclear, biological and chemical officer in the National Guard and has undergone active chemical agent training both at Fort McClellan and at Redstone Arsenal.

"I wish people would understand this. I sense a lot of fear here, and I would like to dispel that fear. I'd be glad to talk to anyone about it. When you go through this training it is all so canned that there is really nothing to get excited about," he said. "It's important for soldiers to learn their duties this way," he said.

Retired University of Missouri-Rolla chemist Fred Hardtke asked for an explanation of the chemicals used in the Tokyo subway terrorist attack that killed 10 people. Wellmaker said it was a more potent form of the GB gas soldiers learn to neutralize in the chemical defense training facility.

"We have heard estimates that there were about 10 pounds of the substance in the subway, and only 10 people died," he said. "And that was in an enclosed subway with limited, and not in open air, correct?" Hartdke asked. "That's correct, sir, and if an accident were to happen in the CDTF, it would stay inside the sealed facility with the soldiers, who are already wearing protective gear," Wellmaker answered.

Sager was the last person to speak in the question and answer session. He said he was aware of an accident in which an airplane sprayed a small amount VX gas into the air in Utah. "The gas migrated 27 miles, precipitated onto the grass, and killed 6,400 sheep that ate the grass," he said. "That sounds like a pretty serious toxic agent to me," he said.

"I don't think anyone is saying nerve agent is non-toxic," Sexton said. "The redundancy of training and safety system just makes an accident unlikely," he said.

Star

Missouri Sierra Club opposes all smoke training

By Eric Larson
Star Military Writer

The Missouri chapter of the Sierra Club announced Friday it not only opposes the state permit that would allow the Army's chemical school to move from Fort McClellan to Missouri, but is going a step further in encouraging the government to halt the training in Calhoun County as well.

"We are convinced that this type of abuse is not suitable anywhere," said a news release from the environmental group.

The State of Missouri is reviewing the Army's application to conduct smoke obscurant training at Fort Leonard Wood. A public comment period on the permit application culminates May 12 in a public hearing in Waynesville, Mo., a town near the base.

Sierra Club representatives plan to be at the meeting to argue against the permit, citing an Army study they say proves the training would harm plants and animals near the training grounds, including the Indiana bat and the gray bat, which are listed as endangered species.

While the Army says its numerous studies on obscurant smokes have been inconclusive, Sierra Club members who have seen portions of one study believe the evidence is clear:

"I don't think there's any question that plants and animals will be damaged," said Ken Midkiff, program director of the Missouri chapter. "We don't see how you could spray 65,000 gallons of oil in the course of a year and not do any damage."

"I don't think there's any question that plants and animals will be damaged."

Ken Midkiff, program director, Missouri Sierra Club

The document Midkiff cites, "Preliminary Study of Effects of Military Obscurant Smokes on Flora and Fauna during Field and Laboratory Exposures" is the final report of a study conducted by the Army in 1986.

Fog oil was one of three smokes tested on living cells, plants and rodents. The study found that each of the smokes "exerted varying degrees of physiological and mutagenic effects" on the subjects.

The executive summary of the study says that plants and animals could take years or decades to show the effects of exposure to obscurant smokes, and that by the time symptoms appear, "the system may be damaged beyond repair."

The smoke permit is the only environmental permit the Army lacks before it can move the chemical school. The Army has already received permission from Missouri's Department of Natural Resources to build a live-agent training facility at Leonard Wood like the one at McClellan.

The Defense Base Closure and Realignment Commission, which has the final word on whether the school would move, has said the Army must receive all the permits it needs by June 22. The commission must make its final recommendations to Congress by July 1.

Smoke training has been done at McClellan's Pelham Range since 1951, except from 1973 to 1979 when the school was relocated to a base in Maryland. The practice has the tacit approval of the Alabama Department of Environmental Management.

The smoke is actually a white vapor produced by heating fog oil, which is similar to 20-weight motor oil without additives. Soldiers learn to use the smoke to cloak the movement of troops.

Some neighbors of Pelham Range have complained of burning eyes resulting from smoke that strays beyond the boundary of the range. They're concerned about the long-term health effects.

Midkiff said he is more worried about the effect of the smoke on the ecosystem of Mark Twain National Forest, which surrounds Fort Leonard Wood on three sides. Canoeists and bass and trout fisherman use rivers and streams in the area for recreation. The bats feed on insects Midkiff believes will be affected by the smoke.

Not all environmentalists oppose moving the smoke training, however.

"It's the greatest thing to happen to Fort Leonard Wood since Fort Leonard Wood was a fort," said G.A. Maxwell, president of the Roubidoux Fly Fishers Association and an employee at the base.

While the transfer of McClellan's chemical and military police schools would drain Calhoun County of vital jobs and income, it would bring $10 million worth of construction and more than 2,000 new jobs to the Missouri base.

"The environmental groups are working to whip up a lather around this. We know it's safe for the people and the environment," said Keith Prichard, head of a booster group for Leonard Wood. "Where better than to check this than around Anniston. Do you see desolate forests around there?"

Midkiff does not think ADEM or the Army has monitored the effect of the smoke on the ecosystem of Pelham Range, which encompasses more than 20,000 acres. He also says differing weather conditions at the two bases could mean that what may be safe for McClellan may not be safe for Leonard Wood.

Document Separator

POSITION PAPER ON ENVIRONMENTAL AND PERMITTING ISSUES RELATIVE TO THE PROPOSED CLOSURE OF FORT McCLELLAN, ALABAMA PRESENTED BY SENATOR HOWELL HEFLIN TO THE 1995 DEFENSE BASE CLOSURE AND REALIGNMENT COMMISSION MONDAY, JUNE 12, 1995

J.J./D.N.
This is M.C.'s copy
Have fun w/ it.
Ralph

FORT McCLELLAN TO FORT LEONARD WOOD

1. Secretary West: When you last appeared before the Commission, you indicated that the permitting process for the move of Fort McClellan was underway.

   Please give the Commission a status report?

2. General Sullivan: The permit for smoke training issued by the state of Missouri limits smoke emissions to 3700 pounds during any 24-hour period. It also specifically prohibits the introduction of graphite, brass, or viscosity reducers into the smoke oil.

   How will these restrictions affect Army smoke training?

   Does the Army contemplate amending this permit in the near term?

   If so, how?

JJ - do you want to ask any chemical threat or CWC treaty compliance issues of Army? We got as well get them on the record too.

- ABM issues - R+A Book

IF IN RUSH see ★'s

HEFLIN'S [redacted] ANNOTATION

POSITION PAPER ON ENVIRONMENTAL AND PERMITTING ISSUES RELATIVE TO THE PROPOSED CLOSURE OF FORT McCLELLAN, ALABAMA PRESENTED BY SENATOR HOWELL HEFLIN TO THE 1995 DEFENSE BASE CLOSURE AND REALIGNMENT COMMISSION MONDAY, JUNE 12, 1995

Mr. Chairman and Members of the Commission, I thank you for this opportunity to again address the Defense Base Closure and Realignment Commission (BRAC) concerning the recommendation to close Fort McClellan in my home state of Alabama.

In my previous testimony before this Commission at the April 4, 1995, BRAC regional hearing held in Birmingham, Alabama, I focused on the Army's failure to consider the joint service and domestic and international training needs currently provided by Fort McClellan. The Army never consulted the Air Force, the Navy, the Marine Corps or the National Security Council about the military value of the Fort, and that is still the case. In addition, since April the Fort's far-reaching international and domestic anti-terrorism responsibilities have increased.

In the past few years, twenty-four countries have trained their military and civilian defense personnel at Fort McClellan, including the Japanese personnel who responded to the nerve gas attack in Tokyo's subway on March 20, 1995. As a result of the World Trade Center bombing in New York City last year, Tokyo's sarin gas attack on March 20, a threatened nerve gas attack at Disneyland in Anaheim, California, on Easter weekend (April 15-16, 1995), the Oklahoma City bombing on April 19, and the discovery just four days ago of a stockpile of nuclear-grade zirconium in Queens, New York, (See news stories attached at Tab A) the entire world -- and especially the United States -- has become acutely aware of the absolute necessity for us to maintain the best anti-terrorism training capability in the world, which we already have at Fort McClellan. As an example of many of our cities' recognition of the need to improve their ability to counter chemical and biological terrorist attacks, the Port Authority of New York

and New Jersey recently requested Fort McClellan to assist them in training their 1,400 officers to be prepared to respond to any such attacks. (See Tab A, page 5). As another example, the City of Atlanta is already training their officials to respond to an emergency during the 1996 Olympics. (See Tab A, page 6). We fully expect Atlanta to also request important training assistance from Fort McClellan. It is clear to me, as I'm sure it is to you, that the Army Chemical School's training expertise and capability to respond to the growing terrorist threat is directly related to national security, as well as having a major and direct impact on military value -- which is the most important criteria of your own decision process.

Contrary to their ill-advised recommendations in previous years, this year not even the Defense Department has recommended the outright closure of the Army's chemical defense training facilities -- they just want to move it. However, if you go along with that poorly conceived idea under the guise of theoretically trying to save a few dollars -- which I very seriously doubt will ever be achieved -- you will be putting our country's internal and national security at grave risk.

The Defense Department's recommendation to close Fort McClellan and to move the Army's Chemical School and its nuclear, biological and chemical defense training facilities to Missouri is hinged on the assumption that they can somehow obtain all the permits, licenses and certifications which are required to construct, operate and move the Army's state-of-the-art training facilities to Fort Leonard Wood in the short six year time frame required by the BRAC enabling legislation. Ladies and Gentlemen, anyone who's had any experience with the complicated business of trying to obtain environmental permits and build those kinds of sophisticated facilities knows you can't validly obtain all the required permits in 90 days. It just can't be done, and with all due respect, when the officials of the State of Missouri say they've

given the Army all the permits they need, please don't be fooled by that misrepresentation.

When you began your review of the Fort McClellan recommendation earlier this year, you keyed on the permit issue. As you knew, the 1993 BRAC Commission wisely rejected the Army's recommendation to close Fort McClellan two years ago, because the Army couldn't produce the permits necessary to accomplish the Chemical School's and the Chemical Defense Training Facility's ("CDTF") relocation to Missouri. Despite the 1993 BRAC Commission's instructions to the Defense Department for the Army to obtain all the required permits before the 1995 BRAC process began (See page 101 of BRAC hearing transcript dated March 1, 1995, attached at Tab B), the Army did not begin their permit application process until March 1, 1995, after Secretary of Defense Perry's base closure recommendations had been submitted to you. (See page 37 of BRAC hearing transcript dated March 7, 1995, attached at Tab C). In his appearance at the March 1, 1995, BRAC hearing, Deputy Secretary of Defense John Deutsch testified: "I believe that the proposal . . . to move the Chemical Warfare School Element up to Fort Leonard Wood, Missouri -- it would not go to Fort Leonard Wood . . . unless the proper permits are received from the State of Missouri." (emphasis added) (See Tab B, page 102). A week later, on March 7, 1995, in his appearance before this Commission, Army Secretary Togo West acknowledged that the permitting process in Missouri would be uncertain. In response to Commissioner Steele's questions, Secretary West candidly testified: "I would say that there are no guarantees in the permitting process. The one thing that I, as a lawyer, over the years have learned, is that we have no real indication as to how the process could turn out when a community and a permitting authority begin to come to grips with the reality." (See Tab C, page 37).

That reality check has now occurred just as Secretary West predicted. In the past two months, the environmental community and a number of concerned citizens in Missouri have

raised serious objections about the speed of the permitting process and have filed numerous appeals in and challenges to every single permit proceeding in the state. So when Missouri officials tell you the Chemical School's move is guaranteed don't you believe them, because the long and uncertain permitting debate has just begun. It won't be settled for years, during which time Fort McClellan will have to remain open, and when it is over the Army may never obtain all the permits they need to move the chemical training to Fort Leonard Wood. The long and expensive permit fight and the increased costs of building the new facilities in Missouri, which will inevitably result from the permit appeals process, will likely negate any predicted current costs savings projected from the recommended move. Moreover, there will only be costs, and no savings at all, if the Army ultimately loses the permit battle and the Chemical School's facilities have to remain at Fort McClellan. In that event, this Commission's hoped for cost-cutting accomplishments will be lost, because the Army won't be able to make good on its very uncertain permitting predictions to you.

Since the permits seem to be the predominant issue regarding the Fort McClellan recommendation, I urge you to closely examine and seriously question the glaring defects in that process.

CDTF INCINERATOR HAZARDOUS WASTE PERMIT

The most controversial permit question is whether or not the Army needs a hazardous waste permit in Missouri to build and operate the Chemical Defense Training Facility ("CDTF"). On May 19, 1993, in response to a request from 1993 BRAC Chairman Jim Courter, the current Director of Missouri's Department of Natural Resources, David A. Shorr, replied:

> ". . . we anticipate that the Chemical Defense Training Facility would require permits from Missouri's Air Pollution Control Program, Water Pollution Control Program (for NPDES), and the Hazardous Waste Program. The permit for the incinerator from the Hazardous Waste Program will, no doubt, take the most time

to obtain. . . Depending on the complexity of the permit and the complexity of the incinerator, the Part 1 Application will take nine to fourteen months to complete. Part 2 of the permit (after construction is complete), will take an additional eight months to a year to complete." (emphasis added). (See copy of letter dated May 19, 1993, attached at Tab D).

Nineteen months later, on December 23, 1994, in a letter to Defense Secretary Perry, Mr. Shorr confirmed and reiterated for the third time the State of Missouri's position regarding permits for the Chemical School and the CDTF at Fort Leonard Wood. Mr. Shorr stated:

> "As I indicated on June 4, 1993, we anticipate the construction of this facility will require air pollution control, water pollution control and hazardous waste program related permits. To date, we have not received applications for such permits and eagerly await their submittal so that we can timely review and approve if appropriate." (emphasis added) (See copy of letter dated December 23, 1994, attached at Tab E).

Consistent with Mr. Shorr's repeated assurances to both BRAC and the Department of Defense that the CDTF incinerator requires a hazardous waste permit, on April 5, 1995, Col. Anders B. Aadland, Chief of Staff, Fort Leonard Wood, Missouri, responded in writing to the office of the Chief of Staff, Department of the Army, Washington, DC, as follows:

> "1. As requested by Congressman Browder, environmental permits submitted by Fort Leonard Wood are enclosed as follows:
>
> a. Air permit for the CDTF incinerator
> b. Air permit for large area smoke training
> c. Installation-wide storm water permit
> d. Hazardous waste permit for CDTF
>
> 2. As of this date, no official reply has been received from the Missouri Department of Natural Resources regarding any of these permit applications." (emphasis added) (See copy of memorandum dated April 5, 1995, attached at Tab F).

Surprisingly, and totally inconsistent with his often repeated official position during the previous two years, a week after Col. Aadland's memorandum was transmitted, Missouri's Director of Natural Resources, David Shorr, stated that a hazardous waste permit is not needed for the CDTF. In sworn testimony before this BRAC Commission at your regional hearing in Chicago, Illinois, on April 12, 1995, Mr. Shorr stated:

"To answer your question, Mr. Commissioner, three permits are required by... Missouri: A permit for air construction for the CDTF, which is the Chemical Decontamination and Training Facility, a water permit for the base, and a permit for the smoke school, which is going -- which was issued as a PSD permit application to significantly deteriorate the air around the area of Fort Leonard Wood. A hazardous waste permit is not required for the thirty-four thousandth time. Okay. Any other questions?" (emphasis added) (See page 99 of BRAC hearing transcript dated April 12, 1995, attached at Tab G).

According to records at the Missouri Department of Natural Resources ("MDNR"), the state received Fort Leonard Wood's hazardous waste permit application referenced in Col. Aadland's memorandum on April 6, 1995, and within a single day determined that a RCRA hazardous waste permit was not needed for the CDTF. During that extremely limited review, MDNR evaluated only two waste streams which would be incinerated in the CDTF facility. Those were the chromium impregnated filters used in the gas masks and the wastewaters resulting from the decontamination of the nerve agents (i.e. Sarin & VX). MDNR's primary focus on the gas mask filters was highlighted in MDNR Director Shorr's testimony at the April 12 BRAC regional hearing in Chicago. (See Tab G, pages 102-103). However, Fort Leonard Wood's permit application did not include the following hazardous, or potentially hazardous, wastes which are generated at the CDTF and are likely to be burned in the incinerator:

a. Laboratory wastes generated at the CDTF facility - Numerous solvents are used in the CDTF laboratory at Fort McClellan for quality control checks and for normal maintenance requirements on various pieces of equipment. That use produces wastes which are possibly contaminated with nerve gas agents and are, therefore, required to be incinerated at the CDTF by U.S. Army Directive. Other laboratory material wastes contain metals above allowable Toxicity Characteristic Leaching Procedure ("TCLP") levels which are also incinerated. Specific laboratory chemicals which would be considered hazardous waste when they are incinerated include: acetone, carbon disulfide, chloroform, cyclohexane, ethyl alcohol, hexane, hydrochloric acid, isopropyl alcohol,

mercury, methyl alcohol, methyl ethyl ketone, methylene chloride, nitric acid, potassium dichromate, silver nitrate, sodium hydroxide and sulfuric acid. (See inventory of CDTF MSDS attached at Tab H).

b. Waste nerve agent detector pads containing silver nitrate - These pads are known to fail the TCLP test for silver and are burned in the CDTF incinerator.

c. Ventilation carbon filters - Carbon filters are used to absorb the active nerve agents from the ventilation system which maintains a negative air pressure in the CDTF building. Nerve agents and materials containing nerve agents have been classified as D003 reactive wastes by the U.S. Army at facilities that are destroying nerve agent weapons. This determination is based on the fact that VX nerve agent is a sulfur-bearing material. VX can generate toxic gases, vapors or fumes in sufficient quantities to present a danger to human health. A mere rise in temperature will cause a release of toxic fumes from the filters.

Unfortunately, in their hasty review MDNR failed to investigate the above-mentioned waste streams and also failed to obtain answers to these questions from either Fort McClellan or Fort Leonard Wood prior to concluding that a hazardous waste permit would not be required for the CDTF incinerator.

As a result of Fort Leonard Wood's and MDNR's incomplete review of the CDTF's potential hazardous waste stream, on May 12, 1995, three individuals and the Missouri Coalition for the Environment (an established environmental organization representing thousands of members throughout the state) filed an appeal petition before the Missouri Hazardous Waste Management Commission ("HWMC"). (See copy of petition attached at Tab I). The petitioners asked the HWMC to prohibit Fort Leonard Wood from constructing and operating the CDTF incinerator without first obtaining a hazardous waste permit from the state. The petition alleges

that hazardous wastes will be burned in and emitted from the incinerator and that Fort Leonard Wood failed to appropriately identify all the hazardous wastes which will be incinerated in the CDTF as discussed above.

In response to that appeal petition, on June 1, 1995, the Attorney General for the State of Missouri filed a "Motion to Dismiss" with the HWMC based on the arguments set forth in an accompanying brief entitled "Suggestions in Support of Respondent's Motion to Dismiss." (See copy attached at Tab J). As in most states, in Missouri it is the Attorney General, not MDNR Director Shorr, who is responsible for interpreting the law and representing the state in legal matters. In his brief on the application of Missouri law to MDNR Director Shorr's decision on the hazardous waste permit, the Attorney General contradicted Mr. Shorr by stating:

> ". . . the decision petitioners claim is a final agency decision is not a final, appealable decision. An agency decision is final when 'the agency arrives at a terminal, complete resolution of the case before it. An order lacks finality in this sense while it remains tentative, provisional, or contingent, subject to recall, revision or reconsideration by the issuing agency.'
>
> Under this analysis, the decision by the MDNR that a permit is not required to operate the CDTF is not a final administrative decision which would render it subject to appeal before this Commission. The MDNR decision is contingent upon the accuracy of the information that was supplied to it by the U.S. Army Engineers Center in Fort Leonard Wood (Army). The decision is also contingent upon the procedures, methodologies and waste streams, among other things, remaining the same as currently envisioned by the Army. Furthermore, the determination whether a particular facility needs a hazardous waste treatment, storage or disposal permit is, by statute, the responsibility of the facility owner and/or operator, not the MDNR. The MDNR's responsibility is to review and approve or deny permit applications submitted to it." (emphasis added) (See Tab J, page 5).

As we know, Fort Leonard Wood had made this determination by the submission of their hazardous waste permit application to MDNR in early April of 1995. Consequently, by not acting to either approve or deny the permit, MDNR has placed the whole hazardous waste permit issue in complete limbo.

In his June 1 filing with the HWMC, the Attorney General continued:

". . . the MDNR may change its mind as to whether the CDTF, even based on the information currently available to the MDNR, requires a hazardous waste treatment, storage or disposal permit. This 'decision' such as it is, confers no rights upon the Army. In any later administrative or judicial action citing the Army for the failure to have a treatment, storage or disposal permit for the CDTF unit, the Army could not utilize any previously made statements by the MDNR such as those cited in paragraphs 11 and 12 of the Petition filed herein to estop the government from bringing its action." (emphasis added) (See Tab J, pages 5-6).

Paragraphs 11 and 12 in the appeal petition (See Tab I, pages 4-5) which the Attorney General cited above are the statements which MDNR Director Shorr made to this BRAC Commission during the regional hearing in Chicago on April 12 that a hazardous waste permit is not needed for the CDTF incinerator. Clearly, as Missouri's Attorney General -- the state's top legal officer -- concluded in his brief, MDNR Director Shorr's recent assurances to you are not supported by Missouri law:

"The MDNR position that the CDTF unit does not require a hazardous waste treatment, storage or disposal permit does not determine any obligations. . . . legal consequences will not flow from this agency position complained of. The MDNR position that a permit is not required does not really decide anything because the MDNR is not strictly vested with the power to decide that issue." (emphasis added) (See Tab J, page 6).

Consequently, it is clear that instead of being settled as Director Shorr would have you believe, Missouri's Attorney General has determined that under the state's statute the hazardous waste permit issue in Missouri is not resolved. (See copy of Mo. Rev. Stat. § 260.395 attached at Tab K). Therefore, the Army has not met your requirement to have all the necessary permits in hand prior to your making a decision on the closure recommendation. In the short time remaining, it is now virtually impossible for the Army and MDNR to go back and properly and legally deal with the hazardous waste permit prior to your June 22 decision deadline. Meanwhile, the appeal of MDNR's decision is still pending before the MHWC, and their next meeting is not until August 3, 1995, well after your deadline.

As if the Army doesn't already have enough problems, Missouri's hazardous waste law also contains a provision which allows interested parties to file a citizen's suit for failure to possess a properly issued hazardous waste permit. (See copy of Mo. Rev. Stat. § 260.415.3 attached at Tab K). Such a lawsuit typically could not be filed until the operation of the CDTF facility is imminent. Consequently, a citizen suit filed against Fort Leonard Wood four or five years from now, during the final stages of construction or just before operation of the CDTF incinerator begins, could block the whole process at the 11th hour; and the Army would have to continue training at Fort McClellan after wasting hundreds of millions of dollars on the proposed move. As we've already seen, there are several well organized citizen groups and environmental organizations in Missouri who will continue to oppose this move, unless the Army and MDNR properly and legally follow the state's well-established hazardous waste permitting process, including allowing public input and providing adequate due process. Some of those groups have already indicated they will likely file a citizens suit, if it becomes necessary to force the Army and MDNR to follow the applicable provisions of the state's environmental laws and regulations. Consequently, unless the Army obtains a prc for the CDTF incinerator -- which they most assuredly hav caught up in controversy and uncertainty for years in the f

MISREPRESENTS WEST'S TESTIMONY. ARMY HAD PERMIT APPS READY TO GO 1 MARCH; THEY DIDN'T SUBMIT THEM PRIOR.

CDTF INCINERATOR AIR PERMIT

Fort Leonard Wood submitted an application for an ← Defense Training Facility ("CDTF") to the MDNR on Ma the Army's chain of command, including Army Secretary permit preparers at Fort Leonard Wood, have repeatedly st permit applications until after the Secretary of Defense announced his base closure recommendations on February 28, 1995. In the rush to prepare and submit their permit

applications, Fort Leonard Wood personnel failed to consult with anyone at Fort McClellan, as they had been instructed to do by higher Army headquarters (See copy of memorandum dated March 13, 1995, attached at Tab L). In 1983 it took personnel at Fort McClellan months to prepare the complicated application for the permit to construct the CDTF, at a time when the applicable environmental laws and regulations were much simpler to understand and comply with than they are today. By then, Fort McClellan had also spent two years working on an Environmental Impact Statement ("EIS") for the CDTF, which began in 1981. Miraculously, Fort Leonard Wood's personnel prepared and submitted their CDTF permit application in only one day! (See copy of permit application attached at Tab M). Moreover, to date Fort Leonard Wood personnel have repeatedly stated they do not intend to begin work on an EIS for any facet of the proposed Chemical School move, including the CDTF, until after you members of the BRAC Commission make your decision.

Because they did not know enough about the CDTF and because they failed to consult with Fort McClellan, Fort Leonard Wood's personnel prepared their CDTF permit application based on outdated drawings, information and engineering data assembled during 1983-1985, (See Tab M, pages 2, 4, 8, 11, 13 and 14) on which basis Fort McClellan's original permits to construct and operate were issued on November 2, 1983, and June 1, 1987, respectively. (See copies of Fort McClellan's 1983 and 1987 CDTF permits attached at Tabs N and O). Another major defect in Fort Leonard Wood's permit application process is their personnel did not realize that Fort McClellan's June 1, 1987, permit to operate the CDTF was withdrawn by the Alabama Department of Environmental Management ("ADEM") on December 17, 1992, when it was replaced by a new permit to operate on that same day. (See copy of Fort McClellan's December 17, 1992, permit attached at Tab P). The 1992 operating permit was issued by ADEM to encompass the dozens of changes and major modifications which had been made to the CDTF

at Fort McClellan. As you can see by comparing the information and flow diagrams in Fort McClellan's August 25, 1992, application to ADEM for a permit modification (See copy attached at Tab Q) with Fort Leonard Wood's CDTF permit application to MDNR (See Tab M), Fort McClellan's modifications to the CDTF were not included in Fort Leonard Wood's permit application. Therefore, they are also not included in the CDTF air permit issued by MDNR.

Based on the incomplete and inaccurate information in Fort Leonard Wood's permit application and because of MDNR's rush to issue the permits before June 22, MDNR Director David Shorr conveniently determined that the air emissions from Fort Leonard Wood's CDTF would be *de minimis*. Consequently, no public comment period and no public hearing opportunity was provided by the state on the CDTF permit application, which would have taken a minimum of 45 days under Missouri law and would have slowed down the permit process.

On April 10, 1995, MDNR issued a "permit to construct" the CDTF incinerator, which Director Shorr has since said is also a permit to operate. (See copy of permit attached at Tab R). However, it is clear from the detailed Conditions attached to the permit that the incinerator cannot begin operation until <u>after</u> Fort Leonard Wood conducts and meets stringent burn tests and strict emissions tests <u>after construction</u> of the facility. In addition, Special Conditions (a) and (b) on page 2 of the Missouri air permit (See Tab R, page 3) state that no hazardous wastes can be burned in the CDTF incinerator, specifically gas mask filters containing chromium. However, as described in the earlier detailed discussion on the hazardous waste permit, it is clear that hazardous wastes other than the gas mask filters will be burned in the incinerator -- which requires a permit from the Missouri Hazardous Waste Program.

The accelerated "fast track" review of the CDTF permit application, without providing any opportunity for public input or giving Missouri citizens time to study the public health and safety and environmental issues, resulted in immediate anger and opposition from environmental

organizations and public interest citizen's groups in Missouri. (See copies of news articles attached at Tab S). Consequently, on April 27, 1995, three individuals and the Missouri Coalition for the Environment filed an appeal of the issuance of the CDTF construction permit with the Missouri Air Conservation Commission ("MACC"). (See copy of Notice of Appeal attached at Tab T). The appeal alleges the CDTF air permit was based on incomplete and inaccurate operational data; that hazardous wastes will be burned in and emitted from the incinerator; that more than 100 tons/year of pollutions will be emitted from the incinerator requiring a public hearing process; that the required pre-application modeling, monitoring, analysis of visibility and projected air quality impacts were not done; that the requirements for prevention of significant deterioration ("PSD") review were not met; and numerous other defects. The parties seek denial of the permit and a public hearing on the CDTF permit application. (A partial discussion of the technical defects in the CDTF air permit application and MDNR's permit approval process, which was prepared by the environmental engineering firm of Schreiber, Grana & Yonley, Inc. and submitted to the MACC in support of the permit appeal, is attached at Tab U).

On April 27, 1995, the same appealing parties filed a motion with the MACC to expedite and complete the appeal process on the CDTF air permit so there would be some modicum of final state agency action on the CDTF permit prior to this BRAC Commission's decision deadline of June 22, 1995. (See copy of Motion to Expedite attached at Tab V). Unfortunately for all concerned, including you members of the BRAC Commission, that motion to expedite was opposed by MDNR (See copy of MDNR's May 5, 1995, Response in Opposition attached at Tab V), and it was subsequently denied by the MACC in a hurriedly convened telephone conference on or about May 9, 1995. The MACC has indicated they intend to assign the CDTF air permit appeal to an Administrative Hearing Officer who will then be responsible for

establishing a discovery schedule and eventually conducting a hearing on the permit appeal. That process, which has not yet begun, will take several months to complete. Consequently, the CDTF air permit appeal process will obviously not be completed before the BRAC Commission's decision deadline of June 22.

The MACC's ultimate decision on the CDTF air permit appeal will in turn be reviewable by a judicial appeal to the State Circuit Court and by the Missouri Court of Appeals. That process typically takes a minimum of eighteen months to two years to complete. It is clear from the public statements recently made by several of the environmental and citizen's groups in Missouri that they intend to fight these permits to the end; consequently, the CDTF air permit will be subjected to continuing controversy and legal appeals for years to come. During that time, of course, no one will know the eventual outcome, and the Chemical School's training facilities will be left in a continuing state of limbo with no way for anyone to undo or rectify a hasty decision made by this BRAC Commission.

In recent days, various staff members at the MDNR have been making what I consider to be brash and factually misleading statements about the status of these permits. For example, in an Associated Press story written by David A. Lieb filed in Jefferson City, Missouri, on June 7, 1995, Roger Randolph, director of MDNR's air pollution control program stated: "These permits are well researched, and the models are double and triple checked. The permits have undergone such scrutiny that they are near perfect." The next day, on June 8, 1995, in a story written by Thomas Hargrove published in the Birmingham Post-Herald, MDNR Director Shorr was quoted as saying: "We follow the law here (in Missouri). If they (Alabama) are playing games with the law, they should play the same game across the board." Unfortunately for MDNR, their permitting process has been far from perfect. In fact, as the detailed technical comments which were filed in support of the permit appeal before the MACC have shown, there

are major serious defects in the permits which don't need a rocket scientist to understand.

To begin with, the legal description of the location of the CDTF contained in the air permit issued by MDNR is Section 21, Township 35 North, Range 8 West. However, that location is approximately 12 miles east of the location specified by the longitude and latitude coordinates contained in Fort Leonard Wood's CDTF permit application. Moreover, the location specified for the CDTF in MDNR's air permit is outside the boundaries of Fort Leonard Wood, is even outside of Pulaski County where Fort Leonard Wood is located, and instead is actually situated in the Mark Twain National Forest in adjacent Phelps County.

Second, the air permit issued by the State of Alabama for the CDTF at Fort McClellan specifically restricts the quantity of live nerve agent on site to a maximum of one liter at any one time. Contrary to the repeated public statements and assurances of both Fort Leonard Wood and MDNR personnel to the citizens of Missouri, the air permit issued by MDNR for the CDTF at Fort Leonard Wood does not include a quantity restriction.

Third, a temperature of 1,750°F for at least two seconds is required for the complete destruction of GB and VX nerve agents in the incinerator. However, no detention time, which would assure complete destruction of all live nerve agents in the secondary chamber of the CDTF incinerator, is specified in the air permit issued by MDNR. Moreover, no operating conditions are included in the air permit issued by MDNR, even though MDNR Director Shorr now says permission was granted by the state permit to also operate the CDTF.

Fourth, the existing CDTF at Fort McClellan uses two autoclaves for the decontamination of the Battle Dress Overgarments ("BDO") worn by the troops while training in the CDTF. This makes possible the reuse of the BDO's up to four times before they have to be incinerated. This information was included in a letter sent to Mr. Art Groner at MDNR on February 18, 1994, and received by MDNR's Hazardous Waste Section on February 22, 1994. However, the

inclusion of the two autoclaves was left out of both Fort Leonard Wood's permit application and the air permit for the CDTF issued by MDNR. In addition, none of the emissions from the autoclaves was included in the emission calculations. Because the autoclaves are not included in the permitted equipment for the CDTF, the amount of BDO's which will be required to be incinerated in Fort Leonard Wood's CDTF will be four times greater than the planned amount. Consequently, this major omission of the autoclaves from MDNR's air permit will increase the daily waste load to be incinerated at Fort Leonard Wood's CDTF to approximately 1,300 pounds, which exceeds the permitted quantity of 1,000 pounds contained in the CDTF air permit issued by MDNR. This serious omission will also drive up the cost of the CDTF training, because four times as many BDO's will have to be purchased by the Chemical School in order to provide the live nerve agent training in Missouri.

Fifth, Fort Leonard Wood's air permit application for the CDTF and MDNR's permit review (which is part of the air permit) specify use of a Midland Ross Pyrobatch model, forced draft, batch type, dual chamber incinerator unit at Fort Leonard Wood. However, Midland Ross is no longer in business, and this model is no longer in production. Consequently, Fort Leonard Wood cannot procure the CDTF incinerator specified in their air permit from MDNR.

In the event this list of obvious deficiencies is not enough to prove the point that MDNR's air permit won't allow the Army to build and operate the required CDTF at Fort Leonard Wood, a detailed description of additional permit errors and omissions is attached at Tab W.

Because numerous significant errors and omissions have been identified in the CDTF permit application and the air permit issuance process, MDNR will eventually be required to reevaluate the CDTF permit application and all supplemental information submitted by the U.S. Army for the Chemical School's proposed operations and facilities at Fort Leonard Wood.

MDNR clearly failed to adequately consider all the applicable regulatory requirements and potential environmental impacts associated with the multiple operations and facilities that are an integral part of the Chemical School's operation, including the CDTF. Until these numerous and serious permit issues are addressed and all required procedures, regulations, and requirements of law (both Missouri and Federal) are complied with by MDNR, the Army will not possess all the necessary permits which this BRAC Commission has said are required in order to approve the Defense Department's recommendation. With only ten days to go before your decision deadline, it is obvious that the requisite permits will not be obtained by the Army. Consequently, I urge you to join with the 1991 and 1993 BRAC Commissions and once again reject this ill-advised recommendation.

FOG OIL SMOKE AIR PERMIT

Fort Leonard Wood submitted an air permit application to MDNR on March 1, 1995, to conduct static and mobile fog oil smoke training in Missouri. (See copy of permit application attached at Tab X). Like their CDTF air permit application, Fort Leonard Wood's personnel prepared their fog oil permit application in only one day, because they did not begin work on the application until after Defense Secretary Perry announced his base closure recommendations on February 28, 1995. Also like the CDTF permit application process, Fort Leonard Wood's personnel hurriedly prepared and submitted their fog oil permit application to MDNR without first talking to or coordinating with officials at Fort McClellan, despite receiving specific instructions from TRADOC headquarters to do so. (See Tab L).

Because they had been in too big a hurry earlier in the month, on March 16, 1995, Fort Leonard Wood had to submit supplementary information to MDNR modifying their original permit application from VOC (volatile organic compound) to PM_{10} (particulates) emissions. Their modification also stated that 63,000 gallons per year of "light grade mineral oil" would

be used to generate smoke at Fort Leonard Wood. (See copies of supplementary March 16, 1995, information attached at Tab Y). For some strange reason, no permit application for use of additives (such as kerosene which is required to thin the fog oil during cold weather) or for use of any other kinds of obscurants or smoke generators was ever submitted by Fort Leonard Wood to MDNR, despite the fact that those kinds of materials are a vital component of the Chemical School's smoke training program at Fort McClellan. (See Description of Fog Oil Smoke/Obscurant Training conducted at Fort McClellan attached at Tab Z).

On March 23, 1995, in response to a Freedom of Information Act request filed by MDNR, Fort McClellan provided written information directly to MDNR detailing the use of fog oil, other fuels and obscurants at Fort McClellan over the past five years. (See copy of March 23, 1995, memorandum attached at Tab 1). The March 23 memo explained that during the past five years Fort McClellan used an average of 77,476 gallons of fog oil each year. In 1993, the actual fog oil usage was 93,800 gallons, and in 1994 Fort McClellan used 116,350 gallons of fog oil in the Chemical School's smoke training exercises. (See Tab 1). Fort McClellan also informed MDNR they used gasoline to run the smoke generators, and the Fort's "potential to emit" with 20 mobilizing chemical units would roughly double the above listed fog oil and gasoline usage totals each year. In addition, Fort McClellan pointed out to MDNR that they also use other required smoke generation sources including hexachloroethane smoke pots, colored dye smoke grenades, infrared defeating obscurant grenades (brass flakes), and large area infrared defeating obscurants (graphite powder). Finally, Fort McClellan notified MDNR that they also expect to begin using millimeter wave obscurants (similar to radar chaff) within the next two years. (See Tab 1). Even after receiving that information, neither Fort Leonard Wood nor MDNR made any further changes to the permit application.

On April 11, 1995, MDNR issued a draft air permit to Fort Leonard Wood which limits

the Army to the use of no more than 65,000 gallons per year of fog oil. (See copy attached at Tab 2). No use of any other type of fuel or obscurants was allowed under MDNR's draft permit. There was also no mention of the use of anti-freeze type additives which must be mixed with the SGF-2 fog oil (which is 20 weight motor oil, not mineral oil as stated in the permit application) when the temperature drops below 40°F to be able to use the fog oil during the winter months. Other conditions in the draft permit limited the Chemical School to doing smoke training a maximum of 135 days/year for a maximum of one hour per day. Fort McClellan currently trains with smoke at least 250 days per year, conducting from one to four exercises per day, with each exercise averaging one hour each, depending on weather conditions.

Officials in the Army's chain of command subsequently became concerned about the severely restrictive conditions in the draft fog oil permit issued by MDNR, because it would clearly not allow the Chemical School to do the type and extent of smoke training in Missouri which is presently conducted at Fort McClellan. Consequently, they requested an analysis of the draft permit from the experts at the Chemical School. In response, on May 16, 1995, the Special Assistant to the Commandant of the U.S. Army Chemical School, sent a detailed five page memorandum to Headquarters, Department of Army, concluding that the draft permit conditions will essentially destroy the Chemical School's ability to effectively do smoke training. (See copy of May 16, 1995, memorandum attached at Tab 3). In summary, the May 16 memo concluded that Missouri's smoke permit restrictions "will create overwhelming degradation to Chemical Mission readiness" which "would kill both the U.S. Army and U.S. Air Force smoke training." (See Tab 3, page 1). The memo also stated that under MDNR's draft permit the Chemical School would lose the ability to train with any other obscurant except fog oil, and the fog oil training itself would be drastically reduced to only 25% of current training standards. In addition, the Reserve Component smoke training would also be a casualty of the severely

restrictive Missouri draft air permit. (See Tab 3, page 1).

After subjecting the draft fog oil permit to a thirty day comment period, MDNR held a required public hearing at Waynesville, Missouri, on May 12, 1995. Public opposition to issuance of the fog oil permit was voiced by several citizens, and formal statements of opposition were filed by several attendees, including the Ozark Chapter of the Sierra Club (See copies attached at Tab 4). In addition, detailed technical comments on the numerous deficiencies in the draft fog oil permit were filed with MDNR by the environmental engineering firm of Schreiber, Grana & Yonley, Inc., St. Louis, Missouri, on May 12, 1995. A partial summary of those technical comments is attached at Tab 5.

On June 7, 1995, MDNR issued a final fog oil air permit to Fort Leonard Wood. (See copy attached at Tab 6). Unfortunately for the Army, the final permit is even more restrictive than the draft permit. The number of special conditions was increased from 24 in the draft permit to 37 in the final permit. Moreover, whereas the draft permit simply failed to mention the use of such items as kerosene additives, obscurants and smoke sources other than fog oil, MDNR's final permit specifically prohibits their use in Missouri. Therefore, the final permit is even more damaging to the Chemical School's ability to conduct smoke training at Fort Leonard Wood than even LTC Newing predicted in his May 16 memorandum at Tab 3. (See article on the impact of the fog oil permit limits on the Army's smoke training attached at Tab 7). The Army now finds itself in a difficult dilemma. They have received a fog oil permit, but in reality it's a worthless piece of paper, because it won't allow the Chemical School to properly train in Missouri. Undoubtedly it will be a difficult "gut check" decision for the Army, but now they really have only two alternatives. They can either be honest and admit to you they don't have the permits they need to move the Chemical School to Missouri. Or, they can file an appeal of their own permit with the Missouri Air Conservation Commission ("MACC") hoping

to convince the MACC to remove the fatally restrictive conditions in MDNR's permit. In either event, however, the Army will be acting against self-interest, because they will be admitting to you that despite the "hype" coming out of Missouri, the fog oil permit is of no real military value to the Army. In any event, it is now clear to everyone that your first and most important criteria for making your decision as members of the BRAC (i.e. preservation of military value) will not be met by this permit. Moving the smoke training to Fort Leonard Wood will damage national security by compromising the military mission; therefore, you should vote to reject the recommendation to close Fort McClellan.

Even if the Department of Defense decides to ignore the obvious and play out their bluff by not admitting the fog oil permit will seriously degrade the Chemical School's training capability, environmental groups in Missouri have already put the Army and MDNR on notice that they intend to appeal the issuance of the fog oil permit. Roger Pryor, Executive Director of the Missouri Coalition for the Environment ("Coalition") was quoted in the press on June 8, 1995, as follows: "We're going to fight this thing to the end. If the (Missouri Air) Commission wants to go forward, they can, but they do so at the risk of it being thrown out of court." (See copy of news story from the June 8, 1995, Birmingham News attached at Tab 8). St. Louis attorney Lew Green, Counsel for the Coalition, has indicated in the press that he expects to file an appeal with the MACC within a few days. That appeal will take months to be resolved, and the MACC's decision will then be reviewable in the State Circuit Court and by the Missouri Court of Appeals. The judicial appeals process alone typically takes from eighteen months to two years to complete, during which time the fate of the fog oil air permit will remain uncertain. Clearly, the finality of the permit process which you members of this BRAC Commission have so forthrightly sought before you have to make your decision will not be achieved for years into the future.

FOG OIL VARIANCE

Despite being in such a rush to immediately prepare and submit their permit applications to MDNR on March 1, 1995, Fort Leonard Wood's personnel did not realize they would need a variance for their fog oil permit until after they were so informed by MDNR in mid-April. Consequently, on April 24, 1995, Fort Leonard Wood submitted to MDNR an application for a variance from Missouri's state air regulations which impose a maximum 20% opacity limit on air emissions. (See copy of variance application attached at Tab 9). The objective of the Army Chemical School's fog oil training mission is to generate a smoke cloud which is 100% effective in obscuring vision to protect our troops and equipment from enemy detection. Consequently, Fort Leonard Wood needed a variance from the state's air regulations before they could be legally issued a fog oil air permit.

The variance application was discussed at the Missouri Air Conservation Commission's ("MACC's") regularly scheduled meeting on April 27, 1995. However, the granting of the opacity variance was formally opposed by a number of parties, including three individuals and the Missouri Coalition for the Environment ("Coalition"). (See copies of news stories and a copy of the petition filed by the opponents attached at Tab 10).

The evidentiary phase of the administrative hearing process on Fort Leonard Wood's variance request was quickly initiated by the MACC at the insistence of the MDNR, because they recognized that timetables normally followed in processing variance applications would prevent MDNR from issuing the fog oil permit before June 22. As a result, fifteen depositions of the opponents, Fort Leonard Wood personnel, MDNR personnel and the Coalition's expert witnesses were scheduled and taken in an extraordinarily short nine day period between May 15 and May 23, 1995. The parties then had only one day to pour over the voluminous record which had been developed and prepare for the MACC's hearing on the variance application,

which began on May 25, 1995.

In another unusual turn of events, the Chairwoman of the MACC designated herself as the hearing officer, instead of following the normal procedure of referring the matter to an appointed administrative hearing officer. A formal hearing on the variance was conducted over the two day period of May 25 and 26, with various members of the MACC in attendance, several of whom actively and aggressively participated in the hearing process, often recommending to the Chairwoman how she should rule on various legal issues, objections and evidentiary questions.

Following the conclusion of the hearing of testimony, the parties were given only five short days over the Memorial Day holiday weekend to review the lengthy depositions and transcripts and prepare and submit by June 1, 1995, replies and exhibits for consideration by the MACC.

Under Missouri law, the four (out of six) members of the MA entire two days of the hearing, had to review the lengthy transcrip could participate in the variance decision. Moreover, all six member on the variance had to review, discuss and vote on the proposed fi of law and language in the MACC's order. If you think, like I do, the six members of the MACC who have full time jobs and o responsibilities to get this done, you would be in good company. short, but undoubtedly backbreaking days over another weekend, t accomplished their task. On June 6, 1995, the MACC approved an order granting Fort Leonard Wood's request for an opacity variance <u>for only one year</u> from the date of startup testing. (See copy of MACC order attached at Tab 11). The very next day, on June 7, 1995, MDNR speedily issued Fort Leonard Wood's fog oil air permit, based on the issuance of the opacity

OF COURSE, THEY EXPECT US TO READ THIS BOOK IN TWO DAYS.

variance by the MACC.

In response, on June 9, 1995, an individual plaintiff, along with the Missouri Coalition for the Environment, filed a complaint in the State Circuit Court in St. Louis, Missouri, against the MACC and Fort Leonard Wood challenging the granting of the opacity variance and asking the court to void its issuance. (See copies of news article and Petition for Judicial Review attached at Tab 12).

In conjunction with filing their lawsuit, the plaintiffs also asked the State Circuit Court for a stay of the MACC's order granting Fort Leonard Wood's opacity variance. (See copies of Motion for Stay and the plaintiffs' memorandum in support of their motion attached at Tab 13). On June 9, 1995, the State Circuit Court issued an "Order to Show Cause" to the MACC and to Fort Leonard Wood to explain why the stay should not be granted. A hearing on the Motion for Stay is scheduled for June 16, 1995. (See copy of Show Cause Order attached at Tab 13). If the stay of the variance is granted, then the issuance of the fog oil permit would also be adversely affected, because the fog oil permit could not be legally issued or remain in effect if the variance is stayed by the court.

In any event, the environmental groups in Missouri have kept their promise to challenge the permits and variances, not only in the administrative forum, but also in court. Even if the stay of the variance is not granted, it will be eighteen to twenty-four months before the outcome of that litigation is finalized, including further review by the Missouri Court of Appeals. Meanwhile, the fate of the fog oil permit, which depends on the validity of the issuance of the opacity variance, will also be unknown.

STORMWATER PERMIT

On January 24, 1994, Fort Leonard Wood submitted a general facility-wide stormwater discharge permit application to MDNR for a number of ongoing activities at Fort Leonard

Wood, such as maintenance facilities, fuel storage areas, asphalt plant, airfield operations, landfills, ordnance ranges, etc. On February 17, 1995, MDNR issued Fort Leonard Wood a state operating permit for those discharges, which will be effective for five years in accordance with normal timetables under the Clean Water Act.

On March 2, 1995, in a one paragraph letter submission which attached a one page map sketch (See copies attached at Tab 14), Fort Leonard Wood requested a modification to the Fort's general stormwater discharge permit to include the proposed fog oil smoke training activities proposed for relocation from Fort McClellan. With lightning-like speed, the very next day, on March 3, 1995, MDNR issued a draft state operating permit modifying the discharge of stormwater from Fort Leonard Wood's operational activities to include the Chemical School's proposed fog oil smoke training activities.

Despite opposition from established environmental groups, including the Ozark Chapter of the Sierra Club (See copy of written comments attached at Tab 14) and the Missouri Coalition for the Environment, on April 4, 1995, MDNR issued a revised state operating permit to Fort Leonard Wood without providing a requested public hearing. The permit was issued for a number of stormwater discharges which included fog oil smoke training at several outfalls and additional discharge points at Fort Leonard Wood. (See copy of permit attached at Tab 14).

In response, on May 3, 1995, three individuals and the Coalition filed an appeal of the issuance of the revised stormwater discharge permit with the Missouri Water Conservation Commission ("MWCC"). The permit appeal alleges that the stormwater permit does not include necessary water quality control measures required under State law, that the Army failed to seek authority to use flame training and fog oil obscurants which will adversely impact water quality, and that monitoring requirements for heavy metals were not included for discharges into the Big Piney River, along with a number of additional defects in both Fort Leonard Wood's permit

application and in the permit issued by MDNR. The parties seek denial of the permit by the MWCC. (See copy of appeal attached at Tab 15).

The next regularly scheduled meeting of the MWCC is not until June 21, 1995, the day before this BRAC Commission's June 22, 1995, decision deadline. Clearly, the MWCC has decided not to deal with this appeal on an expedited basis, since no action has been taken on the appeal. Consequently, the stormwater permit appeal process will not be completed before the BRAC Commission's decision date. The MWCC's ultimate decision on the permit appeal will also be reviewable in the State Circuit Court and by the Missouri Court of Appeals. The judicial process along typically takes from eighteen to twenty-four months to complete, during which time the final status of the water permit will be uncertain.

NUCLEAR REGULATORY COMMISSION LICENSES

THIS MAY BE SIGNIFICANT.

One of the vital training components of the Army's Chemi defense training conducted at Fort McClellan using live nuclear agei component is included in the Chemical School's proposed relocatio The nuclear radiation training facilities at Fort McClellan consist of ten 25-30 different radioactive isotopes, many of which have half lives tha the Chemical School's training and testing exercises, the radiation fa radioactive waste ("LLRW"), which averages three 55 gallon drums McClellan, Fort Leonard Wood does not have access to a functioning regional LLRW disposal facility. Consequently, Fort Leonard Wood will have to construct a LLRW facility on site with the capability of storing and managing LLRW for at least fifteen years and perhaps longer.

Because the Chemical School utilizes special nuclear materials and produces LLRW, Fort Leonard Wood will have to obtain two new licenses from the Nuclear Regulatory Commission ("NRC"), a Part 30 license and a Part 70 license. For a more detailed discussion of the

operation of Fort McClellan's nuclear defense training facilities, its important functions in support of the CDTF, and the requirements for NRC licenses and LLRW facilities at Fort Leonard Wood, see the copy of the White Paper attached at Tab 16. The only NRC license Fort Leonard Wood possesses is a Part 35 license utilized by the base hospital. To date, Fort Leonard Wood has not applied for these two new NRC licenses. In order to do so, the plans and design for the new nuclear facilities at Fort Leonard Wood must be attached to a 100+ page NRC application. The process of designing and preparing those plans and application is estimated to take twelve months. Once an application is received by the NRC, it can take from thirty days to a year to process, depending on the completeness of the application.

Even then, Fort Leonard Wood would have only a Limited Operations License, which would allow only the storage but not the use of radioactive materials. A final Full Operations License would not be issued by the NRC until after the facility at Fort Leonard Wood is constructed and inspected. Optimistic estimates by Fort Leonard Wood engineers indicate this could take at least three years. As an example of how long this complete nuclear licensing process can take, when the Chemical School was moved back to Alabama from Aberdeen Proving Ground, Maryland, the radiological facility at Fort McClellan received its Limited Operations License in 1980. However, the Chemical School was not allowed to begin full-scale operations until its nuclear facilities were finally completed and inspected by the NRC in 1988.

During the years before Fort Leonard Wood receives its Full Operations License, nuclear defense training would either have to be continued at Fort McClellan or it would have to be discontinued. Moreover, only after the radioactive materials have been removed from Fort McClellan and that facility is decommissioned by the NRC may that facility close and its two existing licenses be terminated. In addition, if and when Fort Leonard Wood decides to apply for their NRC licenses, the Army can fully expect opposition from environmental groups and

nuclear activists in Missouri. As an example, see the May 10, 1995, testimony presented to the Missouri House of Representatives Energy Commission by Kay Drey attached at Tab 17. Consequently, like the challenges which have been filed on the issuance of the various air, water and hazardous waste permits, it is almost guaranteed that the NRC licensing process at Fort Leonard Wood will also be subjected to legal challenges and uncertainty for a number of years in the future. Until that is settled, no one will know for sure whether the Chemical School's nuclear training facilities can ever be relocated to Missouri.

ENDANGERED SPECIES AND WILDLIFE ISSUES

Another disturbing and extremely serious issue involved in the Chemical School's proposed relocation is the Army's failure to comply with, and cavalier attitude toward, its obligations under the Federal Endangered Species Act and other wildlife protection statutes. According to both the Army and the Missouri Natural Heritage Program, Fort Leonard Wood is home to a large number of imperiled species, native species and migratory species. Of particular concern are the federally listed endangered American bald eagle, Gray bat and Indiana bat, which are known to inhabit Fort Leonard Wood. The Army has recommended transferring several training activities to Fort Leonard Wood which would likely harm these species. As discussed in detail earlier in this position paper, one of the primary activities conducted by the Army's Chemical School is obscurant training utilizing fog oil smoke and other smoke obscurants. During fog oil smoke training, SGF-2 (similar to 20 weight motor oil) and/or diesel fuel are vaporized and dispersed into the air, where they form a smoke screen composed of small droplets of the vaporized substance. Ideally, the smoke screen created during these exercises hugs the ground to conceal troop movements. According to the Army's report on a smoke trial conducted at Fort Leonard Wood in 1993:

> "No findings were available on the environmental acceptance of fog oil dispersion or effects on [Fort Leonard Wood's] three endangered species of Indiana bats,

> Grey bats, and American Bald eagles. An assessment by Federal, State, and local environmental officials is a critical factor to feasibility of smoke operations on the installation." (See copy of excerpt from "Assessment Report -- Smoke Trial 1993" attached at Tab 18).

To date, no such assessment has been done, in spite of available and alarming information demonstrating that fog oil and obscurant training will likely adversely affect these three endangered species, as well as other wildlife at Fort Leonard Wood.

The Army is already well aware of the potential adverse impact of fog oil smoke on the endangered Indiana and Gray bats. On January 17, 1995, the U.S. Army Corps of Engineers Construction Engineering Research Laboratories published a draft document entitled "Potential Impact of Fog Oil Smoke on Selected Threatened and Endangered Species" (See copy of excerpts attached at Tab 19). That report recognized the Army's need "to minimize adverse impacts upon individuals or populations of threatened and endangered species present in training areas", and notes that "[e]xposure to smokes and obscurants is perceived to constitute such a potential negative impact." The document also states that there are currently "inadequate data to provide an accurate assessment of the potential impact of smokes and obscurants . . . on threatened and endangered species occupying training installations." On the contrary, sufficient information does exist to demonstrate that the various types of obscurants, including fog oil smoke, will have an adverse impact on, or at the very least "may affect", the Indiana and Gray bats at Fort Leonard Wood, as well as the endangered American bald eagle.

Many other documents -- both Army reports and scientific publications -- reveal the likely adverse impact of fog oil smoke on these bats. According to a report entitled "Environmental and Health Effects Review for Obscurant Fog Oil" by C.J. Driver and others (See copy attached at Tab 20), "[f]og oils have the potential to accumulate in the aquatic environment while they are being routinely used and could reach acutely toxic levels for some benthic organisms." The

Driver report also states that "[l]ubricating oils such as SGF-2 have been shown to bioaccumulate in aquatic food chains with mammalian top consumers" and that "[l]oss of aquatic food sources may affect the survivability of aquatic wildlife young that are dependent on limited local resources and high nutrient requirements during their initial growth period." The bats prey primarily upon mayflies, caddisflies, stoneflies, and other insects associated with the aquatic environment. These same mayflies, caddisflies, and stoneflies reside at the bottom of rivers and lakes during their larval state, and thus are "benthic organisms". The Driver report confirms the Army's own conclusion that fog oil smoke will have a direct adverse affect on the primary prey of the Indiana and Gray bats, and thus on the bats themselves.

Efforts made by the Corps of Engineers in its January 17, 1995, report (See Tab 19) to attempt to discount the impact of fog oil smoke on the endangered Indiana and Gray bats are highly questionable. For example, the conclusions in the Impact Document are premised on the incorrect notion that fog oil smoke training will not occur at night. Furthermore, the Corps' Impact Document ignores the fact that fog oil smoke generation occurs most often at prime foraging time for the bats -- dusk and dawn. The Corps document does recognize that "fog oil precipitating onto the vegetation would be ingested by and accumulated in the prey insects", and that "oils have been used as insecticides in the past . . . ; thus, there may be a reduction in insect populations and in turn a reduction in food availability should fog oil precipitate onto the vegetation." In spite of its recognition of these facts, the Corps report concludes that the adult bats "would not be expected to ingest significant quantities of fog oil." However, in the next paragraph, the Corps report recognizes the need to test their critical assumption that "[t]he prey of bats does not contain sufficient quantities of fog oil to cause toxicological effects when ingested by bats." Furthermore, the Corps report ignores the Driver Report's conclusion that fog oil smoke <u>will</u> have an adverse impact on the bats' food chain. Likewise, other scientists

have documented mortality of Gray bats resulting directly from pesticide application on the bats prey. E.g., Clark, D., et al. 1978. "Dieldrin-Induced Mortality in an Endangered Species, the Gray Bat (Myotis grisescens)" Science, 199(4335):1357-59.

Unfortunately, the Army failed to reveal in its fog oil permit application or otherwise to the Missouri Department of Natural Resources that the Chemical School's obscurant smoke training also utilizes graphite flakes, brass flakes and other additives. Fort Leonard Wood has also failed to apply for permission to use HC smoke, a pyrotechnic smoke-producing composition of grained aluminum, zinc oxide and hexachloroethane contained in smoke munitions and "floating smoke pots". In addition to fog oil smoke and HC smoke and munitions, the Army Chemical School utilizes munitions containing red, white and plasticized phosphorus during obscurant training, as well as dye colored smokes for signaling purposes. The Army has failed to even preliminarily address the impact which these activities will have on the bald eagle and Indiana and Gray bats. I suggest they have failed to do so, because even a preliminary analysis would reveal that the planned move of the Chemical School to Fort Leonard Wood would be doomed due to the adverse impact the training would have on the resident endangered species and their habitat.

In July of 1993, the Chemical Research & Development Center of the U.S. Army Armament, Munitions and Chemical Command at Aberdeen Proving Ground, Maryland, ("CRDC") published a five-volume document intended "to provide a general environmental assessment for the overall smoke/obscurant program." According to Volume 4 of that document, "HC smoke mix and its combustion products pose significant health hazards to manufacturing personnel and using troops" and "is fairly toxic to mammals." A training accident in the 25th Infantry Division, Hawaii, in 1984 seriously injured twenty-two soldiers, one of whom died. According to Volume 2 of the CRDC document, the phosphorus compounds

used in smoke training are potentially lethal to both humans and wildlife, and may cause sublethal effects after prolonged exposure. In at least one case, bald eagles in Alaska died after eating fowl which had consumed phosphorus residue. Volume 5 of the CRDC document states that "some of the organic dyes presently used in colored smoke pyrotechnic formulations pose potential serious health hazards to occupationally exposed personnel" and present toxic and carcinogenic hazards. While the CRDC documents do not address the health and environmental effects of smoke containing graphite or brass flakes, they clearly reveal that the Chemical School's obscurant training activities will have a potentially devastating effect on the bats, bald eagles, and wildlife on and near Fort Leonard Wood.

Mr. Chairman and Members of the Commission, it is important for you to understand the adverse impact the Chemical School's activities will likely have on the wildlife and protected species at Fort Leonard Wood. Moreover, I draw your attention to the fact that I was able to do so relying almost exclusively on the Army's own documents and reports. It is particularly disturbing to me that the Army, which has this information in its possession, has failed to live up to its obligations under the Endangered Species Act and other wildlife laws.

Before anyone discounts the importance of this issue, let me remind the Committee of the impact the Endangered Species Act had on a multi-million dollar dam which the Tennessee Valley Authority had largely completed prior to the passage of that Act. I was elected to the Senate just a few months after the U.S. Supreme Court handed down its famous decision in TVA v. Hill back in 1978, and I can personally attest to the consternation in the Senate over the Court's ruling that TVA could not complete the Tellico Dam. As a result of my own experience with the snail darter and numerous other endangered species issues since -- including the recent Alabama sturgeon fiasco -- I am acutely aware that one small critter can shut down the best laid plans of any agency -- whether it be the TVA, the Federal Highway Administration, or even the

U.S. Army. Consequently, I strongly encourage this Commission to examine carefully the Army's failure to comply with the Endangered Species Act and other wildlife protection statutes in making your decision on the Chemical School's recommended move to Fort Leonard Wood.

Section 7 of the Endangered Species Act requires that the Army, in consultation with the U.S. Fish & Wildlife Service, ensure that any action it authorizes, funds or carries out is not likely to jeopardize the continued existence of any endangered or threatened species. 16 U.S.C. § 1536(a)(2). Section 7 also prohibits the irreversible or irretrievable commitment of resources during the consultation period. It is my belief that Fort Leonard Wood's submittal of their permit applications to the State of Missouri, coupled with the Army's knowledge that the Chemical School's activities "may affect" the endangered species at Fort Leonard Wood, triggered its obligations under Section 7 of the Endangered Species Act. Certainly that action was an action authorized, funded or carried out by the Army. Furthermore, if you elect to accept the Army's recommendation that the Chemical School and other activities be transferred from Fort McClellan to Fort Leonard Wood, you will set in motion a process which cannot be stopped by you or officials at the Department of Defense -- thus resulting in an irreversible and irretrievable commitment of resources. Based upon the available science, it is clear that the Chemical School's activities will either be prohibited or at the very least severely curtailed by the presence of these endangered species at Fort Leonard Wood.

On April 27, 1995, Congressman Glen Browder wrote to the U.S. Fish & Wildlife Service Director, Mollie Beattie, requesting from her information on the Army's compliance with the mandates of ESA section 7. (See copy of April 27 letter attached at Tab 21). The Fish and Wildlife Service replied on May 12, 1995, that the Army had not initiated consultation with the Service on this issue, and that the Army did not intend to do so until after this Commission has made its decision. (See copy of May 12 letter attached at Tab 21). In my opinion, that

decision to delay consultation is contrary to federal law, and I suspect a federal court would confirm my opinion. With all due respect, I remind the Commission that, while your own actions are expressly exempted from the requirements of the National Environmental Policy Act, 42 U.S.C. § 4321-4370, your actions are not exempted from the requirements of the Endangered Species Act ("ESA"). This Commission is well aware of the substantial resources which will be required to close Fort McClellan and transfer the Chemical School's activities to Fort Leonard Wood. It would be a travesty if the Army's violation of the ESA ultimately blocks the transfer of the Chemical School and other activities to Fort Leonard Wood **after** substantial taxpayer money has been spent to effectuate the move.

Finally, the documented bald eagle death from obscurant training, and the known toxicity of these compounds to other birds, raise the question of whether the Army has satisfied its obligations under the Bald and Golden Eagle Protection Act, 16 U.S.C. § 16 U.S.C. §§ 668-668d and the Migratory Bird Treaty Act, 16 U.S.C. §§ 703-712. Although those statutes do not contain consultation requirements like those found in Section 7 of the ESA, they do prohibit the taking, killing, or poisoning of migratory birds (including bald eagles) and more specifically, the taking, killing, poisoning, molesting or disturbing of bald eagles. I am concerned that the relocation of the Chemical School and the CDTF to Fort Leonard Wood will have just such an adverse effect on migratory birds and bald eagles in violation of these two laws. Unfortunately, I can find no evidence that the Army has even contemplated its obligations under these latter two laws, much less taken steps to comply with them, any more than they have the Endangered Species Act.

NATIONAL ENVIRONMENTAL POLICY ACT REQUIREMENTS

I now call your attention to the issue of compliance with the National Environmental Policy Act, 42 U.S.C. §§ 4321-4370 ("NEPA"). I recognize that the authorizing legislation for

the BRAC and the relevant case law demonstrate that this Commission's decisions are not subject to NEPA. While this may have been a wise decision by Congress, I note that it leaves you members of the BRAC Commission, the public, and the Army in the dark regarding the environmental impact of your decision. As you know, NEPA requires federal agencies to prepare an environmental impact statement before approving any "major federal action significantly affecting the quality of the human environment." 42 U.S.C. § 4332. It has been conceded by both Army and EPA personnel, as well as the environmental coordinator at Fort Leonard Wood, that the Army will "definitely have to do an impact statement" pursuant to NEPA if this BRAC Commission makes the decision to relocate the CDTF, Chemical School and other Fort McClellan activities to Fort Leonard Wood. (See copies of news articles attached at Tab 22). Unfortunately, no one will truly understand the environmental consequences of this decision until after it has been irrevocably made by this Commission.

You Commission members have previously expressed your concerns regarding the Army's ability to obtain all of the necessary environmental permits and approvals in a timely fashion to effectuate the relocation of the Chemical School to Fort Leonard Wood. Based on the Army's previous experience with hundreds of projects, it is undisputed that the Army will not be able to secure the requisite NEPA approvals in the near future --and perhaps not at all. As an example, it took the Army four years (from 1981 to 1985) to complete the environmental impact statement ("EIS") on the CDTF currently in operation at Fort McClellan. (See also copy of letter from David Shorr to BRAC dated May 19, 1993, indicating that preparation of an EIS for Fort Leonard Wood will take four years, attached at Tab D).

One of the primary components of an EIS is an analysis of the impacts of an agency action upon endangered and threatened species and other wildlife. As discussed at length in the previous section, relocating the Chemical School to Fort Leonard Wood will very likely have

a severe adverse impact on the three listed endangered species known to inhabit Fort Leonard Wood. Therefore, the EIS will likely show that this proposed move will have a significant adverse impact on the environment, and I believe the Army will be bound to reverse its decision to close Fort McClellan. However, because of the Army's unwillingness to comply with its obligations to consult pursuant to the ESA, and because this Commission's decision process is exempted from NEPA, we will not know for four or five years whether the recommendation to relocate Fort McClellan's activities to Fort Leonard Wood was doomed from the start. Mr. Chairman and Members of the Commission, even though you are not required by law to do an EIS, if you carefully consider the available information regarding the adverse impact on the environment of this proposed move, I believe the only reasonable decision you can make is to reject the Army's recommendation to close Fort McClellan. By rejecting that recommendation now, this Commission will have avoided needlessly wasting millions of taxpayer dollars on an ill-fated endeavor which will never be successfully completed.

CONCLUSION

Mr. Chairman and Members of the Commission, there are a host of other permits, licenses and certifications which will be needed by the Army to accomplish the relocation of the Chemical School to Fort Leonard Wood. One example is a required approval from the Federal Aviation Administration, because the CDTF which has three stacks exceeding 50 feet in height, will be located in a fly over zone less than 2500 feet from Forney Air Field which services three commercial TWA Express Airline flights each day. Another example is an approval from the Department of Defense Explosive Safety Board for the CDTF, as is currently required at Fort McClellan. Numerous other examples abound, which I dare say Fort Leonard Wood has not even focused on. Nevertheless, I do not believe further elaboration of additional permitting deficiencies is necessary. That's because I sincerely believe that the detailed discussion already

provided in this position paper should be more than enough to firmly convince you that the Army does not now possess, nor are they ever likely to acquire, all the required permits to accomplish moving the Chemical School and its training facilities to Fort Leonard Wood. I trust you agree, and I urge you to vote to reject this recommendation.

The Birmingham News
March 20, 1995

Nerve gas hits heart of Tokyo

Thousands ill, 6 die in subway

By **Laura King**
Associated Press writer

TOKYO — Passengers fainted, vomited and went into convulsions after a lethal nerve gas spewed from packages planted today on one of the world's busiest subway systems. Six people died in the terrorist attack and 3,227 were treated in hospitals.

No group immediately claimed responsibility and there was no obvious motive.

Police said the toxic agent was sarin, a nerve gas developed by the Nazis during World War II that can be fatal even in small doses.

Japanese news reports quoted authorities as saying the substance was planted in wrapped containers in at least five subway cars on three train lines.

All over central Tokyo, passengers staggered onto the streets, gasping for breath. Some foamed at the mouth and bled from the nose, witnesses said. People overcome by gas were carried out.

Workers clad in prot

Injured subway passenger

Tokyo's clean and efficient subway trains carry 2.7 billion passengers a year, about twice as many as the New York subway system.

quickly poured into stations. Troops were called out, including an anti-chemical-warfare squad. Signs were hastily posted outside stations saying there had been a guerrilla attack.

Authorities said 3,227 people were admitted to hospitals for treatment or observation, and hundreds if not thousands of others suffered lesser symptoms including nausea and coughing.

Prime Minister Tomiichi Murayama expressed outrage and demanded a full investigation.

"We absolutely can't allow this kind of indiscriminate murder of innocent citizens," he told reporters.

Authorities refused to discuss sus

Tokyo

From Page **1A**

included Aum Shinri Kyo, a religious cult that has been accused of making sarin.

The group, which has been linked by news reports to several unsolved kidnappings, denied any involvement in today's poisonings and threatened in a statement to sue anyone who suggested there was a link.

The cult in January began legal proceedings accusing a Japanese business leader of spreading sarin into its religious facilities in Kamikuishiki in central Japan. The business leader filed countercharges in February.

Sarin was blamed for seven deaths in June at houses in the central Japanese town of Matsumoto. The source was never identified, and there were no arrests.

Two unexplained incidents earlier this month could yield clues. On March 15, three mysterious attache cases were discovered at a Tokyo subway station, each containing three tanks with an unknown liquid, small motorized fans, a vent, and a battery. One was giving off a vapor.

Ten days before that, 19 train riders in Yokohama, a port city near Tokyo, were taken to hospitals complaining of eye and respiratory pain from an unknown source of fumes.

Hospitals in central Tokyo were inundated today. Doctors and nurses rushed frantically to administer CPR, give oxygen and hook up intravenous drips.

"When I got to the hospital, I couldn't move my
write my name
speak," said co

The poiso
rished na
clean a
The t
ca
v

"Japan has turned into a scary country," said taxi driver Koichi Horie. "We can't allow crimes like this."

However, the stock market was unshaken. Analysts said dealers closely followed the situation, but prices finished only moderately lower in light trading.

The first report of the fumes came about 8:15 a.m., and central Tokyo was quickly filled with chaotic scenes. People overcome by the gas were carried out to the sidewalk. Others staggered out on their own, gasping.

Emergency vehicles raced to stations, sirens screaming, and helicopters buzzed overhead. At hard-hit Tsukiji Station, a nearby temple was pressed into service as a first-aid center.

But most pedestrians appeared remarkably calm, obeying police orders to take detours and stay away from station entrances and exits.

The chaos snarled Tokyo's already slow-moving rush-hour traffic, and closures were expected to cause major transport problems in coming days. Officials did not know how long it would be before the capital's busy Hibiya line and parts of the Marunoouchi line would reopen.

Sarin, developed during World War II by Nazi Germany, attacks the central nervous system. It can be fatal in minuscule amounts when inhaled or absorbed through the skin.

Experts said it would be possible to carry the substance in a container and plant it in such a way that it would leak out.

The religious group Aum Shinri

The Anniston Star - The Front Page
Thursday - March 30, 1995

Expert: Nerve gas terrorism 'foreboding and ominous'

Professor says closing McClellan might hurt ability to respond to future attacks

☆ *Japan's top police official gunned down/10A*

By Eric Larson
Star Military Writer

In 1980, when Brent Smith was teaching a class in counter-terrorism at Fort McClellan's Military Police School, he could not predict the nerve gas attack in Tokyo last week that would leave 10 dead and at least 5,000 injured.

Now that it's happened, however, he says he wouldn't be surprised if another group struck closer to home.

"These are things that terrorists in America have contemplated but have not known how to do," said Smith, who wrote the book, "Terrorism in America," and chairs the criminal justice department at the University of Alabama in Birmingham.

"This incident gives these people the knowledge that (nerve gas) can be made — and made pretty cheaply," Smith said.

"This is foreboding and ominous. It is probably the most problematic issue in terrorism that has developed in the past decade," Smith said.

Japanese officials still are trying to determine the complete make-up of the lethal chemical mix released on a Tokyo subway last week. Early reports indicated that the nerve gas sarin was involved. The gas kills by making it impossible for the body's muscles to relax.

During the time Smith lectured at McClellan's Military Police School — he was there in 1980-81 — he and other experts theorized that suitcase nuclear detonators would become popular among terrorist groups. That didn't happen.

Nerve gas did. And it's likely to be used again because its ingredients can be obtained without a special permit and without attracting a great deal of attention, Smith said. The recipe can then be mixed in a lab.

Despite the shock of the Tokyo attack, it should not be surprising that terrorists would use such a lethal weapon so indiscriminately, Smith said.

Although some terrorist groups choose their targets carefully, many don't, he said. By hitting innocent civilians in a seemingly random manner, their goal is to make people lose confidence in the ability of their government to protect them. Perversely, the terrorists expect people to embrace their alternative governmental vision, he said.

In the 1960s, plane hijackings became popular with terrorists as a way to win demands of money or release of comrades from prison. Hijackings have declined in recent years as commando squads have gotten better at thwarting them.

That kind of defense capability doesn't happen overnight, Smith said.

"This particular brand of terrorism has opened that up again. It will take the government time to catch up." Smith predicts it likely will be 10 years before researchers can develop a way to spot the substance in a sealed container in someone's plane luggage.

Identifying groups that would use nerve gas won't be easy. Although Japanese police suspect a religious group of being behind the subway massacre, there's nothing about nerve gas that would make it a weapon of choice for right-wing terrorists as opposed to those that lean to the left politically.

"It's just like a gun — it can be used by anybody," he said.

Five of the seven types of chemical weapons stored at Anniston Army Depot contain sarin. The amount measures in the tons, but the exact amount is classified.

Meanwhile, across town at Fort McClellan, small amounts of sarin are used to train military personnel in decontaminating equipment.

Officials at both installations say their separate caches of nerve gas are well guarded. The Chemical Defense Training Facility is guarded 24 hours a day. The depot would not release details on the its level of security., saying only that "extensive safety and security measures are in place."

Some fort supporters point to the Tokyo incident as a reason to keep the Army's Chemical School at Fort McClellan. Students at the school's CDTF learn how to decontaminate equipment laced with live nerve agent.

More than 1,000 foreign military chemical specialists from more than a dozen countries have gone through training at the live-agent facility since it opened in March 1987, said Mike Abrams, Fort McClellan's public information officer.

The countries that have taken part include Germany, Greece, Egypt, Brazil, South Korea and Jordan, Abrams said. Japan sent 10 officials in 1990 to spend a week at the chemical school and train at the live-agent facility, he said.

The Army believes it can save money by moving the chemical and military police schools to Fort Leonard Wood, a base in Missouri. While he doesn't know all the factors that go into such a decision, Smith said moving the school at this time may be a mistake when it comes to the terrorism issue.

"There would definitely be some down time if you moved an agency or a school like this. There can't help but be," Smith said. "I'm not sure we can afford that down time."

Feds rushed to Disneyland

Easter weekend gas threat, other terrorist act now treated as hoax

By **Thomas W. Lippman**
The Washington Post

WASHINGTON — A small army of federal law enforcement agents, U.S. troops and public health officials converged on Disneyland in Southern California over Easter weekend in anticipation of a gas attack or other terrorist act directed at crowds thronging the popular amusement park, U.S. officials said Saturday.

Alerted by Disney officials that they had received a letter and videotape threatening some kind of attack during one of the theme park's busiest weekends, federal authorities sent troops trained in chemical warfare, Public Health Service and Federal Emergency Management Service officials and FBI agents to the park south of Los Angeles.

"There was an implication that something involving chemicals might be used against Disneyland," one official said. But the threat failed to materialize and is being treated as a hoax, officials said Saturday. The FBI is conducting a "criminal investigation to determine who was responsible," Justice Department spokesman Carl Stern said.

White House officials confirmed the Disneyland deployment was the incident President Clinton was referring to on Friday in remarks praising the swift and effective response of law enforcement authorities to the Oklahoma City bombing and other recent terrorist threats.

"There was one recent incident with which I was intimately familiar, which involved a quick and secret deployment of a major United States effort of FBI and FEMA and Public Health Service and Army personnel because we had a tip of a possible terrorist incident which, thank goodness, did not materialize," the president said. "We went to the place and we were ready, we were ready to try to prevent it, and if it occurred, we were ready to respond. So we have been on top of this from the beginning."

Federal authorities do not want to send teams scrambling around the country every weekend, one official said, but in the Disneyland case the FBI decided heightened concern about gas attacks made the deployment advisable.

Popular attractions such as Disneyland often receive anonymous threats, federal officials said Saturday. Most turn out to be unfounded, but the possibility of a gas attack in California received urgent attention because it came soon after the mysterious gas attacks on the Tokyo subway system attributed to a religious cult in Japan.

But he and White House officials denied a report in Saturday's *Baltimore Sun* that federal authorities had intercepted two Japanese men at Los Angeles International Airport a few days before Easter and that the men were carrying instructions on how to make the toxic nerve gas sarin.

The *Sun* said the men may have been members of the cult blamed for the March 20 Tokyo subway attacks, which killed 12 people.

That reported episode "simply did not happen," a White House official said. "The *Baltimore Sun* story is false," Stern said.

The Birmingham News
April 23, 1995

The Anniston Star - The Front Page
Tuesday - April 12, 1995

N.Y. Port Authority seeks help from McClellan

By Eric Larson
Star Military Writer

When the Port Authority of New York and New Jersey wanted to learn how to prepare their subway personnel for a nerve gas terrorist attack, they decided to consult another authority — Army chemical weapons experts at Fort McClellan.

Monday, four Port Authority officials got a tour of the fort's chemical defense facilities and met with chemical school personnel. Their goal: to develop a first-response plan in case of a terrorist attack similar to last month's in Tokyo that killed 10 subway commuters and injured more than 5,000.

The agency is no stranger to terrorism. In addition to running the La Guardia, JFK and Newark airports and a subway route linking two states, the Port Authority is responsible for operating the World Trade Center, which was bombed by a terrorist group in 1993.

Nerve gas, however, is a new weapon for transit authorities to contend with, said Salvatore Samperi, deputy director of the Port Authority's public safety de-

■ See Port/7A

Port

■ From Page 1A

partment. And the fact that the deadly weapon has now been used once makes it more likely to happen again.

The organization is most concerned about its bridges, tunnels and subway system. The subway alone carries 200,000 people daily between New Jersey and the midtown and Wall Street sections of Manhattan, Samperi said.

He wanted to learn what it would take to train the Port Authority's 1,400 police officers to identify nerve agent, protect themselves from its effects and rescue commuters. In searching private and government organizations for guidance, "all roads pointed to Fort McClellan and the U.S. Army Chemical School," he said.

After the "absolutely excellent" day trip to the base, Samperi wants to persuade the Port Authority leadership that it would be worthwhile for a Fort McClellan team to view its airports and bus and train stations to help design a first-response plan.

"We will have a series of further conversations," Samperi said.

That's good news for members of the Chamber of Commerce's Military Affairs Task Force. Task force members have been playing up the chemical school's value to the military and trying to persuade the Base Closure and Realignment Commission that moving the school to Fort Leonard Wood, Mo., would stall training for several months or years.

Now they can argue that moving the school might hurt civilian communities that want to prepare for a nerve-gas environment, said Walt Phillips, a former Army chemical corps officer and a member of the task force.

"The individuals that first go into these places have got to have the confidence that they are trained," Phillips said. "You have to keep the panic down as much as possible."

Samperi is confident that the Army is the agency to do the training.

"I think the word is going to get out" to other communities, Samperi said. "We'll keep pointing to the Chemical School. That will just make a pathway to their door."

The Birmingham News - Page 9A
Friday - May 12, 1995

Tests ready Atlanta for Olympic disasters

By David Pace
Associated Press writer

BERRYVILLE, Va. – After training for four days and responding for five hours to a simulated multiple disaster, Atlanta authorities and Olympic officials say they're starting to grasp what might be in store for them once the Games begin next year.

"It was a very valuable experience," said Douglas Arnot, director of the Atlanta Committee for the Olympic Games, after 125 officials completed the federal course Thursday.

"It certainly brought together a lot of people who will have to play on the same team, and for the first time for many of them, it highlighted the need to work together and better understand what each others roles will be," he said.

The climax of the Federal Emergency Management Agency course was the five-hour drill in which the Atlanta group had to deal with a traffic accident and fire that blocked I-285, a major water main break downtown, the bombing of a power substation, a series of tornadoes and a host of smaller problems.

"Our exercises are kind of devilish in a way," said John W McKay, director of FEMA's training division. "We don't let them win.

"If they think they've got it fixed, we'll break something else and throw at them, which is very much similar to actual disaster situations, and trying to respond to them."

Angelo Fuster, an aide to Mayor Bill Campbell, said the drill left the group "really stretched and challenged."

"The kind of constant challenges that we experienced was exactly the kind of training we needed," he said.

The drill, and the three days of workshops that preceded it, were conducted at FEMA's Mount Weather conference and training center in the picturesque Shenandoah Valley about 70 miles west of Washington.

FEMA has been offering similar crisis management training to cities since 1983. Officials from Oklahoma City went through the program last year and credited it for helping them handle the aftermath of the April 19 terrorist attack on the federal building.

To prepare the Atlanta and Olympic officials, the course was specifically tailored to match conditions and situations expected in Atlanta next summer, right down to using the same number of computer terminals and programs in use in Atlanta and Fulton County emergency management offices.

Fuster said the simulation was so real that in the midst of the disaster drill, "citizens were calling to complain or ask for pictures of the mayor and council members were calling to demand how come we're spending so much money."

Contributing to the realism were "Olympic newsbreaks" that were broadcast into each room where the Atlanta officials were dealing with their simulated crises.

The newsbreaks, produced by a FEMA consultant, used interviews and information from the Atlanta officials to continually update the crisis of the moment, and how it was being handled.

Nuclear-grade zirconium cache seized

Trio nabbed; probers call it 'tip of iceberg'

NEW YORK (AP) — The government's seizure of tons of metal that can be used to make nuclear weapons may be just a fraction of the illicit marketplace linked to the former Soviet Union.

Three men, including a former bank president, were arrested Thursday and charged with trying to sell nearly 8 tons of zirconium to undercover agents posing as Iraqi-sponsored arms dealers.

Investigators suspect the nuclear-grade zirconium confiscated Thursday was stolen, possibly in Ukraine. Officials called it the largest seizure of nuclear-related materials in U.S. history.

Since the breakup of the Soviet Union, U.S. officials have warned of the potential for its nuclear hardware and related materials to end up in the hands of terrorists or rogue nations.

"The concern now is it could reach epidemic proportions of leakage out of Russia, given the weakly enforced export control laws and the desperation for cash," said David Albright, president of the Institute for Science and International Security, a research group in Washington.

"These types of incidents are a tip of the iceberg," said Evan Medeiros, a senior analyst with the Arms Control Association in Washington.

The yearlong case began after informants told investigators that the men were trying to sell zirconium from the former Soviet Union on the black market, said Robert Van Etten, special agent in charge of the U.S. Customs Service office in New York.

Shipping documents show the non-radioactive metal was sent from the Ukraine to Germany before heading to the United States.

The zirconium was stored at a warehouse in the borough of Queens, the complaint against the men alleges. The men allegedly sought $2 million for 5 tons of the metal, a price later reduced to $1.8 million, Van Etten said.

In secretly taped conversations, the defendants said the material had been stolen from a stockpile in Ukraine, Van Etten said. Officials have not yet confirmed its source.

Nuclear-grade zirconium is typically used as a coating for uranium fuel rods in reactors. It can play a supporting role in the manufacture of weapons since a byproduct of uranium used in reactors is plutonium — a key component in nuclear arms.

Other grades of zirconium are used in jewelry.

The 5-ton shipment, destined first for Italy to avoid the U.S. trade embargo, was delayed by Customs investigators in December at New York's Kennedy Airport. The businessmen then negotiated a deal to get the undercover agents a 2-ton shipment from Ukraine instead. That shipment was seized Thursday in Cyprus.

Charged with attempting to illegally export zirconium, in violation of U.S. trade sanctions against Iraq, were Demetrios Demetrios, 40, Renos Kourtides, 55, and Constantine Zahariadas, 50. They each face a maximum 10-year prison term and $25,000 fine if convicted.

The Birmingham News
June 9, 1995

Excerpt from BRAC hearing
on Wednesday, March 1, 1995

Testimony from
The Honorable John Deutsch
Deputy Secretary of Defense

excuse me a moment, Mr. Secretary, while I talk to my staff?

(A discussion was held off the record.)

CHAIRMAN DIXON: Mr. Secretary, I have questions from certain Members of the Congress here and, frankly, my staff believes that some would be better directed to the service, chiefs of the service secretaries, but I want to ask you this one because the distinguished Congressman is in the room, I'm told, and we think you perhaps can answer this question and, if you find that it's one better handled by someone else, we'll pursue it more later.

I have represented to Members of the Congress that this would be their instrument for asking the tough questions and, frankly, the reason I've done that, Mr. Secretary, is because I've been pretty vocal in saying that I'm going to avoid a huge cosmetic add-on that will cause great expense and concern in the country, and so we want to be pretty tough about how we evaluate everything, frankly, that you've done.

✳ This question is from Congressman Browder: Secretary Deutch, the 1993 Base Closure and Realignment Commission removed from the list proposed by the Department of Defense and directed the -- let's get this right. Yes.

Secretary Deutch, the 1993 -- there's been a little

scratching on this. I've got to be a little careful how I do this, to get it correct.

Secretary Deutch, the 1993 Base Closure and Realignment Commission removed Fort McClellan in Alabama from the list proposed by the Department of Defense and directed the Secretary of Defense to pursue all the required permits and certification for the construction of facilities at a new location prior to the 1995 base closure process before the DOD could again place that installation on the 1995 BRAC list.

Fort McClellan is recommended for closure again this year. Have any of the necessary permits been obtained by the Army at the receiving installation?

MR. DEUTCH: No, they have not. Let me make a philosophical remark and then return to this particular case. Bill Perry mentioned that, when the list from the different services came forward, that we carefully evaluated each and every list and there were six or seven extremely difficult cases that received our personal attention.

He mentioned the Missile Wing at Grand Forks because of its treaty implications, and here is another instance which was discussed extensively as being one of the

five or six really tough questions before us. That is both whether we would be able to maintain our chemical defense preparedness and, secondly, whether in combination McClellan's proximity to the Anniston, Alabama chemical decommissioning work -- it would be possible it would be impaired by this recommendation.

So this was a very close call and one that we did spend a great deal of time on.

I believe that the proposal before the Commission says, the proposals to move the Chemical Warfare School element up to Fort Leonard Wood, Missouri -- it would not go to Fort Leonard Wood, the proposal says, unless the proper permits are received from the State of Missouri. So that is a process that the Army has got to go through before we would be happy to close or would be willing to close Fort McClellan.

CHAIRMAN DIXON: Would you excuse me a moment while I talk to staff about that?

(A discussion was held off the record.)

CHAIRMAN DIXON: Mr. Secretary, as I understand that, in discussing this with staff -- and, in saying this, may I say to the Congressmen in question and everybody in

this room, we do not yet determine the correctness of your decision, of course. That's part of our process, which will be an ongoing process for many months.

But, as I understand this now, in the event, in the end, that we would support your decision, it's clear that we would have to have before us clear evidence that all permits were in place.

MR. DEUTCH: That's our recommendation to you, Mr. Chairman.

CHAIRMAN DIXON: And it is our statement to you that we would not act unless they were in place, I take it.

MR. DEUTCH: That's our recommendation to you, as well.

CHAIRMAN DIXON: Thank you, sir. Thank you, sir.

(A discussion was held off the record.) **

CHAIRMAN DIXON: Well, we're going to pick on you a little more because they say, since you came from Energy, you may be more conversant with this than many others, anyway.

The New Mexico congressional delegation, Senators Pete Domenici and Jeff Bingaman and Representatives Joe Skeen, Bill Richardson, and Steve Schiff, asked the Chair to ask this:

Excerpt from BRAC hearing
on Tuesday, March 7, 1995

Testimony from
The Honorable Togo D. West, Jr.
Secretary of the Army

like to be heard on that.

GENERAL SULLIVAN: Posts are multi-faceted.

CHAIRMAN DIXON: This is General Sullivan.

GENERAL SULLIVAN: General Sullivan. Madam Commissioner, land, infrastructure, training facilities, maintenance facilities, power projection platforms and quality of life, that all enters into it, quality of life for our people. We have to have barracks and so forth. And all of that entered into our decision making.

And also I have a -- we have a real burden in the Army, because we have in fact mobilized about four times this century, fairly significant mobilizations, and we need the capability to expand the organization without overdrawing that. Okay? Because we are in fact eliminating a lot of World War II wood which was used for mobilization. We're getting rid of that infrastructure on the bases, and we have dropped some maneuver bases.

I think what you have now is what we'll need for a 10-division force, a million men and women, with some capacity to increase. And I wouldn't want to predict what the future would hold.

✳ MRS. STEELE: Thank you. Switching to Fort

McClellan, reading from your report, there is a line that says the governor of the State of Missouri has indicated an expeditious review of the permit application can be accomplished. I read that only because it says that, but it does not mention whether there is any guarantee or percentage of a guarantee that it will be granted.

So my question is, Mr. Secretary, the Army has again recommended relocating the chemical school from Fort McClellan to Fort Leonard Wood. Responding to a similar request, the '93 commission recommended that the Army, quote, pursue all of the required permits and certification for the new site prior to the '95 BRAC process.

Has the Army received these permits? Is the Army pursuing these permits? And in the absence of such permits, how do you believe the Commission should respond to your request?

SECRETARY WEST: I think that the Commission -- I recommend that the Commission respond in the way that we presented it to you. Let me say, Commissioner Steele, that you've hit, with respect to Fort Drum and Fort McClellan, on two decisions that in the final analysis ended up right on my desk as they sort of came up, advised by the Chief of Staff.

So I'm pleased to give the direct explanation.

I would say that there are no guarantees in the permitting process. The one thing that I, as a lawyer, over the years have learned, is that we have no real indication as to how the process could turn out when a community and a permitting authority begin to come to grips with the reality.

For that reason -- and incidentally, let me answer a second question that is implicit in that -- and we did not start the permitting process until after the base closure announcement was made by this -- the list was announced by the Secretary of Defense. That was at my express direction, again, I think, advised by those who have -- with whom I've been working here at the table.

That was because that would have, in our view, been premature. It would have been before the decision. It would have been pre-decisional. So first we had to decide what our recommendation would be this year, and then we would be free, perhaps, to proceed with the initial public steps to get the permit. And so our recommendation to the Secretary of Defense, which he has approved and forwarded to you, is that if we don't get the permits, then we don't close the base.

MRS. STEELE: Thank you. My time has expired.

STATE OF MISSOURI
Mel Carnahan, Governor • David A. Shorr, Director
DEPARTMENT OF NATURAL RESOURCES
OFFICE OF THE DIRECTOR
P.O. Box 176 Jefferson City, MO 65102-0176 (314)751-4422
FAX (314)751-7627

May 19, 1993

When responding, refer to: A33625-2R

Mr. Jim Courter
Chairman, Defense Base Closure and Realignment Commission
1700 North Moore Street, Suite 1425
Arlington, VA 22209

Dear Mr. Courter:

In your letter of May 7, concerning the relocation of the Chemical Defense Training Facility at Fort McClellan to Fort Leonard Wood in Missouri, you presented four issues for discussion by the State of Missouri. The Missouri Department of Natural Resources is still in the process of reviewing the applicable Environmental Impact Statement and permitting information from Fort McClellan for the Chemical Defense Training Facility. Below I have provided you with Missouri's initial response to the issues. We will continue to review documents recently received and will provide additional information within two weeks as appropriate.

Issue #1: The Chemical Defense Training Facility will require nine years to put into operation.

Discussion: (See enclosed timeline.) An Environmental Impact Statement will require four years to complete, based on experience at Lexington-Bluegrass Army Depot with chemical weapons demilitarization facility, and the Gaithersburg, MD chemical weapons research facility. There was no inkling of opposition until the Environmental Impact Statement scoping meeting.

Missouri's Response: We understand that it is the Department of Defense's intent to prepare an Environmental Impact Statement (EIS) for the movement of all operations to Fort Leonard Wood. The Chemical Defense Training Facility will be included in this package and not result in an additional document. All correspondence regarding the EIS should be directed to my office to ensure timely response. We are willing to cooperate to the maximum extent possible in the identification of issues for purposes of the EIS related to compliance with state environmental laws and permitting requirements.

Issue #2: The Resource Conservation Recovery Act (RCRA) permits required for the Chemical Defense Training Facility and smoke operations will take two-four years to obtain, with most probable timeframe being closer to four years.

Discussion: Based on Army guidance, which provides a planning figure of two-four years (reference not stated). As an example, chemical demilitarization facility at Johnston Island took four years to obtain a RCRA permit, and it isn't even in the continental U.S. It is Army policy that construction cannot commence without a completed RCRA permit. This will also hold up the move of the Chemical School until 1998, after the RCRA permit is received.

Missouri's Response: Currently, we anticipate that the Chemical Defense Training Facility would require permits from Missouri's Air Pollution Control Program, Water Pollution Control Program (for NPDES), and the Hazardous Waste Program. The permit for the incinerator from the Hazardous Waste Program will, no doubt, take the most time to obtain. Air and water permits typically require six months or less. The original NPDES water quality permit issued to Lake City Army Ammunition was issued within seven months of receiving all necessary information. Depending on the complexity of the permit and the complexity of the incinerator, the Part 1 application will take nine to fourteen months to complete. Part 2 of the permit (after construction is complete), will take an additional eight months to a year to complete. I have enclosed a typical review schedule for your use in this matter. Please note the items with an asterisk on the schedule are dependent on Department of Defense, and the timeliness and completeness of their response can either accelerate or delay the process.

I have also included for your review Missouri's applicable hazardous waste rules for incinerators and a brief history of the permitting of a hazardous waste incinerator at Lake City Army Ammunition Plant, which took nine months to complete.

Issue #3: The Chemical Defense Training Facility will be more costly to build in Missouri because a technology upgrade will be required. This will add $20-25 million dollars to construction costs.

Discussion: Missouri will require a more advanced incineration system in order to obtain a RCRA permit.

Missouri's Response: At this time I see no reason to believe that construction of an incinerator in Missouri would be any more costly or time consuming than construction in any other state. Missouri's rules on hazardous waste incinerators parallel those of the U.S. EPA and these rules apply nationwide. As mentioned previously, I have enclosed a copy of Missouri's rules for the permitting of the incinerator through the Hazardous Waste Program.

Issue #4: Smoke training operations are not possible in an environmentally sensitive area like Fort Leonard Wood and the Ozarks, including the national forest areas surrounding Fort Leonard Wood.

Discussion: Last year, Fort McClellan used 600,000 lbs. of fog oil for smoke training operations. Missouri would never allow smoke to filter into national forest areas or be used around the sensitive Indiana and Grey Bat feeding areas.

Missouri's Response: Based upon information submitted to the Department of Natural Resources by Fort Leonard Wood, the Army is in the process of establishing numerous test areas and with monitoring of meteorological conditions they propose to ensure that the smoke stays on Army property. We will have to study the issue further. Currently, we are scheduled to observe trial runs of the smoke training exercise to give us a better feel for environmental impacts that can be anticipated.

I hope that this information will assist you in your deliberations. Should you have additional questions, please don't hesitate to call me at 314-751-4422.

Very truly yours,

DEPARTMENT OF NATURAL RESOURCES

David A. Shorr
Director

DAS:esp

Enclosures

c: The Honorable Christopher Bond
The Honorable John Danforth
The Honorable William Clay
The Honorable James Talent
The Honorable Richard Gephardt
The Honorable Ike Skelton
The Honorable Alan Wheat
The Honorable Pat Danner
The Honorable Melton Hancock
The Honorable Bill Emerson
The Honorable Harold Volkmer

STATE OF MISSOURI
DEPARTMENT OF NATURAL RESOURCES
OFFICE OF THE DIRECTOR
P.O. Box 176 Jefferson City, MO 65102-0176 (314)751-4422
FAX (314)751-7627

December 23, 1994

The Honorable William J. Perry
Secretary
Department of Defense
The Pentagon
Washington, D.C. 20301

RE: Fort Leonard Wood, Missouri

Dear Secretary Perry:

Enclosed you will find two letters regarding Fort Leonard Wood and the Defense Base Closure and Re-Alignment Commission. The letters relate Missouri's position regarding the transfer of the Chemical School and its Chemical Defense Training Facility (CDTF) from Fort McClellan to Fort Leonard Wood. This letter is to reiterate our position regarding permitting at Fort Leonard Wood.

Resources has indicated that the CDTF is a permittable facility under Missouri law.

As I indicated on June 4, 1993, we anticipate the construction of this facility will require air pollution control, water pollution control and hazardous waste program-related permits. To date, we have not received applications for such permits and eagerly await their submittal so that we can timely review and approve if appropriate.

Missouri is prepared to expedite the review processes for these facilities.

We have an excellent working relationship with the environmental staff at Fort Leonard Wood and the bases' command. Fort Leonard Wood has and continues to demonstrate a commitment to sound environmental stewardship. That relationship certainly will add to our ability to have a prompt review with quick responses.

Should you have any questions, please feel free to contact us directly about any environmental activities at Fort Leonard Wood.

Very truly yours,

DEPARTMENT OF NATURAL RESOURCES

David A. Shorr
Director

DAS:sh

Enclosure

TOTAL P.03

DEPARTMENT OF THE ARMY
HEADQUARTERS
U.S. ARMY ENGINEER CENTER AND FORT LEONARD WOOD
FORT LEONARD WOOD, MISSOURI 65473-5000

REPLY TO
ATTENTION OF

ATZT-CS

5 APR 1995

MEMORANDUM FOR Department of the Army, Office of the Chief of Staff, The Army Basing Study, 200 Army Pentagon, Room 2A684, Washington, DC 20310-0200

SUBJECT: Congressional Inquiry from Congressman Browder

1. As requested by Congressman Browder, environmental permits submitted by Fort Leonard Wood are enclosed as follows:

a. Air permit for the CDTF incinerator

b. Air permit for large area smoke training

c. Installation-wide storm water permit

d. Hazardous waste permit for CDTF

2. As of this date, no official reply has been received from the Missouri Department of Natural Resources regarding any of these permit applications.

FOR THE COMMANDER:

ANDERS B. AADLAND
COL, EN
Chief of Staff

CF (wo/encls):
HQ, TRADOC

Excerpt from BRAC Regional Hearing
in Chicago, Illinois, on April 12, 1995

Testimony from
The Honorable Mel Carnahan
Governor of Missouri

and

Mr. David A. Shorr, Director
Missouri Department of Natural Resources

Gov. Carnahan: Intro remarks

delegation regarding the Charles Melvin Price Center, and we, in Missouri, are certainly supportive of their efforts to keep that facility open.

We are here, of course, to address the future of the United States Army installations in Missouri, and so first I would like to have a few important words, and I'll kind of make them a few, about Fort Leonard Wood.

Fort Leonard Wood, as you know, is a state-of-the-art facility set the standard truly for training engineers and not only for the Army but for the whole Department of Defense, and that facility, Fort Leonard Wood, has the facilities and the resources to support additional missions, such as the Army's chemical decontamination training facility that's under consideration.

Yesterday -- and this is the news that I want to present to you -- the Missouri Department of National Resources announced the issuance of two permits and released a third preliminary permit for public comment.

You may notice that this is probably ahead of any schedule that anyone would

have expected. I'm also advised by the director of the Department of Natural Resources that no hazardous waste permit is required, and this is largely due to the new pollution prevention activities undertaken by the Department of Defense over the last two years.

Every step is being taken to protect the environment but also to insure that the mission transfer contemplated is successful.

Fort Leonard Wood has served as a vital asset to our company's military for over 50 years. We are going to do all we can in our power to see that we serve for many more.

Now I would like to turn our attention to the principal reason we are here today and that is to address the proposed closure of the Aviation and Troop Command, ATCOM, in St. Louis.

First, as governor, as you would expect, I have made economic development the top priority, and I'm working in cooperation with many of the same people that are appearing here today both to create jobs and new businesses and certainly recommend to the retention, and, we

My question is directed to you, Governor Carnahan. You may have these numbers at your fingertips.

As you know, one of the central issues in relocating the chemical defense training facility at Fort Leonard Wood are a lot has been said and written and speculated. You told us that two permits had been granted recently --

GOVERNOR CARNAHAN: That's correct.

COMMISSIONER ROBLES: -- and one was just recently released.

Could you just further clarify, first of all, are those the only three permits required to move that facility and operate that facility at Fort Leonard Wood and, secondly, what kind of permits? Are these construction permits? Operations permits? Are they about water or sewer, so that, for the record, we know exactly and get this permit issue on the table so there's no more speculation about whether the permits will or will not be granted and whether the permits can be accomplished in time to move the facility?

GOVERNOR CARNAHAN: I like to be permitted to call the director of our Department of Natural

Resources. You may wish to swear him if that's part of your procedure. I think he could be much more precise than I.

(Witness sworn.)

COMMISSIONER ROBLES: And, sir, would you state your name and address.

DIRECTOR SHORR: My name is David Shorr. I'm Director of the Department of Natural Resources. My address is 200 Jefferson Street, Jefferson, Missouri.

COMMISSIONER ROBLES: Thank you.

DIRECTOR SHORR: To answer your question, Mr. Commissioner, three permits are required by the City of Missouri: A permit for air construction for the CDTF, which is the Chemical Decontamination Training Facility; a water permit for the base, and a permit for the smoke school, which is going -- which was issued as a PSD permit application to significantly deteriorate the air around the area of Fort Leonard Wood. So there's three permits required. A hazardous waste permit is NOT required for the thirty-fourth thousand time. Okay. Any other questions?

CHAIRMAN DIXON: I thank the general for

(1) Transcript corrected to reflect Mr. Shorr's true and correct statement during the hearing.

pursuing this.

You are all on notice, and incidentally, we do not prejudge what we will do with respect to this conflict between the states and Missouri. That's still a question for us to resolve at some future date, but we put you on notice that the State of Alabama has suggested that we'll not be able to be permitted adequate time.

Our counsel is Madelyn Ceden (phonetic). As you know, I'll put all of you on notice, put you all on notice that we would be reluctant to act should it come down to a decision that in your favor if we were of the opinion that had not been adequately permitted. You are aware of that?

GOVERNOR CARNAHAN: Yes, we are.

CHAIRMAN DIXON: There's another question I believe from Commissioner Wendi Steele. Have we concluded with the distinguished cabinet member?

(No verbal response.)

Commissioner Kling?

COMMISSIONER KLING: You stated -- I just want to understand. You are saying that the

permits will be, one, it will be for the construction and, two, for the operation or do we have to get something different?

DIRECTOR SHORR: In Missouri, under Missouri Law, a permit to construct under current law is all that's required under the CDTF. That permit was issued yesterday.

COMMISSIONER KLING: Will allow after construction that will allow the operation?

DIRECTOR SHORR: Correct.

COMMISSIONER KLING: I do want to again suggest Madelyn Ceden is now working in the back of the room. She was elsewhere on business for the Commission, but you do know that counsel for the Commission it's very imperative that we have a legal opinion from her? And we do not prejudge this. I'm anxious to make that clear. It's only imperative with respect to a training question in the northern tier and your permit question that the procedural matters be adequately addressed.

DIRECTOR SHORR: Chairman Dixon, my job is protecting the environment of the State of Missouri. My job is not to issue permits. If there was a facility that could not do what

they're required to do, I have done my job, period.

CHAIRMAN DIXON: I hope you haven't taken the opinion I suggested that you didn't. Thank you very much, sir. I don't want to get in trouble here.

(Laughter.)

Commissioner Cornella?

COMMISSIONER CORNELLA: I have a question. I understand there may be some dispute over whether or not some masks constitute hazardous waste. Maybe you could help us there with this.

DIRECTOR SHORR: Be glad to.

COMMISSIONER CORNELLA: If that's the case, determine that they do, would the waste permit then be required?

DIRECTOR SHORR: Based upon the materials that we have received from the Department of Defense, the current mask that is being used, which contains achromic acid component, which would create a chromium discharge from the incinerator would be a hazardous waste.

Under the procedures that they have followed under pollution prevention they have

discontinued use of that mask filter. The military should be commended for it. All that means shouldn't be a last hazardous waste discharge.

CHAIRMAN DIXON: I thank you very much. Mr. Walker, would you be kind enough to yield the question from Commissioner Steele.

COMMISSIONER STEELE: Sir, I'm not sure if this will end up being common sense or a legal question at the end of it.

When you were talking about the lowest cost to the taxpayers -- I want to pursue that a little bit -- is it possible for a GSA out of the Federal Property Act to access that facility, allow the Department of Defense to take over that facility, as the department is doing with other facilities to other agencies, and, if so, if that is possible, getting rid of less or non-less number, depending upon how you look at that word? Where does that $30 million cost come in to the Army if they should take over that facility?

MR. WALKER: There's two possibilities in the Army operating the facility -- three ways of

CDTF MSDS INVENTORY
FORT McCLELLAN, ALABAMA

As of: 04/12/95

Inventory of CDTF MSDS

Change		Chemical Name	Common Name	Manufacturer	EGG	Lab	Laund	Master
Change		Chemical Name	Common Name	Manufacturer	EGG	Lab	Laund	Master
	1	Acetic Anhydride		Various Sources (GE)	1980			1980
	2	Acetone		Fisher Scientific	1990	1990	1990	1990
	3	Acetone		Various Sources (GE)	1984	1984	1984	1984
	4	Activated Aluminas		Alcoa	1992			1992
	5	Adhesive	3M Brand	3M General Offices	1992			1992
	6	Adhesive		Three Bonds	1990			1990
	7	Adhesive Maintenance	TAP Suit Glue	TRA-CON Inc			1992	1992
	8	Air Freshner	Neutrodor	Lehn and Fink Products	1990			1990
	9	Air Freshner	Applescent	Neutron Industries	1990			1990
	10	Airbrasive Powder No. 1		SS White Industrial	1979			1979
	11	Airlift (Floral/Lemon)		Spartan Chemical Co	1987			1987
	12	Air, compressed		Air Products	1992	1992		1992
	13	Alarm Chem Agent	M8A1	Honeywell Inc	1992	1992	1992	1992
	14	Alcohol, 3A	CM Indicator	LaMotte Company	1991			1991
	15	Alkalinity Titration Reagent		LaMotte Company	1988			1988
	16	Alkali, Laundry		Guttler Chemicals Inc			1992	1992
	17	Aluminum Metal/Powder	Aluminum Foil	Various Sources (GE)		1984		1984
	18	Aluminum Oxide		KC Abrasive Company		1992		1992
	19	Ammonium Chloride		Various Sources (GE)	1977			1977
	20	Ammonium Persulfate		Various Sources (GE)	1978			1978
	21	Amyl Acetate	Isoamyl	Mallinckrodt Inc Science	1992			1992
	22	Amyl Acetate	Isoamyl	Union Carbide	1992			1992
	23	Amyl Acetate	Isoamyl	Van Waters and Rogers	1992			1992
	24	Aqueous Alkaline Solution		AGFA Division	1994			1994
	25	ASD-10		Affiliated Laboratories	1992			1992
	26	Battery BA3517/U	M8A1	Battery Assemblers	1992			1992
	27	Battery Nonrechargeable		Alexander Mfg Co	1991	1991		1991
	28	Battery Nonrechargeable	CAM Battery	Ballard Battery	1992			1992
	29	Battery, Rechargeable	CAREFREE	Eagle Picher Ind	1990			1990
	30	Benzoyl Chloride		Various Sources (GE)	1981			1981
New	31	Black 37030 Zenthane		Hentzen Coating Inc	1991			1991
New	32	686 A Tan Zenthane		Hentzen Coating Inc	1991			1991
	33	Biphthalate (Buffer Soln)	pH 4	JT Baker Inc		1992		1992
	34	Biphthalate (Buffer Soln)	pH 4	Orion Application Soln		1991		1991
	35	Boric Acid		Various Sources (GE)	1983			1983
	36	Brake Fluid, NAPA DOT-3		Occidental Chem Corp				1990
	37	Bromine Tablet		LaMotte Company	1992			1992
	38	Buffer Solution	Hardness 1	Hach Chem Co	1992			1992
	39	Buffer Solution pH 4.00		Ciba Corning		1987		1987
	40	Buffer Solution pH 7.00		Ciba Corning		1987		1987
	41	Buffer Solution pH 10.00		Orion Application Soln		1991		1991
	42	Buffer Solution pH 10.01		Orion Application Soln		1987		1987
	43	BWT-119	Scavenger	Chem-E Inc	1989			1989
	44	BWT-243	Conditioner	Chem E Inc	1989			1989
	45	Cabosil		Cabot Corp	1981	1981		1981
	46	Calcium Hypochlorite Granular	HTH	Olin Industries	1993	1993		1993
	47	Calcium Hypochlorite (Dry)	HTH	Various Sources (GE)	1980	1980		1980
	48	Calcium Stearate		Tenneco Chemicals	1980			1980
	49	Camphor, Synthetic		Lonza			1989	1989

Ch		Chemical Name	Common Name	Manufacturer	EGG	Lab	Laund	Master
	50	Canister, Gas Mask		Calgon Carbon Corp	1992	1992	1992	1992
	51	Carbon ASC Activated		Calgon Carbon Corp	1992			1992
	52	Carbon Dioxide	Extinguisher	Amerigas Inc	1992	1992	1992	1992
	53	Carbon Disulfide		Various Sources (GE)	1982	1982		1982
	54	Caustic Potash	CWT-3700	Chem E Inc	1990			1990
	55	Charcoal (Activated)	Supelpure	Supelco Inc		1990		1990
	56	Charcoal (ActReplacement)	Supelpure	Supelco Inc		1990		1990
	57	Chattahoochee Sealer		Coranado Paint Co	ND			ND
	58	Chem-E E-10		Chem-E Inc	1991			1991
	59	Chemical Agent Monitor	CAM		1992			1992
	60	Chlorine		Olin Industries	1992			1992
	61	Chlorine		PPG Industries	1989			1989
	62	Chloroform		American Burdick & J	1985	1985		1985
	63	Chloroform		Various Sources (GE)	1979			1979
	64	Chromosorb 106		Manville International	1986	1986		1986
	65	Chromosorb 106		Sigma Chemical Co		1991		1991
	66	Cleaner, All Purpose	DIBS	Drackett Products	1992			1992
	67	Cleaner, Bathroom	Vani-Sol	National Laboratories	1985			1985
	68	Cleaner, Bathroom	Scrub Bubbles	Natl Brands Inc	1990			1990
	69	Cleaner, Bathroom	Disinfectant	Spartan Chemical Co	1985			1985
	70	Cleaner, Bathroom and Bowl		Purex Industries	1986			1986
	71	Cleaner, Glass		James Austin Company		1990	1990	1990
	72	Cleaner, Glass Type II		Hysan Corporation			1986	1986
	73	Cleaner, Glassware	Liqui-nox	Alconox, Inc	1986	1986		1986
	74	Cleaner, Glass, Bulk		Spartan Chemical Co	1992			1992
	75	Cleaner, Stainless Steel	Aqua Steel	Carroll Company	1992			1992
	76	Cleaner, Stainless Steel		Spartan Chemical Co	1988			1988
	77	Cleaning Compound	Foamy Q & A	Spartan Chemical Co	1989			1989
	78	Cleaning Soln, Electrode pH		Cole-Parmer Instruments		1989		1989
	79	Cleanser	Comet	Procter and Gamble	1986	1986		1986
	80	Conditioner, Boiler Sludge		Western Water Mgt	1986			1986
	81	Copper Sulfate		Various Sources (GE)	1984			1984
	82	Coravol		Western Water Mgt	1986			1986
	83	Correction Fluid		LHB Industries	1992	1992	1992	1992
	84	Correction Fluid		Paper Mate	1985	1985	1985	1985
	85	Corrosion Prev Compound	Water Disp	LHB Industries	1992			1992
	86	Conductivity Neutralizing Soln		Masters Chem Co	ND			ND
	87	CWT-348	Inhibitor	Chem-E Inc	1989			1989
	88	Cyclohexane		American Burdick & J	1985	1985		1985
	89	Cyclohexene		Various Sources (GE)	1983			1983
	90	Decon Agent STB		Timmerman Corp				1992
	91	Decon Apparatus, M13	M13 DAP	Dalden Corp	1992			1992
	92	Decon Kit, M258A1-1	Packet 1	Mine Safety Appliances	1992	1992	1992	1992
	93	Decon Kit, M258A1-2	Packet 2	Mine Safety Appliances	1992	1992	1992	1992
	94	Decon Tng and Refill Kits	M58A1	Mine Safety Appliances				1992
	95	Degreaser/Cleaner	Matterhorn	Carrol Company	1989			1989
	96	Degreaser/Cleaner	Mean Green	ChemPro Corporation	1989			1989
	97	Detector Unit	M43A1	Westmount	1992	1992	1992	1992
	98	Detergent, General Purpose		Lighthouse for the Blind		1988		1988
	99	DF-(Difluoro)		Department of the Army	1989	1989	1989	1989
	100	Diethylamine		Aldrich Chemical Co	1992			1992
	101	Diethylamine		Fisher Scientific	1980			1980

ange		Chemical Name	Common Name	Manufacturer	EGG	Lab	Laund	Master
	102	Dishwashing Compound		LHB Industries		1992	1992	1992
	103	DPD #3R Tablet		LaMotte Company	1993			1993
	104	Drierite		WA Hammond	1992	1992		1992
	105	Dry Chemical ABC		Amerex Corporation	1992	1992	1992	1992
	106	Dry Chemical ABC	Extinguisher	Chemguard	1988	1988	1988	1988
	107	DS2		Department of the Army	1992	1992	1992	1992
	108	Dust-Off Aerosol Cans		Dupont		1989		1989
	109	Electrode Storage Soln, pH		Cole-Parmer Instruments		1987		1987
	110	Epoloid G Part A	5-G-9/F-TOP 5G9	Rowe Bisonite Inc	12 92			12 92
	111	Epoloid G Part A	5-G-9/F-TOP 5G9	Rowe Bisonite Inc	10 92			10 92
	112	Epoloid G Part A	5-G-30 White	Rowe Bisonite Inc	5 86			5 86
	113	Epoloid G Part A Gray	5-G-5	Rowe Bisonite Inc	1994			1994
	114	Epoloid G Part A Green	F-TOP-5G17 Green	Rowe Bisonite Inc	4 93			4 93
	115	Epoloid G Part B	5-G-ALL	Rowe Bisonite Inc	1994			1994
	116	Epoloid G Part B	5-G-30 White	Rowe Bisonite Inc	7 87			7 87
	117	Epoloid G Part B	5-G-ALL	Rowe Bisonite Inc	12 92			12 92
	118	Epoloid Part A	5-E-27	Rowe Bisonite Inc	5 86			5 86
	119	Epoloid Part B	5-E-27	Rowe Bisonite Inc	5 86			5 86
	120	Epoloid Reducer	8-F-2 Reducer	Rowe Bisonite Inc	5 86			5 86
New	121	Epoloid Reducer	8-K-2 Reducer	Rowe Products INC	1984			1984
	122	Ethyl Alcohol		ARDO Enterprises	1987			1987
	123	Ethyl Alcohol		Pharmco Products	1993	1993		1993
	124	Ethyl Alcohol		Various Sources (GE)	1981	1981		1981
	125	Ethyl Alcohol		Virgina Chemicals	ND			ND
	126	Ethylene Glycol	Antifreeze	Old Water Automotive	1991			1991
	127	Ferric Chloride Solution		Various Sources (GE)	1984			1984
	128	Ferrion Indicator		LaMotte Company	1991			1991
	129	Ferrous Sulfate Heptahydrate		Various Sources (GE)	1980			1980
	130	Filming Amine		LaMotte Company	1992			1992
	131	Filming Amine A	Amine Indicator	LaMotte Company	1992			1992
	132	Filming Amine B	Barium Chloride	LaMotte Company	1992			1992
	133	Filming Amine C	Chloroform	LaMotte Company	1992			1992
	134	Filming Amine D	Sulfide Test Soln #1	LaMotte Company	1992			1992
	135	Filming Amine E	Sulfuric Acid	LaMotte Company	1992			1992
	136	Filter Element	For M17	Calgon Carbon Corp	1992	1992	1992	1992
	137	Fluorinert	FC-43 (ITD)	3M General Offices		1992		1992
	138	FORMAT		Affiliated Laboratories	1992			1992
	139	Fragrance Gel		Scentex Inc	ND			ND
	140	Freon -12		Matheson Gas Co	1989			1989
	141	Fresh Water Soluble Deod		Fresh Products	1988			1988
	142	Fuel Oil No. 2		Various Sources (GE)	1981			1981
	143	G-23	Refractory Bricks	AP Green Industries	1989			1989
	144	Gasoline, Unleaded		Shell Oil Company	1992			1992
	145	GB	Sarin	Department of the Army	1992	1992	1992	1992
	146	Gelband Solution		Omega Specialty Co		ND		ND
	147	Glass Wool- Silane Treated		Supelco Inc	1991	1991		1991
	148	Glycine Solution		LaMotte Company	1993			1993
	149	Grease, Laboratory Apparatus	Lubriseal	Thomas Scientific		1989		1989
	150	Greenpack-80		AP Green Industries	1988			1988
	151	Greenpatch 421		AP Green Industries	1992			1992
	152	Halon	Extinguisher	Ansul Fire Protection	1992	1992	1992	1992
	153	Hardness Reagent #5		LaMotte Company	1992			1992

C ge		Chemical Name	Common Name	Manufacturer	EGG	Lab	Laund	Master
	154	Hardness Titrating Reagent		LaMotte Company	1991			1991
	155	Helium		Air Products	1981	1981		1981
	156	Helium		Various Sources (GE)	1982	1982		1982
	157	Hexanes		EM Science		1991		1991
	158	Hexanes		JT Baker Inc		1987		1987
	159	Hg Absorb		Lab Safety Supply		1990		1990
	160	Hydrochloric Acid		LaMotte Company	1992			1992
	161	Hydrochloric Acid		Various Sources (GE)	1984	1984		1984
	162	Hydrogen		Air Products	1981	1981		1981
	163	Hydrogen in Air		Alphagaz	1992			1992
	164	Hydrogen Sulfide in Nitrogen	Specialty Gas	Liquid Air Corp	ND			ND
	165	Inconell Alloys		Huntington Alloys	1985			1985
	166	Ink	A-A-208A Type I	Sinnett Elpaco Corp			1990	1990
	167	Ink Marking Stencil	Type M-White	Ideal Stencil			1992	1992
	168	Ink Stencil Marking	Type M-Black	Ideal Stencil			1992	1992
	169	Ink White Stencil	N-3807	Niles Chemical Paint			1992	1992
	170	Insecticide, Fire Ant	AMDRO	AMDRO	1990			1990
	171	Inswool Blanket		AP Green Industries	1991			1991
	172	Inswool Hardware		AP Green Industries	1988			1988
	173	Inswool Module		AP Green Industries	1988			1988
	174	Iodine		Various Sources (GE)	1982			1982
	175	Isopropyl Alcohol		Aldrich Chemical Co	1991	1991		1991
	176	Isopropyl Alcohol		Various Sources (GE)	1982	1982	1982	1982
	177	Isopropyl Amine		Various Sources (GE)		1982		1982
	178	Jet-Lube		Jet Lube Inc	1992			1992
	179	Liquid Oxygen Scavenger		Western Water Mgt	1986			1986
	180	Lithium Bromide		Foote Mineral Co	1992			1992
	181	Lithium Bromide		Lithium Corp of America	1992			1992
	182	M18A2 Detector Kit		Truetech Inc	1992	1992	1992	1992
		M18A2 Detector Kit A	Blue Top Bottle	Truetech Inc	1992	1992	1992	1992
		M18A2 Detector Kit B	Det Tube Blue	Truetech Inc	1992	1992	1992	1992
		M18A2 Detector Kit C	Det Tube Green	Truetech Inc	1992	1992	1992	1992
		M18A2 Detector Kit D	Det Tube Red	Truetech Inc	1992	1992	1992	1992
		M18A2 Detector Kit E	Det Tube White	Truetech Inc	1992	1992	1992	1992
		M18A2 Detector Kit F	Det Tube Yellow	Truetech Inc	1992	1992	1992	1992
		M18A2 Detector Kit G	Red Top Dispenser	Truetech Inc	1992	1992	1992	1992
		M18A2 Detector Kit H	White Powder	Truetech Inc	1992	1992	1992	1992
		M18A2 Detector Kit I	Tablet 34	Truetech Inc	1992	1992	1992	1992
	183	M256A1 Det Kit		Truetech Inc	1990	1990	1990	1990
		M256A1 Det Kit A	Amp Bleach	Truetech Inc	1992	1992	1992	1992
		M256A1 Det Kit B	Amp Caustic	Truetech Inc	1992	1992	1992	1992
		M256A1 Det Kit C	Amp Heater	Truetech Inc	1992	1992	1992	1992
		M256A1 Det Kit D	Amp Methanol	Truetech Inc	1992	1992	1992	1992
		M256A1 Det Kit E	Amp Pyridine	Truetech Inc	1992	1992	1992	1992
		M256A1 Det Kit F	Amp Substrate	Truetech Inc	1992	1992	1992	1992
		M256A1 Det Kit G	Pellet Lewisite	Truetech Inc	1992	1992	1992	1992
		M256A1 Det Kit H	Det Spot Circle	Truetech Inc	1992	1992	1992	1992
		M256A1 Det Kit I	Det Spot Square	Truetech Inc	1992	1992	1992	1992
		M256A1 Det Kit J	Det Spot Star	Truetech Inc	1992	1992	1992	1992
	184	M256A1 Tng Kit	Buffer	Chemtronics Inc	1992			1992
		M256A1 Tng Kit A	Caustic H	Chemtronics Inc	1992			1992
		M256A1 Tng Kit B	Heater Assy	Chemtronics Inc	1992			1992

Change		Chemical Name	Common Name	Manufacturer	EGG	Lab	Laund	Master
		M256A1 Tng Kit C	Lewisite Tablet	Chemtronics Inc	1992			1992
		M256A1 Tng Kit D	Methanol Soln	Chemtronics Inc	1992			1992
		M256A1 Tng Kit E	Methanol-P	Chemtronics Inc	1992			1992
		M256A1 Tng Kit F	Methanol-T	Chemtronics Inc	1992			1992
		M256A1 Tng Kit G	Substrate Soln	Chemtronics Inc	1992			1992
	185	Magnesium Oxide		Various Sources (GE)	1981			1981
	186	MBC 120	NA-Mixture	Nashville Chemical Co	1993			1993
	187	Megabore Test Mix, DB-210	DB-210	J and W Scientific		1989		1989
	188	Mercury		Various Sources (GE)		1981		1981
	189	Metal Polish		Hysan Corporation		1987		1987
	190	Methyl Alcohol		Various Sources (GE)		1981		1981
	191	Methyl Ethyl Ketone		Startex Chem Inc	1988			1988
	192	Methylene Chloride		American Burdick & J	1985	1985		1985
	193	Microbicide YR	Cooling Water	Nashville Chemical Co	1985			1985
	194	Microbicide YR	Cooling Water	Western Water Mgt	1986			1986
	195	Microbrom		BioLab	1988			1988
	196	Mineral Oil, Mist		Resource Consultants			1991	1991
	197	Mineral Oil, USP		Moyco Industries			1992	1992
	198	Mineral Oil, White		Moyco Industries			1988	1988
	199	Mineral Spirits		Ambrose Oil Co	ND			ND
	200	Mineral Spirits		Valspar Corp	1988			1988
	201	Molecular Ceramic Metal	Belzona R-Metal	Belzona	1992			1992
	202	Molecular Seive Type 5A		Union Carbide	1986			1986
	203	Molecular Seive Type 5A		UOP	ND			ND
	204	Molybdenum Reagent Powder		LaMotte Company	1991			1991
	205	Multionic Cooling Water Treat		Western Water Mgt	1986			1986
	206	n-Hexane		Various Sources (GE)	1983			1983
	207	Nitirite DRT Reagent		LaMotte Company	1985			1985
	208	Nitric Acid (55-70%)		Various Sources (GE)		1980		1980
	209	Nitorgen		Air Products	1980	1980		1980
	210	Nusorb		Nucon International	1986			1986
	211	Oil Cutting		Oatey	1993			1993
	212	Oil Powertrans 10W		Mobile Oil Corp	1986			1986
	213	Oil Turbo Pump ITD		Arthur Pfeiffer		1987		1987
	214	Oil Vacuum Pump	Lubricating	Boekel, Philadelphia		1987	1987	1987
	215	Oil Vacuum Pump	Lubricating	Convoy Oil Corp		1992	1992	1992
	216	Oil Vacuum Pump ITD		CVC Products		1989		1989
	217	Over and under plus	Sealer, Surface	Johnson Wax	1992			1992
	218	Paint, Lacquer	NC Cam	Pratt and Lamber	1991			1991
	219	Phenolphthalein		Hach Chem Co	1992			1992
	220	Phenolphthalein Indicator		Drew Chemical Corp	1983	1983		1983
	221	Phenolphthalein Tablets		LaMotte Company	1991			1991
	222	Phosphate B/C Tablet	Stannous Chloride	LaMotte Company	1992			1992
	223	Phosphate Reagent A		LaMotte Company	1993			1993
	224	Phosphate (Buffer Soln) pH7		J T Baker Inc		1990		1990
	225	Phosphate (Buffer Soln) pH7		Orion Application Soln		1991		1991
	226	Phosphoric acid		J T Baker Inc	ND			ND
	227	Piperdine		Fisher Scientific	1980			1980
	228	Polymide Resin for Guard Col		E I Dupont		1990		1990
	229	Polypropylene		Norton	1987			1987
	230	Potassium Biphthalate		Various Sources (GE)	1981			1981
	231	Potassium Chloride Soln	With/AgCl	Broadley-James Corp		1990		1990

nge		Chemical Name	Common Name	Manufacturer	EGG	Lab	Laund	Master
	232	Potassium Chloride Soln	In Water	Broadley-James Corp		1990		1990
	233	Potassium Cyanide		Various Sources (GE)	1980			1980
	234	Potassium Dichromate		Ashland Chemical Co		1982		1982
New	235	Potassium Fluoride Anhydrous		J.T.Baker Inc		1994		1994
	236	Potassium Fluoride		EM Science		1988		1988
	237	Potassium Fluoride		Mallinckrodt Inc Science		1988		1988
	238	Potassium Hydroxide		ARDO Enterprises	1988			1988
	239	Potassium Iodide		Various Sources		ND		ND
	240	Propane, Liquidied		Various Sources (GE)	1978		1978	1978
	241	Pro-Shine		Spartan Chem Co	1990			1990
	242	Purple K	Extinguisher Dry	Ansul Fire Protection	1992	1992	1992	1992
	243	QL		Department of the Army	1991	1991		1991
	244	Rhoplex	Emulsion	Rohan and Haas	1991			1991
	245	RLT 20F	Boiler Treatment	Nashville Chemical Co	1993			1993
	246	RLT-450	Boiler Treatment	Chem-E Inc	1989			1989
	247	Roundup	Herbicide	Monsanto	1992			1992
	248	Sairset	Refractory Mortar	AP Green Industries	1989			1989
	249	Salt Pellets		Ashland Chemical Co	1986			1986
	250	Sanitizer, J-80		Johnson Wax	1987			1987
	251	Scouring Powder	Type I	Fitzpatrick Brothers		1988		1988
	252	Screen, Urinal	Toilet Deodorant		ND			ND
	253	Seive, Molecular	Mol Seive 8/12	Supelco Inc		1991		1991
	254	Shineline Emulsifier Plus		Spartan Chemical Co	1993			1993
	255	Silastic 140 RTV Adhesive		Dow Corning Corp		1982		1982
	256	Silver Nitrate		Various Sources (GE)		1980		1980
	257	Snapback liquid	Floor Buff	Johnson Wax	1992			1992
	258	Snoop Liquid	Leak Detector	Nupro Company	1988	1988		1988
	259	Snoop Liquid	Leak Detector	Supelco Inc	1991	1991		1991
	260	Soap, Hand	All Hands RTU-20	Affiliated Laboratory	1993			1993
	261	Soap, Hand		Carrol Company	1989			1989
	262	Soap, Hand	Enhance E-2	Johnson Wax	1986			1986
	263	Soap, Hand	Eurobath	Sani-Fresh International	1992	1992		1992
	264	Soap, Hand	Goin Home	Spartan Chemical co	1985			1985
	265	Soap, Hand Cleaner		Makoor Products	1984	1984		1984
	266	Soap, Laundry		Concord Chemical Co	1992	1992	1992	1992
	267	Soap, Liquid		Carroll Company	1992			1992
	268	Soap, Pumice	Fast Orange	Permatex Industrial	1992			1992
	269	Sodium Bicarbonate	Baking Soda	Chemical Commodities	1981	1981		1981
	270	Sodium Bicarbonate	Extinguisher	JT Baker Inc	1992	1992	1992	1992
	271	Sodium Bisulfide		Various Sources (GE)	1981			1981
	272	Sodium Carbonate	Soda Ash	Aldrich Chemical Co	1993	1993		1993
	273	Sodium Carbonate	Soda Ash	Various Sources (GE)	1978	1978		1978
	274	Sodium Hydroxide	DB	Diamond Shamrock	1986	1986		1986
	275	Sodium Hydroxide	Diaphragm	Occidental Chem Corp	1993	1993		1993
	276	Sodium Hydroxide	Rayon	Occidental Chem Corp	1990	1990		1990
	277	Sodium Hydroxide	Diaphragm	Occidental Chem Corp	1993	1993		1993
	278	Sodium Hydroxide (Liq)	Caustic Soda 50%	LCP Chem & Plastics	1984	1984		1984
	279	Sodium Hydroxide (Liq)	Caustic Soda 50%	Olin Industries	1989	1989		1989
	280	Sodium Hydroxide (Liq)	Caustic Soda	Various Sources (GE)	1977	1977		1977
	281	Sodium Hydroxide (Solid)	Caustic Soda	Various Sources (GE)	1977	1977		1977
	282	Sodium Hypochlorite	Bleach	James Austin Company	1990	1990		1990
	283	Sodium Hypochlorite	Bleach	Various Sources (GE)	1983	1983	1983	1983

nge		Chemical Name	Common Name	Manufacturer	EGG	Lab	Laund	Master
	284	Sodium Thiosulfate (5 Hydrate)		JT Baker Inc		1990		1990
New	285	Solvent Blend		Chem Spec &Dev	1990			1990
	286	Spray Paint	Black	LHB Industries	1993			1993
	287	Spray Paint	Gray	LHB Industries			1987	1987
	288	Stannous Chloride		Various Sources (GE)	1980			1980
	289	Starch, Soluble, ACS		Chemical Commodities		1980		1980
	290	Starch, Soluble, ACS		JT Baker Inc		1990		1990
	291	Stearic Acid	Emersol	Various Sources (GE)	1979			1979
	292	Stripper	No Rinse Step Off	Johnson Wax	1990			1990
	293	Stripper, Bravo		Johnson Wax	1987			1987
	294	Stripper, Out Strip		Franklin Maint Co	1992			1992
	295	Stripper, Rinse free		Spartan Chemical Co	1987			1987
	296	Sulfite Reagent A	Hydrochloric Acid	LaMotte Company	1992			1992
	297	Sulfite Reagent B	Salicylic Acid	LaMotte Company	1992			1992
	298	Sulfite Reagent C		LaMotte Company	1993			1993
	299	Sulfur		Shell	1988	1988		1988
	300	Sulfur		Various Sources (GE)	1979	1979		1979
	301	Sulfuric Acid		Allied Chemical	1977			1977
	302	Sulfuric Acid		Various Sources (GE)	1980	1980		1980
	303	Sulfuric Acid Solution N/50		Masters Chem Co	ND			ND
	304	Super Hybond	Plastic Refractory	AP Green Industries	1991			1991
	305	Super Lube (w/teflon)		Permatex Industrial	1991			1991
	306	Talc		Various Sources (GE)	1978		1978	1978
	307	Tapfree		Winfield Brooks Co	1993			1993
	308	Tenax-GC and TA 60/80	Mesh Size	Alltech Associates		1990		1990
	309	Thrust Starting Fluid		Radiator Specialty Co	1992			1992
	310	Titrant Solution	Hardness 3	Hach Chem Co	1987			1987
	311	Toner, Black		Ricoh Corporation	1990			1990
	312	Touch n Seal		Convenience Products	1993			1993
	313	Towerbrom 60m	Granules	Occidental Chem Corp	1993			1993
	314	Trisodium Phosphate Dod		Various Sources (GE)	1978			1978
	315	Tube Smoke	Stanic Chloride	Mine Safety Appliances	1992	1992		1992
	316	VX		Department of the Army	1992	1992	1992	1992
	317	Water Treatment, Boiler		Western Water Mgt	1985			1985
	318	Wax, Complete		Johnson Wax	1988			1988
	319	Wax, show place		Johnson Wax	1987			1987
	320	WD-40		WD-40 Company	1986		1986	1986
	321	Xylene		Fisher Scientific	1992			1992
	322	Xylene		Marathon Petroleum Co	1985			1985
	ERR							

FILED MAY 17, 1995

BEFORE THE MISSOURI
HAZARDOUS WASTE MANAGEMENT COMMISSION

IN THE MATTER OF:	)	
	)	
WILLIAM A. GIBBS, REBECCA I. GIBBS, WENDY PELTON, AND THE COALITION FOR THE ENVIRONMENT	)	
	)	
Petitioners,	)	
vs.	)	APPEAL No. HW-95-2A
	)	
MISSOURI DEPARTMENT OF NATURAL RESOURCES,	)	
	)	
Respondent.	)	

PETITION

Come Now Petitioners, by and through their attorneys, and pursuant to § 260.415 RSMo., request the Hazardous Waste Management Commission to enter its Order prohibiting the U.S. Army Engineering Center and Fort Leonard Wood to construct and operate a Chemical Decontamination Facility and Thermal Treatment Unit (hereafter the "CDTF") without a hazardous waste permit. In support thereof, Petitioners state as follows:

1. Petitioners William A. Gibbs and Rebecca I. Gibbs (hereinafter "the Gibbs") are residents of Newberg, Missouri and own real property near Fort Leonard Wood. The Gibbs and their minor children use for recreational purposes the streams and national forest areas adjacent to Fort Leonard Wood and live and recreate within the potential impact area of the proposed CDTF incinerator site. The Gibbs from time to time visit Fort Leonard Wood and are present on the premises. They will be adversely affected by the emissions resulting from the proposed incinerator.

2. Petitioner Wendy Pelton resides and owns property a

short distance from Fort Leonard Wood. From time to time she drives through the Fort and she frequently floats the Big Piney River a few miles from the Fort. She will be adversely affected by emissions from the proposed incinerator.

3. The Missouri Coalition for the Environment ("Coalition") is a corporation organized and existing under the not-for-profit corporation laws, qualified to do business in Missouri, with its principal office located in St. Louis County, Missouri. The Coalition exists for the purpose of protecting and preserving environmental values in Missouri, and has for years been actively concerned with protecting air quality throughout the state. The Coalition has thousands of members, many of whom seek recreation in floating the Big Piney River, which flows through Fort Leonard Wood, and the Gasconade River, which flows within approximately three miles of the fort, and also in hiking and camping in the Mark Twain National Forest, which surrounds the fort on three sides. The Coalition's interest in protecting and enhancing the quality of the ambient air throughout the state will be adversely affected if the permit is upheld. The Coalition members will be adversely affected by the emissions from the incinerator which is the subject of this appeal, if the permit is upheld. The Coalition files this appeal on its own behalf and on behalf of its members.

4. The Gibbs, Wendy Pelton, and the Coalition are persons "affected in fact" within the meaning of § 260.415 in that each Petitioner has a specific and legally cognizable interest in the subject matter of this administrative action, and the decision of

the Commission will have a direct and substantial impact on that interest.

5. On or about March 1, 1995, the Army submitted to MDNR for approval an Application For Authority to Construct a Thermal Treatment Unit to treat waste generated from a Chemical Decontamination Training Facility ("CDTF") at Fort Leonard Wood in Pulaski County, Missouri. The Army intends to conduct nerve agent training at the proposed facility. Army personnel will identify and decontaminate vehicles and equipment tainted with nerve agents. A copy of Fort Leonard Wood's original application is appended hereto as Exhibit "A".

6. The Army intends to manufacture and use at the CDTF the following nerve agents: GB, VX, and HD. All of these agents are highly toxic and, if mishandled, pose a threat to human health and the environment. Agent GB (Sarin) is a colorless liquid which, when vaporized, is readily absorbed through the skin. It is the same substance implicated in the recent tragedy of the Tokyo subway system, resulting in the death and injuries to hundreds of people. While Agent VX does not volatize as rapidly as agent GB, it is estimated to be 100 times more toxic. Exposure to agents VX and GB can result in death within 15 minutes after exposure to a lethal dose. Agent HD (mustard gas) is a known carcinogen and, when heated, releases toxic fumes. Exposure to lethal doses of HD can result in death within 4 to 6 hours.

7. The operations conducted at the CDTF will include identification and decontamination of live nerve agents. The

decontamination wastes and potentially contaminated materials include clothing, gas mask filters, laboratory wastes, medical and infectious wastes, air filters and washdown water. Debris from the training, laboratory and CDTF will be burned in the incinerator.

8. According to the Permit Application, emissions from the incineration process will include VOCs, carbon monoxide (CO), NOx, sulfur dioxide, particulate matter and toxic substances including Sarin. Through the proposed combustion of the on-site wastes, dioxins and furans will also be emitted. The incinerator will operate 8 hours per day, 250 days per year.

9. The Permit Application is defective in many material respects as it does not accurately and truthfully describe the conditions under which the CDTF will operate at Fort Leonard Wood. The Permit Application is defective and deviates from actual practice at Fort McClellan in that it fails to identify hazardous wastes which will be incinerated in the Thermal Treatment Unit.

Numerous other defects are contained in the Application, as will be developed during the hearing of this case.

10. On April 10, 1995, MDNR approved the Army's application and issued the permit to construct and subsequently operate the CDTF facility. A copy of the Permit to Construct is appended hereto as Exhibit "B".

11. On April 12, 1995, Mr. David A. Schorr, Director of MDNR, testified under oath before the Defense Base Closure and Realignment ("BRAC") Commission that the proposed CDTF

incinerator and related operations would not involve the use, storage or disposal of hazardous wastes and, therefore, a hazardous waste permit was not required. A copy of Mr. Schorr's testimony is appended hereto as Exhibit "C".

12. Mr. Schorr's sworn statements before the BRAC Commission constituted final agency decision within the meaning of § 260.415 RSMo.

13. Had the Fort Leonard Wood Permit Application been accurate, complete and truthful, as required by law, MDNR would have required a RCRA Part B permit for the incinerator.

14. In approving the permit application, MDNR imposed certain Special Conditions including, inter alia, that no hazardous waste be burned in the Thermal Treatment Unit and that emissions from the facility not exceed limits set forth in the approved Permit. Specifically, no detectable limits of GB (Sarin) or VX may be emitted or released from the facility and the Army is prohibited from incinerating gas mask filters containing chromium, a listed hazardous waste under 40 CFR Part 261. Missouri has adopted and incorporated by reference the federal RCRA regulations. See 10 CSR 25-3.260.

15. Some of the materials the Army proposes to incinerate, and which the permit allows the Army to incinerate, are hazardous wastes. Specifically, agent VX is a sulfide bearing material and is a D003 reactive hazardous waste within the meaning of 40 CFR § 261.23(a)(5). Agent VX is absorbed into carbon filters which are then incinerated in the Thermal Treatment Unit. The absorbed VX when exposed to changes in ambient temperatures will have the

opportunity to off gas VX nerve agent which would be sufficient to present a danger to human health. The incineration of these filters account for nearly half of the CDTF's total weight of solid wastes.

16. Upon information and belief, during the course of training Army personnel use nerve agent detectors which utilize pads containing silver nitrate which are then incinerated along which other wastes. Silver is a characteristic listed hazardous waste under 40 CFR Part 261. Laboratory analysis of pads used at Fort McClellan indicate that the material in question exhibits the characteristic of toxicity using the Toxicity Characteristic Leaching Procedure ("TCLP") (appended hereto as Exhibit "D").

17. In addition, upon information and belief, the Army uses in the CDTF laboratories non-halogenated solvents which are listed hazardous wastes under 40 CFR §261.33. These solvents are then incinerated in the Thermal Treatment Unit.

18. By burning Agent VX, silver, non-halogenated solvents in the CDTF incinerator, hazardous waste will escape into the environment which has the potential to cause serious acute injury to public health or the environment.

19. In addition, facilities which manage hazardous waste must comply with the procedures for public participation which include holding a public hearing prior to issuance of the permit. At such a hearing, any interested party may submit information or materials in opposition to the application. See 10 CSR 25-8.010

20. In issuing the Permit, MDNR has failed to properly categorize the installation as requiring a hazardous waste permit

and to hold a public hearing as required by law.

21. Each of the petitioners oppose MDNR's issuance of the Permit To Construct on grounds that they have private rights and/or property interests that will be damaged by the operations at the proposed incinerator site. The injuries that Petitioners presently suffer or may in the future incur as a result of the approval of the Permit and the subsequent construction and operation of the facility including diminished property value, diminished quality of life, detrimental effects upon health, detrimental effect upon quality of the environment and reduced marketability of property.

WHEREFORE, for all the foregoing reasons, Petitioners respectfully request the Commission to:

(a) Grant a full evidentiary hearing as required by law, at which time Petitioners may present evidence regarding their appeal.

(b) Enter its Order enjoining MDNR from issuing an operating permit to Fort Leonard Wood for the CDTF incinerator;

(c) Enter its Order enjoining Fort Leonard Wood from operating the CDTF facility without a hazardous waste permit;

(d) Declaring Petitioners to be prevailing parties in the action and award Petitioners costs and attorneys' fees; and

(e) For such other and further relief as the Commission deems just and proper.

GREEN, HENNINGS & HENRY

By: _____

LEWIS C. GREEN
314 North Broadway, Suite 1830
St. Louis Missouri 63102-2097
(314) 231-4181

Attorney for Petitioners

BEFORE THE MISSOURI
HAZARDOUS WASTE MANAGEMENT COMMISSION

WILLIAM A. GIBBS, REBECCA I. GIBBS, WENDY PELTON, AND THE COALITION FOR THE ENVIRONMENT, Petitioners,	)	
vs.	)	Appeal No. HW-95-2A
MISSOURI DEPARTMENT OF NATURAL RESOURCES, Respondent.	)	

MOTION TO DISMISS

COMES NOW respondent, by and through its attorneys of record, Jeremiah W. (Jay) Nixon, Attorney General, and Shelley A. Woods, Assistant Attorney General, and moves to dismiss the petition filed in the above-styled matter for the reason that this Commission lacks subject matter jurisdiction over the matter. This motion is further made for the reasons and arguments set forth in the Suggestions in Support of this Motion to Dismiss, which are attached hereto and, by this reference, incorporated herein.

WHEREFORE, respondent respectfully requests that this Court dismiss the petition filed in the above-styled matter.

Respectfully submitted,

JEREMIAH W. (JAY) NIXON
Attorney General

SHELLEY A. WOODS
Assistant Attorney General

MBE #33525
P.O. Box 176
Jefferson City, MO 65102-0176
Telephone (314) 526-2823
TELEFAX No. (314) 751-3442

CERTIFICATE OF SERVICE

I hereby certify that a true and correct copy of the foregoing was mailed, postage prepaid, by United States mail, this 1st day of June, 1995, to:

Lewis C. Green
Green, Hennings & Henry
314 N. Broadway, Suite 1830
St. Louis, Missouri 63102-2097

Lt.-Col. Uldric L. Fiore, Jr.
Staff Judge Advocate
U.S. Army Engineer Center
ATTN: ATZT-JA
Fort Leonard Wood, Missouri 65473

Shelley A. Woods

BEFORE THE MISSOURI
HAZARDOUS WASTE MANAGEMENT COMMISSION

WILLIAM A. GIBBS, REBECCA I. GIBBS, WENDY PELTON, AND THE COALITION FOR THE ENVIRONMENT, Petitioners,	)	
vs.	)	Appeal No. HW-95-2A
MISSOURI DEPARTMENT OF NATURAL RESOURCES, Respondent.	)	

SUGGESTIONS IN SUPPORT OF RESPONDENT'S MOTION TO DISMISS

A. SECTION 260.415, RSMO 1994, DOES NOT PROVIDE AUTHORITY FOR THIS COMMISSION TO HEAR AN APPEAL OF THIS MDNR "DECISION"

On or about May 12, 1995, petitioners filed before this Commission a petition requesting "the Hazardous Waste Management Commission to enter its Order Prohibiting the U.S. Army Engineering Center in Fort Leonard Wood to construct and operate a Chemical Decontamination Facility and Thermal Treatment Unit... without a Hazardous Waste Permit."

In their Petition, petitioners allege that the Missouri Department of Natural Resources (MDNR) has concluded that the chemical decontamination facility and thermal treatment unit (CDTF) does not involve the use, storage or disposal of hazardous wastes and, consequently does not require that a hazardous waste permit be issued prior to the operation of the CDTF. Petitioners further claim that that decision is a final agency decision within the meaning of § 260.415, RSMo 1994. Section 260.415.1, RSMo 1994,

provides as follows:

> All final orders and determinations of the commission or the department made pursuant to the provisions of sections 260.350 to 260.430 are subject to judicial review pursuant to the provisions of Chapter 536, RSMo. All final orders and determinations shall be deemed "administrative decisions" as that term is defined in Chapter 536, RSMo. No judicial review shall be available, however, unless all administrative remedies are exhausted.

Section 260.415.1, RSMo 1994, provides that final orders and determinations of this Commission and the Missouri Department of Natural Resources (MDNR) are subject to judicial review pursuant to the requirements set forth in Chapter 536, RSMo 1994. Section 260.415, RSMo 1994, does not provide that final determinations of the Department are subject to appeal before this Commission. Section 260.395.11, RSMO 1994, provides that aggrieved persons may appeal MDNR decisions whenever a permit is issued, renewed, denied, suspended or revoked. This Commission also hears decisions by the MDNR to list, delete or modify the listing of sites on the Registry of Abandoned or Uncontrolled Hazardous Waste Sites. Section 260.460, RSMo 1994. The Missouri Hazardous Waste Management Law, §§ 260.350, et seq., RSMo 1994, including § 260.415, RSMo 1994, does not authorize this Commission to hear any other appeals of MDNR decisions and specifically does not authorize this Commission to hear an appeal of a MDNR decision that a facility does not need a hazardous waste treatment, storage or disposal facility permit.

B. MDNR DECISION NOT A FINAL AGENCY DETERMINATION

In addition, the decision petitioners claim is a final agency decision is not a final, appealable decision. An agency decision is

final when "the agency arrives at a terminal, complete resolution of the case before it. An order lacks finality in this sense while it remains tentative, provisional, or contingent, subject to recall, revision or reconsideration by the issuing agency".[1]

Under this analysis, the decision by the MDNR that a permit is not required to operate the CDTF is not a final administrative decision which would render it subject to appeal before this Commission. The MDNR decision is contingent upon the accuracy of the information that was supplied to it by the U.S. Army Engineers Center in Ft. Leonard Wood (Army). The decision is also contingent upon the procedures, methodologies and waste streams, among other things, remaining the same as currently envisioned by the Army. Furthermore, the determination whether a particular facility needs a hazardous waste treatment, storage or disposal permit is, by statute, the responsibility of the facility owner and/or operator, not the MDNR.[2] The MDNR's responsibility is to review and approve or deny permit applications submitted to it.[3]

Finally, the MDNR may change its mind as to whether the CDTF, even based on the information currently available to the MDNR, requires a hazardous waste treatment, storage or disposal permit. This "decision" such as it is, confers no rights upon the Army. In any later administrative or judicial action citing the Army for the

---

[1] *National Treasury Employees Union v. Federal Labor Relations Auth.*, 712 F.2d 669, 671 (D.C. Cir. 1983), cited with approval in *Dore & Assoc. Contr. v. Dept. of Labor*, 810 S.W.2d 72, 76 (Mo.App. 1990).

[2] Please see §§ 260.395.7, RSMo 1994.

[3] Section 260.395, RSMo 1994.

failure to have a treatment, storage or disposal permit for the CDTF unit, the Army could not utilize any previously made statements by the MDNR such as those cited in paragraphs 11 and 12 of the Petition filed herein to estop the government from bringing its action. [4]

Should the MDNR change its position on the issue of whether the CDTF unit requires a hazardous waste treatment, storage or disposal permit, the Hazardous Waste Management Law, § 260.350, *et seq.*, RSMo 1994, does not contain or prescribe any review procedures which would be required to reverse or modify that position. The MDNR would not need to promulgate any new rule, and the law does not contain a requirement for a public hearing or that a contested case hearing be initiated prior to making any such modification or reversing its position.

The MDNR position that the CDTF unit does not require a hazardous waste treatment, storage or disposal permit does not determine any obligations. The position does not require anyone, including the Army, to do anything.

Finally, legal consequences will not flow from this agency position complained of. The MDNR position that a permit is not required does not really decide anything because the MDNR is not strictly vested with the power to decide that issue. Again, the responsibility lies with the facility owner and/or operator to

---

[4] *Board of Educ. v. City of St. Louis*, 879 S.W.2d 530, 532 (Mo.banc 1994); *Shell Oil Co. v. Director of Revenue*, 732 S.W.2d 178, 182 (Mo.banc 1987); *United States v. Mendoza*, 464 U.S. 154, 159, 104 S.Ct. 568, 572, 78 L.Ed. 2d 379 (1984).

determine whether the facility requires a permit.[5] As the United States Supreme Court explained:

> The relevant considerations in determining finality are whether the process of administrative decision-making has reached a stage where a judicial review will not disrupt the orderly process of adjudication and whether rights or obligations have been determined or legal consequences will flow from the agency action."[6]

Under any of the above outlined tests, the position of the MDNR complained of by petitioners is not a final agency action as that term is utilized in Chapter 536, RSMo 1994.

C. PROSECUTORIAL DISCRETION OF THE MDNR

If the Army does need a hazardous waste treatment, storage or disposal permit, the decision whether to bring suit against the Army is one which is vested within the MDNR in the exercise of its prosecutorial discretion.[7]

In *State ex rel. Schultz v. Harper*,[8] the Western District Court of Appeals carefully researched the issue of prosecutorial discretion and found the following declaration of the standard of prosecutorial conduct:

> The duty of a prosecuting officer necessarily requires that he investigate, i.e. inquire into the matter and accuracy, that in each case he examine the available evidence, the law and the facts, and the applicability of each to the other; that his duties further require that he intelligently weigh the chances of successful

---

[5]Section 260.395, RSMo 1994.

[6]*Port of Boston Marine Terminal Association v. Rederiaktiebolager Transatlantic*, 400 U.S. 62, 71, 91 S.Ct. 203, 209, 27 L.Ed.2d 203 (1970), (citations omitted.)

[7]Section 260.425, RSMo 1994.

[8]573 S.W.2d 427, 430 (Mo.App. W.D. 1978)

termination of the prosecution, having always in mind the relative importance to the county he serves of the different prosecutions which he might initiate. Such duties of necessity involve a good faith exercise of the sound discretion of the prosecuting attorney. 'Discretion' in that sense means power or right conferred by law upon the prosecuting officer of acting officially in such circumstances, and upon each separate case, according to the dictates of his own judgment and conscience *uncontrolled by the judgment and conscience of any other person*. Such discretion must be exercised in accordance with established principles of law, fairly, wisely, and with skill and reason. It includes the right to choose a course of action or non-action, chosen not willfully or in bad faith, but chosen with regard to what is right under the circumstances. That discretion may, in good faith (but not arbitrarily), be exercised with respect to when, how and against whom to initiate criminal proceedings. *Watts v. Gerking*, 11 Or. 641, 228 p. 135, 34 A.L.R. 1489. Such discretion so vested by law in the prosecuting officer is both official and personal. *Engle v. Chipman*, 51 Mich. 524, 16 N.W. 886.***" (Emphasis in original).[9]

Numerous Missouri cases recognize that a prosecutor has broad discretion. In *State v. Petary*,[10] the Missouri Supreme Court stated that "[a] prosecutor has broad discretion in deciding whom to prosecute and what the charges will be; this decision is not subject to judicial review" citing *State v. Massey*.[11]

In the event that the MDNR is incorrect in its position that the CDTF unit does not require a hazardous waste treatment, storage or disposal facility permit, petitioners have other remedies which are available to them. *Mertzlufft v. Bunker Resources Recycling*;[12]

---

[9] *State ex Inf. McKittrick, Atty. Gen. v. Wallach*, 353 Mo. 312, 182 S.W.2d 313, 318-319 [4-10] (Banc 1994).

[10] 781 S.W.2d 534 (Mo.banc 1989), vacated on other grounds, 494 U.S. 1075, on remand 790 S.W.2d 243, cert. denied 498 U.S. 973 (1990).

[11] 763 S.W.2d 181, 183 (Mo.App. 1988).

[12] 760 S.W.2d 592, 601 (Mo.App.S.D. 1988)

Dore & Assoc. Contr. v. Dept. of Labor.[13]

D. LACK OF SUBJECT MATTER JURISDICTION

In the final analysis, this Commission lacks subject matter jurisdiction to provide the relief demanded by petitioners. As explained above, the position of the MDNR that the CDTF does not require a permit is not a final agency decision. Furthermore, § 260.415, RSMo 1994, does not authorize this Commission to hear appeals, but rather provides that final decisions by the MDNR and this Commission will be subject to judicial review.

This Commission has no jurisdiction to issue an order to the MDNR enjoining the issuance of a permit to an air contaminant source. Section 260.370.3(3), RSMo 1994, does authorize this Commission to hold hearings to accomplish the purposes set forth in the state's Hazardous Waste Management Law, § 260.350 to 260.430, RSMo 1994. Section 260.370, RSMo 1994, does not authorize this Commission to issue an order enjoining the issuance of a permit pursuant to the provisions of Chapter 643, RSMo 1994, the state's Air Conservation Law. If at some future point in time someone does determine that the CDTF should have a permit for the treatment, storage or disposal of hazardous wastes, that decision would not eliminate the need for the CDTF unit to also have a permit pursuant to the provisions of the Air Conservation Law, Chapter 643, RSMo 1994.[14]

Finally, the provisions of the Hazardous Waste Management Law

---

[13]810 S.W.2d 72, 76 (Mo.App. 1990)

[14]Please see § 643.075, RSMo 1994

which established the powers and duties of this Commission, §§ 260.370 and 260.372, RSMo 1994, do not authorize this Commission to issue an order to the MDNR requiring it to issue a hazardous waste management permit.

CONCLUSION

WHEREFORE, for all of the foregoing reasons, this Commission should dismiss the Petition filed in the above-styled matter for lack of subject matter jurisdiction.

Respectfully submitted,

JEREMIAH W. (JAY) NIXON
Attorney General

SHIRLEY A. WOODS
Assistant Attorney General

MBE #33525
P.O. Box 176
Jefferson City, MO 65102-0176
Telephone (314) 526-2823
TELEFAX No. (314) 751-3442

CERTIFICATE OF SERVICE

I hereby certify that a true and correct copy of the foregoing was mailed, postage prepaid, by United States mail, this 1st day of June, 1995, to:

Lewis C. Green
Green, Hennings & Henry
314 N. Broadway, Suite 1830
St. Louis, Missouri 63102-2097

Lt. Col. Uldric L. Fiore, Jr.
Staff Judge Advocate
U. S. Army Engineer Center
ATTN: ATZT-JA
Fort Leonard Wood, MO 65473

Shelley A. Woods

HAZARDOUS WASTE MANAGEMENT

CROSS REFERENCES

Transportation of hazardous material by motor vehicle, equipment required, RSMo 307.177
Transporting hazardous waste, intrastate age requirement, violations, RSMo 307.400

260.350. Short title.—Sections 260.350 to 260.430 shall be known and may be cited as the "Missouri Hazardous Waste Management Law".
(L. 1977 H.B. 318 § 1)

260.355. Exempted wastes.—Exempted from the provisions of sections 260.350 to 260.480 are:

(1) Radioactive wastes regulated under section 2011, et seq., of title 42 of United States Code;

(2) Emissions to the air subject to regulation of and which are regulated by the Missouri air conservation commission pursuant to chapter 643, RSMo;

(3) Discharges to the waters of this state pursuant to a permit issued by the Missouri clean water commission pursuant to chapter 204, RSMo;

(4) Fluids injected or returned into subsurface formations in connection with oil or gas operations regulated by the Missouri oil and gas council pursuant to chapter 259, RSMo;

(5) Mining wastes used in reclamation of mined lands pursuant to a permit issued by the Missouri land reclamation commission pursuant to chapter 444, RSMo.
(L. 1977 H.B. 318 § 2, A.L. 1985 S.B. 110)
Effective 6-27-85

260.360. Definitions.—When used in sections 260.350 to 260.430 and in standards, rules and regulations adopted pursuant to sections 260.350 to 260.430, the following words and phrases mean:

(1) **"Cleanup"**, all actions necessary to contain, collect, control, treat, disburse, remove or dispose of a hazardous waste;

(2) **"Commission"**, the hazardous waste management commission of the state of Missouri created by sections 260.350 to 260.430;

(3) **"Conference, conciliation and persuasion"**, a process of verbal or written communications consisting of meetings, reports, correspondence or telephone conferences between authorized representatives of the department and the alleged violator. The process shall, at a minimum, consist of one offer to meet with the alleged violator tendered by the department. During any such meeting, the department and the alleged violator shall negotiate in good faith to eliminate the alleged violation and shall attempt to agree upon a plan to achieve compliance;

(4) **"Department"**, the Missouri department of natural resources;

(5) **"Detonation"**, an explosion in which chemical transformation passes through the material faster than the speed of sound, which is 0.33 kilometers per second at sea level;

(6) **"Director"**, the director of the Missouri department of natural resources;

(7) **"Disposal"**, the discharge, deposit, injection, dumping, spilling, leaking, or placing of any waste into or on any land or water so that such waste, or any constituent thereof, may enter the environment or be emitted into the air or be discharged into the waters, including groundwaters;

(8) **"Final disposition"**, the location, time and method by which hazardous waste loses its identity or enters the environment, including, but not limited to, disposal, resource recovery and treatment;

(9) **"Generation"**, the act or process of producing waste;

(10) **"Generator"**, any person who produces waste;

(11) **"Hazardous waste"**, any waste or combination of wastes, as determined by the commission by rules and regulations, which, because of its quantity, concentration, or physical, chemical or infectious characteristics, may cause or significantly contribute to an increase in mortality or an increase in serious irreversible, or incapacitating reversible, illness, or pose a present or potential threat to the health of humans or the environment;

(12) **"Hazardous waste facility"**, any property that is intended or used for hazardous waste management including, but not limited to, storage, treatment and disposal sites;

(13) **"Hazardous waste management"**, the systematic recognition and control of hazardous waste from generation to final disposition including, but not limited to, its identification, containerization, labeling, storage, collection, transfer or transportation, treatment, resource recovery or disposal;

(14) **"Infectious waste"**, waste in quantities and characteristics as determined by the department by rule and regulation, including the following wastes known or suspected to be infectious: isolation wastes, cultures and stocks of etiologic agents, contaminated blood and

blood products, other contaminated surgical wastes, wastes from autopsy, contaminated laboratory wastes, sharps, dialysis unit wastes, discarded biologicals and antineoplastic chemotherapeutic materials; provided, however, that infectious waste does not mean waste treated to department specifications;

(15) **"Manifest"**, a department form accompanying hazardous waste from point of generation, through transport, to final disposition;

(16) **"Minor violation"**, a violation which possesses a small potential to harm the environment or human health or cause pollution, was not knowingly committed, and is not defined by the United States Environmental Protection Agency as other than minor;

(17) **"Person"**, an individual, partnership, copartnership, firm, company, public or private corporation, association, joint stock company, trust, estate, political subdivision or any agency, board, department or bureau of the state or federal government or any other legal entity whatever which is recognized by law as the subject of rights and duties;

(18) **"Resource recovery"**, the reclamation of energy or materials from waste, its reuse or its transformation into new products which are not wastes;

(19) **"Storage"**, the containment or holding of waste at a designated location in such manner or for such a period of time, as determined in regulations adopted hereunder, so as not to constitute disposal of such waste;

(20) **"Treatment"**, the processing of waste to remove or reduce its harmful properties or to contribute to more efficient or less costly management or to enhance its potential for resource recovery including, but not limited to, existing or future procedures for biodegradation, concentration, reduction in volume, detoxification, fixation, incineration or neutralization;

(21) **"Waste"**, any material for which no use or sale is intended and which will be discarded or any material which has been or is being discarded. "Waste" shall also include certain residual materials, to be specified by the rules and regulations, which may be sold for purposes of energy or materials reclamation, reuse or transformation into new products which are not wastes;

(22) **"Waste explosives"**, any waste which has the potential to detonate, or any bulk military propellant which cannot be safely disposed of through other modes of treatment.

(L. 1977 H.B. 318 § 3, A.L. 1980 2d Ex. Sess. H.B. 5, et al., A.L. 1985 S.B. 110, A.L. 1986 H.B. 875 & 1649, A.L. 1987 H.B. 375, A.L. 1993 S.B. 80, et al.)

260.365. Hazardous waste management commission created—composition, qualifications—compensation—terms—meetings, notice required, quorum.—1. There is hereby created a hazardous waste management agency to be known as the "Hazardous Waste Management Commission of the State of Missouri", whose domicile for the purpose of sections 260.350 to 260.430 shall be deemed to be that of the department of natural resources of the state of Missouri. The commission shall consist of seven members appointed by the governor with the advice and consent of the senate. No more than four members shall belong to the same political party. All members shall be representative of the general interest of the public and shall have an interest in and knowledge of waste management and the effects of improper waste management on health and the environment and shall serve in a manner consistent with the purposes of sections 260.350 to 260.430. Three of the members, but no more than three, one for each interest, shall be knowledgeable of and may be employed in agriculture, the waste generating industry and the waste management industry. Except for the industry members, no member shall receive, or have received during the previous two years, a significant portion of income directly or indirectly from any license or permit holder or applicant for license or permit under any waste management act. At the first meeting of the commission and annually thereafter, the members shall select from among themselves a chairman and a vice chairman. Prior to any vote on any variance, appeal or order, they shall adopt a voting rule to exclude from such vote any member with a conflict of interest with respect to the matter at issue.

2. The members' terms of office shall be four years and until their successors are selected and qualified, except that, of those first appointed, three shall have a term of three years, two shall have a term of two years and two shall have a term of one year as designated by the governor at the time of appointment. There is no limitation on the number of terms any appointed member may serve. If a vacancy occurs the governor may appoint a member for the remaining portion of the unexpired term created by the vacancy. The governor may remove any appointed member for cause. The members of the commission shall be reimbursed for actual and necessary expenses incurred in the performance of their

2d Ex. Sess. H.B. 5, et
936 H.B. 875 & 1649,
L. 1993 S.B. 80, et al.)

ous waste management —composition, qualifica- —terms—meetings, notice

. There is hereby created anagement agency to be dous Waste Management State of Missouri", whose ose of sections 260.350 to med to be that of the de- resources of the state of mission shall consist of nted by the governor with nt of the senate. No more shall belong to the same embers shall be represen- interest of the public and st in and knowledge of nd the effects of improper n health and the environ- in a manner consistent of sections 260.350 to e members, but no more each interest, shall be l may be employed in ag- generating industry and ent industry. Except for rs, no member shall re- d g the previous two o of income directly y license or permit holder nse or permit under any ct. At the first meeting of annually thereafter, the from among themselves a chairman. Prior to any e, appeal or order, they rule to exclude from such ith a conflict of interest natter at issue.

terms of office shall be their successors are se- except that, of those first ll have a term of three a term of two years and m of one year as desig- r at the time of appoint- itation on the number of member may serve. If a governor may appoint a maining portion of the ed by the vacancy. The e any appointed member bers of the commission for actual and necessary the performance of their duties, and shall receive fifty dollars per day for each day spent in the performance of their official duties while in attendance at regular commission meetings.

3. The commission shall hold at least four regular meetings each year and such additional meetings as the chairman deems desirable at a place and time to be fixed by the chairman. Special meetings may be called by three members of the commission upon delivery of written notice to each member of the commission. Reasonable written notice of all meetings shall be given by the department to all members of the commission. Four members of the commission shall constitute a quorum. All powers and duties conferred upon members of the commission shall be exercised personally by the members and not by alternates or representatives. All actions of the commission shall be taken at meetings open to the public. Any member absent from four consecutive regular commission meetings for any cause whatsoever shall be deemed to have resigned and the vacancy shall be filled immediately in accordance with this section.

(L. 1977 H.B. 318 § 4, A.L. 1980 2d Ex. Sess. H.B. 5, et al.)

Effective 10-31-80

260.370. Duties and powers of commission —rules and regulations to be adopted, procedures—inspection fees, use of, refund, when—variances granted, when—review, disapproval, suspension of administrative rules, procedures. —1. Where proven technology is available and the economic impact is reasonable, pursuant to rules and regulations promulgated by the commission, the hazardous waste management commission shall encourage that every effort is made to effectively treat, recycle, detoxify, incinerate or otherwise treat hazardous waste to be disposed of in the state of Missouri in order that such wastes are not disposed of in a manner which is hazardous to the public health and the environment. Where proven technology is available with respect to a specific hazardous waste and the economic impact is reasonable, pursuant to rules and regulations promulgated by the commission, the hazardous waste management commission shall direct that disposal of the specific hazardous wastes using land filling as the primary method is prohibited.

2. The hazardous waste management commission shall, by rules and regulations, categorize hazardous waste by taking into account toxicity, persistence and degradability in nature, potential for accumulation in tissue, and other related factors such as flammability, corrosiveness and other hazardous characteristics. The commission shall by rules and regulations further establish within each category the wastes which may or may not be disposed of through alternative hazardous waste management technologies including, but not limited to, treatment facilities, incinerators, landfills, landfarms, storage facilities, surface impoundments, recycling, reuse and reduction. The commission shall specify, by rule and regulation, the frequency of inspection for each method of hazardous waste management and for the different waste categories at hazardous waste management sites. The inspection may be daily when the hazardous waste management commission deems it necessary. The hazardous waste management commission shall specify, by rule, fees to be paid to the department by owners or operators of hazardous waste facilities who have obtained, or are required to obtain, a hazardous waste facility permit and who accept, on a commercial basis for remuneration, hazardous waste from offsite sources, but not including wastes generated by the same person at other sites located in Missouri or within a metropolitan statistical area located partially in Missouri and owned or operated by the same person and transferred to the hazardous waste facility, for treatment, storage or disposal, for inspections conducted by the department to determine compliance with sections 260.350 to 260.430 and the regulations promulgated thereunder. Funds derived from these inspection fees shall be used for the purpose of funding the inspection of hazardous waste facilities, as specified in subsection 3 of section 260.391. Such fees shall not exceed twelve thousand dollars per year per facility and the commission shall establish a graduated fee scale based on the volume of hazardous waste accepted with reduced fees for facilities accepting smaller volumes of hazardous waste. The department shall furnish, upon request, to the person, firm or corporation operating the hazardous waste facility a complete, full and detailed accounting of the cost of the department's inspections of the facility for the twelve-month period immediately preceding the request within forty-five days after receipt of the request. Failure to provide the accounting within forty-five days shall require the department to refund the inspection fee paid during the twelve-month-time period.

3. In addition to any other powers vested in it by law, the commission shall have the following powers:

(1) From time to time adopt, amend or repeal, after due notice and public hearing, standards, rules and regulations to implement, enforce and carry out the provisions of sections 260.350 to 260.430 and any required of this state by any federal hazardous waste management act and as the commission may deem necessary to provide for the safe management of hazardous wastes to protect the health of humans and the environment. In implementing this subsection, the commission shall consider the variations within this state in climate, geology, population density, quantities and types of hazardous wastes generated, availability of hazardous waste facilities and such other factors as may be relevant to the safe management of hazardous wastes. Within two years after September 28, 1977, the commission shall adopt rules and regulations including the following:

(a) Rules and regulations establishing criteria and a listing for the determination of whether any waste or combination of wastes is hazardous for the purposes of sections 260.350 to 260.430, taking into account toxicity, persistence and degradability in nature, potential for accumulation in tissue, and other related factors such as flammability, corrosiveness and other hazardous characteristics;

(b) Rules and regulations for the storage, treatment and disposal of hazardous wastes;

(c) Rules and regulations for the transportation, containerization and labeling of hazardous wastes, which shall be consistent with those issued by the Missouri public service commission;

(d) Rules and regulations establishing standards for the issuance, modification, suspension, revocation or denial of such licenses and permits as are consistent with the purposes of sections 260.350 to 260.430;

(e) Rules and regulations establishing standards and procedures for the safe operation and maintenance of hazardous waste facilities in order to protect the health of humans and other living organisms;

(f) Rules and regulations listing those wastes or combinations of wastes, for which criteria have been established under paragraph (a) of this subdivision and which are not compatible and which may not be stored or disposed of together;

(g) Rules and regulations establishing procedures and requirements for the reporting of the generation, storage, transportation, treatment or disposal of hazardous wastes;

(2) Adopt and publish, after notice as required by the provisions of chapter 536, RSMo, pertaining to administrative rulemaking, and public hearing, a state hazardous waste management plan to provide for the safe and effective management of hazardous wastes within this state. This plan shall be adopted within two years after September 28, 1977, and revised at least once every five years thereafter;

(3) Hold hearings, issue notices of hearings and subpoenas requiring the attendance of witnesses and the production of evidence, administer oaths and take testimony as the commission deems necessary to accomplish the purposes of sections 260.350 to 260.430 or as required by any federal hazardous waste management act. Unless otherwise specified in sections 260.350 to 260.430, any of these powers may be exercised on behalf of the commission by any members thereof or a hearing officer designated by it;

(4) Grant individual variances in accordance with the provisions of sections 260.350 to 260.430;

(5) Make such orders as are necessary to implement, enforce and effectuate the powers, duties and purposes of sections 260.350 to 260.430.

4. No rule or portion of a rule promulgated under the authority of sections 260.350 to 260.480 and 260.565 to 260.575 and sections 260.820 to 260.826 shall become effective until it has been approved by the joint committee on administrative rules in accordance with the procedures provided in this section, and the delegation of the legislative authority to enact law by the adoption of such rules is dependent upon the power of the joint committee on administrative rules to review and suspend rules pending ratification by the senate and the house of representatives as provided in this section.

5. Upon filing any proposed rule with the secretary of state, the filing agency shall concurrently submit such proposed rule to the committee, which may hold hearings upon any proposed rule or portion thereof at any time.

6. A final order of rulemaking shall not be filed with the secretary of state until thirty days after such final order of rulemaking has been received by the committee. The committee may hold one or more hearings upon such final order of rulemaking during the thirty-day period. If the committee does not disapprove such order of rulemaking within the thirty-day period, the filing agency may file such order of

rulemaking with the secretary of state and the order of rulemaking shall be deemed approved.

7. The committee may, by majority vote of the members, suspend the order of rulemaking or portion thereof by action taken prior to the filing of the final order of rulemaking only for one or more of the following grounds:

(1) An absence of statutory authority for the proposed rule;

(2) An emergency relating to public health, safety or welfare;

(3) The proposed rule is in conflict with state law;.

(4) A substantial change in circumstance since enactment of the law upon which the proposed rule is based.

8. If the committee disapproves any rule or portion thereof, the filing agency shall not file such disapproved portion of any rule with the secretary of state and the secretary of state shall not publish in the Missouri Register any final order of rulemaking containing the disapproved portion.

9. If the committee disapproves any rule or portion thereof, the committee shall report its findings to the senate and the house of representatives. No rule or portion thereof disapproved by the committee shall take effect so long as the senate and the house of representatives ratify the act of the joint committee by resolution adopted in each house within thirty legislative days after such rule or portion thereof has been disapproved by the joint committee.

10. Upon adoption of a rule as provided herein, any such rule or portion thereof may be suspended or revoked by the general assembly either by bill or, pursuant to section 8, article IV of the constitution, by concurrent resolution upon recommendation of the joint committee on administrative rules. The committee shall be authorized to hold hearings and make recommendations pursuant to the provisions of section 536.037, RSMo. The secretary of state shall publish in the Missouri Register, as soon as practicable, notice of the suspension or revocation.

(L. 1977 H.B. 318 § 5, A.L. 1980 2d Ex. Sess. H.B. 5, et al., A.L. 1988 S.B. 535, A.L. 1993 S.B. 52 and S.B. 80, et al.)

260.371. Severability clause, exceptions.—The provisions of this act* are severable, except as otherwise provided in sections 260.225 and 260.370. If any provision of this act* is found by a court of competent jurisdiction to be invalid or unconstitutional, the remaining provisions of this act shall remain in full force and effect.

(L. 1988 S.B. 535 § 3)

Effective 5-3-88

*"This act" (S.B. 535, 1988) contains numerous sections. *Consult Disposition of Sections Table* for definitive listing.

260.372. Powers and duties of commission.—1. The Missouri hazardous waste management commission within the Missouri department of natural resources is hereby given the authority to aid in the promotion of hazardous waste recycling, reuse, or reduction by entering into contracts, subject to appropriations, for the development and implementation of projects dealing with said uses of hazardous wastes or the purchase and development of machinery, equipment, appliances, devices, and supplies solely required to develop and operate hazardous waste recycling, reuse, and reduction projects.

2. The hazardous waste management commission within the Missouri department of natural resources shall promulgate rules and regulations to establish or participate in one or more regional waste exchange clearing houses where generators of wastes may list those wastes that have market value or other use.

(L. 1980 2d Ex. Sess. H.B. 5, et al.)

Effective 10-31-80

260.375. Duties of department—licenses required—permits required.—The department shall:

(1) Exercise general supervision of the administration and enforcement of sections 260.350 to 260.430 and all standards, rules and regulations, orders or license and permit terms and conditions adopted or issued hereunder;

(2) Develop and implement programs to achieve goals and objectives set by the state hazardous waste management plan;

(3) Retain, employ, provide for and compensate, within appropriations available therefor, such consultants, assistants, deputies, clerks and other employees on a full- or part-time basis as may be necessary to carry out the provisions of sections 260.350 to 260.430 and prescribe the times at which they shall be appointed and their powers and duties;

(4) Budget and receive duly appropriated moneys for expenditures to carry out the provisions of sections 260.350 to 260.430;

(5) Accept, receive and administer grants or other funds or gifts from public and private agencies including the federal government for the purpose of carrying out any of the functions of sections 260.350 to 260.430. Funds re-

ceived by the department pursuant to this section shall be deposited with the state treasurer and held and disbursed by him in accordance with the appropriations of the general assembly;

(6) Provide the commission all necessary support the commission may require to carry out its powers and duties including, but not limited to: keeping of records of all meetings; notification, at the direction of the chairman of the commission, of the members of the commission of the time, place and purpose of each meeting by written notice; drafting, for consideration of the commission, a state hazardous waste management plan and standards, rules and regulations necessary to carry out the purposes of sections 260.350 to 260.430; and investigation of petitions for variances and complaints made to the commission and submission of recommendations thereto; ∫

(7) Collect and maintain, and require any person to collect and maintain, such records and information of hazardous waste generation, storage, transportation, resource recovery, treatment and disposal in this state, including quantities and types imported and exported across the borders of this state and install, calibrate and maintain and require any person to install, calibrate and maintain such monitoring equipment or methods, and make reports consistent with the purposes of sections 260.350 to 260.430;

(8) Secure necessary scientific, technical, administrative and operational services, including laboratory facilities, by contract or otherwise;

(9) Develop facts and make inspections and investigations, including gathering of samples and performing of tests and analyses, consistent with the purposes of sections 260.350 to 260.430, and in connection therewith, to enter or authorize any representative of the department to enter, at all reasonable times, in or upon any private or public property for any purpose required by sections 260.350 to 260.430 or any federal hazardous waste management act. Such entry may be for the purpose, without limitation, of developing or implementing standards, rules and regulations, orders or license or permit terms and conditions, of inspecting or investigating any records required to be kept by sections 260.350 to 260.430 or any license or permit issued hereunder or any hazardous waste management practice which the department or commission believes violates sections 260.350 to 260.430, or any standard, rule or regulation, order or license or permit term or condition adopted or issued hereunder, or otherwise endangers the health of humans or the environment, or the site of any suspected violation of sections 260.350 to 260.430, or any standard, rule or regulation, order, or license or permit term or condition adopted or issued hereunder. The results of any such investigation shall be reduced to writing and shall be furnished to the owner or operator of the property. No person shall refuse entry or access requested for the purpose of inspection under this provision to an authorized representative of the department or commission who presents appropriate credentials, nor obstruct or hamper the representative in carrying out the inspection. A suitably restricted search warrant, upon a showing of probable cause in writing and upon oath, shall be issued by any judge or associate circuit judge having jurisdiction to any such representative for the purpose of enabling the representative to make such inspection;

(10) Require each hazardous waste generator located within this state and each hazardous waste generator located outside of this state before utilizing any hazardous waste facility in this state to file a registration report containing such information as the commission by regulation may specify relating to types and quantities of hazardous waste generated and methods of hazardous waste management, and to meet all other requirements placed upon hazardous waste generators by sections 260.350 to 260.430 and the standards, rules and regulations and orders adopted or issued hereunder;

(11) Require each hazardous waste transporter operating in this state to obtain a license and to meet all applicable requirements of sections 260.350 to 260.430 and the standards, rules and regulations, orders and license terms and conditions adopted or issued hereunder;

(12) Require each hazardous waste facility owner and operator to obtain a permit for each such facility and to meet all applicable requirements of sections 260.350 to 260.430 and the standards, rules and regulations, orders and permit terms and conditions adopted or issued hereunder;

(13) Issue, continue in effect, revoke, modify or deny in accordance with the standards, rules and regulations, hazardous waste transporter licenses and hazardous waste facility permits;

(14) Encourage voluntary cooperation by persons or affected groups to achieve the purposes of sections 260.350 to 260.430;

(15) Enter such order or determination as may be necessary to effectuate the provisions of sections 260.350 to 260.430 and the standards, rules and regulations, and license and permit terms and conditions adopted or issued hereunder;

(16) Enter such order or cause to be instituted in a court of competent jurisdiction such legal proceedings as may be necessary in a situation of imminent hazard, as prescribed in section 260.420;

(17) Settle or compromise as it may deem advantageous to the state, with the approval of the commission, any suit undertaken by the commission for recovery of any penalty or for compelling compliance with any provision of sections 260.350 to 260.430 or any standard, rule or regulation, order, or license or permit term or condition adopted or issued hereunder;

(18) Advise, consult and cooperate with other agencies of the state, the federal government, other states and interstate agencies and with affected groups, political subdivisions and industries in furtherance of the purposes of sections 260.350 to 260.430 and, upon request, consult with persons subject to sections 260.350 to 260.430 on the proper measures necessary to comply with the requirements of sections 260.350 to 260.430 and rules and regulations adopted hereunder;

(19) Encourage, coordinate, participate in or conduct studies, investigations, research and demonstrations relating to hazardous waste management as it may deem advisable and necessary for the discharge of its duties under sections 260.350 to 260.430;

(20) Represent the state of Missouri in all matters pertaining to interstate hazardous waste management including the negotiation of interstate compacts or agreements;

(21) Arrange for the establishment, staffing, operation and maintenance of collection stations, within appropriations or other funding available therefor, for householders, farmers and other exempted persons as provided under section 260.380;

(22) Collect and disseminate information relating to hazardous waste management;

(23) Conduct education and training programs on hazardous waste problems and management;

(24) Encourage and facilitate public participation in the development, revision and implementation of the state hazardous waste program;

(25) Encourage waste reduction, resource recovery, exchange and energy conservation in hazardous waste management;

(26) Exercise all powers necessary to carry out the provisions of sections 260.350 to 260.430, assure that the state of Missouri complies with any federal hazardous waste management act and retains maximum control thereunder, and receives all desired federal grants, aid and other benefits;

(27) Present to the public, at a public meeting, and to the governor and the members of the general assembly, an annual report on the status of the state hazardous waste program;

(28) Develop comprehensive plans and programs to aid in the establishment of hazardous waste disposal sites as needed within the various geographical areas of the state within a reasonable period of time;

(29) Control, abate or clean up any hazardous waste placed into or on the land in a manner which endangers or is reasonably likely to endanger the health of humans or the environment and, in aid thereof, may cause to be filed by the attorney general or a prosecuting attorney, a suit seeking mandatory or prohibitory injunctive relief or such other relief as may be appropriate. The department shall also take such action as is necessary to recover all costs associated with the cleanup of any hazardous waste from the person responsible for the waste. All money received shall be deposited in the hazardous waste fund.

(L. 1977 H.B. 318 § 6, A.L. 1980 2d Ex. Sess. H.B. 5, et al.)

Effective 10-31-80

260.377. Inspection by department.—Subject to appropriations, the department of natural resources shall conduct inspections of any hazardous waste facility. The frequency of such inspections shall be specified by the commission through rule and regulation based on the classification category of the hazardous waste, as specified in section 260.370. Such inspections shall determine compliance by licensee or permittee with the requirements of sections 260.350 to 260.430 and regulations promulgated thereunder as well as compliance with any special conditions in the permit issued to the permittee.

(L. 1980 2d Ex. Sess. H.B. 5, et al.)

Effective 10-31-80

260.379. Permit not to be issued, when—notice to department of certain crimes, penalty for failure to notify—reinstatement, when.—1. The department of natural resources shall not issue a permit to any person for the operation of any facility or issue any license to any person under the authority of sections 260.350 to 260.434, if such person has had three or more convictions, which convictions occurred after July 9, 1990, and within any five-year period within the courts of the United States or of any state except Missouri or had two or more convictions within a Missouri court after July 9, 1990, and within any five-year period, for any crimes or criminal acts, an element of which involves restraint of trade, price-fixing, intimidation of the customers of any person or for engaging in any other acts which may have the effect of restraining or limiting competition concerning activities regulated under this chapter or similar laws of other states or the federal government; except that convictions for violations by entities purchased or acquired by an applicant or permittee which occurred prior to the purchase or acquisition shall not be included. For the purpose of this section, the term "person" shall include any business organization or entity, successor corporation, partnership or subsidiary of any business organization or entity, and the owners and officers thereof, or the entity submitting the application.

2. The director shall suspend, revoke or not renew the permit or license of any person issued pursuant to sections 260.350 to 260.434, if such person has had two or more convictions in any court of the United States or of any state other than Missouri or two or more convictions within a Missouri court for crimes as specified herein if such conviction occurred after July 9, 1990, and within any five-year period.

3. Any person applying for a permit or license under sections 260.350 to 260.434 shall notify the director of any conviction for any act which would have the effect of limiting competition. Any person with a permit or license shall notify the department of any such conviction within thirty days of the conviction or plea. Failure to notify the director is a class D felony and subject to a fine of one thousand dollars per day for each day unreported.

4. Provided that after a period of five years after a permit has been revoked under the provisions of this section, the person, firm or corporation affected may apply for rehabilitation and reinstatement to the director of the department. The department shall promulgate the necessary rules and regulations for rehabilitation and reinstatement. The time period for same shall not exceed five years.

(L. 1990 S.B. 530)
Effective 7-9-90

260.380. Duties of hazardous waste generators—fees to be collected, disposition—exemptions.—1. After six months from the effective date of the standards, rules and regulations adopted by the commission pursuant to section 260.370, hazardous waste generators shall:

(1) Promptly file and maintain with the department, on registration forms it provides for this purpose, information on hazardous waste generation and management as specified by rules and regulations, and the hazardous waste generator may provide such information in a single registration form for all hazardous waste generation sites owned or operated by the hazardous waste generator or may register each hazardous waste generation site separately for the purposes of subdivision (10) of this subsection;

(2) Containerize and label all hazardous wastes as specified by standards, rules and regulations;

(3) Segregate all hazardous wastes from all nonhazardous wastes and from noncompatible wastes, materials and other potential hazards as specified by standards, rules and regulations;

(4) Provide safe storage and handling, including spill protection, as specified by standards, rules and regulations, for all hazardous wastes from the time of their generation to the time of their removal from the site of generation;

(5) Unless provided otherwise in the rules and regulations, utilize only a hazardous waste transporter holding a license under sections 260.350 to 260.430 for the removal of all hazardous wastes from the premises where they were generated;

(6) Unless provided otherwise in the rules and regulations, provide a separate manifest to the transporter for each load of hazardous waste transported from the premises where it was generated. The generator shall specify the destination of such load on the manifest. The manner in which the manifest shall be completed, signed and filed with the department shall be in accordance with rules and regulations;

(7) Utilize for treatment, resource recovery, disposal or storage of all hazardous wastes,

ns for rehabil-
time period for
years.

ardous waste gener-
d, disposition—ex-
nths from the effec-
dards, rules and
commission pursu-
ardous waste gener-

aintain with the de-
orms it provides for
on hazardous waste
ent as specified by
the hazardous waste
ch information in a
for all hazardous
ned or operated by
ator or may register
neration site sepa-
subdivision (10) of

label all hazardous
dards, rules and reg-

ious wastes from all
fr noncompatible
ential hazards
, rules and regula-

e and handling, in-
s specified by stan-
ns, for all hazardous
eir generation to the
n the site of genera-

herwise in the rules
ly a hazardous waste
ense under sections
e removal of all haz-
premises where they

herwise in the rules
separate manifest to
load of hazardous
ne premises where it
ator shall specify the
on the manifest. The
nifest shall be com-
with the department
ith rules and regula-

nt, resource recovery,
ll hazardous wastes,

only a hazardous waste facility authorized to operate under sections 260.350 to 260.430 or the federal Resource Conservation and Recovery Act, or a state hazardous waste management program authorized under the federal Resource Conservation and Recovery Act, or any facility exempted from the permit required under section 260.395;

(8) Collect and maintain such records, perform such monitoring or analyses, and submit such reports on any hazardous waste generated, its transportation and final disposition, as specified in sections 260.350 to 260.430 and rules and regulations adopted hereunder;

(9) Make available to the department upon request samples of waste and all records relating to hazardous waste generation and management for inspection and copying and allow the department to make unhampered inspections at any reasonable time of hazardous waste generation and management facilities located on the generator's property and hazardous waste generation and management practices carried out on the generator's property;

(10) Pay annually, on or before January first of each year, effective January 1, 1982, a fee to the state of Missouri to be placed in the hazardous waste fund to be used solely for the administrative costs of the program. The fee shall not exceed one dollar per ton of hazardous waste registered with the department as specified in subdivision (1) of this subsection for the twelve-month period ending June thirtieth of the previous year. The amount of the fee shall be established annually by the commission by rule or regulation. However, the fee shall not exceed ten thousand dollars per generator per year and no fee shall be imposed upon any generator who registers less than ten tons of hazardous waste annually with the department;

(a) All moneys payable under the provisions of this subdivision shall be promptly transmitted to the department of revenue, which shall deposit the same in the state treasury to the credit of the hazardous waste fund;

(b) The hazardous waste management commission shall establish and submit to the department of revenue procedures relating to the collection of the fees authorized by this subdivision. Such procedures shall include, but not be limited to, necessary records identifying the quantities of hazardous waste registered, the form and submission of reports to accompany the payment of fees, the time and manner of payment of fees, which shall not be more often than quarterly.

2. Exempted from the requirements of this section are individual householders and farmers who generate only small quantities of hazardous waste and any person the commission determines generates only small quantities of hazardous waste on an infrequent basis, except that:

(1) Householders, farmers and exempted persons shall manage all hazardous wastes they may generate in a manner so as not to adversely affect the health of humans, or pose a threat to the environment, or create a public nuisance; and

(2) The department may determine that a specific quantity of a specific hazardous waste requires special management. Upon such determination and after public notice by press release or advertisement thereof, including instructions for handling and delivery, generators exempted under this subsection shall deliver, but without a manifest or the requirement to use a licensed hazardous waste transporter, such waste to:

(a) Any storage, treatment or disposal site authorized to operate under sections 260.350 to 260.430 or the federal Resource Conservation and Recovery Act, or a state hazardous waste management program authorized under the federal Resource Conservation and Recovery Act which the department designates for this purpose; or

(b) A collection station or vehicle which the department may arrange for and designate for this purpose.

(L. 1977 H.B. 318 § 7, A.L. 1980 2d Ex. Sess. H.B. 5, et al., A.L. 1985 S.B. 110)

Effective 6-27-85

260.385. Activities not allowed and requirements to be met by hazardous waste transporters.—After six months from the effective date of the standards, rules and regulations adopted by the commission pursuant to section 260.370, hazardous waste transporters shall:

(1) Not transport any hazardous waste in this state without first obtaining a hazardous waste transporter license from the department as specified in section 260.395;

(2) Use and operate equipment which has been approved by the department and follow procedures, when transporting hazardous wastes, which meet all applicable state and federal regulations and standards for the transportation of hazardous materials and all

applicable standards, rules and regulations adopted under sections 260.350 to 260.430 and all terms and conditions of their license;

(3) Unless otherwise provided in sections 260.350 to 260.430 or the rules and regulations adopted hereunder, accept only shipments of hazardous waste that are accompanied by a manifest, provided by the generator, that has been completed and signed by the generator in accordance with the rules and regulations adopted under sections 260.350 to 260.430;

(4) Complete, sign and file the transporter portion of the manifest as specified in rules and regulations adopted under sections 260.350 to 260.430;

(5) Deliver hazardous waste and the accompanying manifest only to the destination specified by the generator on the manifest, which destination must be a hazardous waste facility holding a permit under sections 260.350 to 260.430 or the federal Resource Conservation and Recovery Act, or a state hazardous waste management program authorized under the federal Resource Conservation and Recovery Act, or a resource recovery or other facility exempted from the permit requirement, and in accordance with provisions which apply under section 260.395 and rules and regulations adopted hereunder;

(6) Collect and maintain such records and submit such reports as specified in sections 260.350 to 260.430 and in rules and regulations and terms and conditions of their license adopted or issued hereunder;

(7) Make available to the department upon request made during transportation, samples of wastes transported and all records relating to hazardous waste transportation, for inspection and copying, and allow the department to make unhampered inspections at any reasonable time of all facilities and equipment.

(L. 1977 H.B. 318 § 8, A.L. 1985 S.B. 110)

Effective 6-27-85

260.390. Duties of hazardous waste facility owners and operators—tax to be collected, disposition—duties upon termination of use of facility—inspection fees, commercial facilities, requirements.—1. After six months from the effective date of the standards, rules and regulations adopted by the commission pursuant to section 260.370, hazardous waste facility owners or operators shall:

(1) Not construct, substantially alter or operate, including all postclosure activities and operations specified in the rules and regulations, a hazardous waste facility without first obtaining a hazardous waste facility permit from the department as specified in section 260.395;

(2) Operate the facility according to the standards, rules and regulations adopted under sections 260.350 to 260.430 and all terms and conditions of the permit;

(3) Unless otherwise provided in sections 260.350 to 260.430 or the rules and regulations adopted hereunder, accept delivery of hazardous waste only if delivery is by a hazardous waste transporter holding a license under sections 260.350 to 260.430, the shipment is accompanied by a manifest properly completed by both the generator and transporter and their facility is the destination indicated by the generator on the manifest. Exempted from the requirements of this subsection are deliveries, when directed by the department, from householders, farmers and other persons exempted from generator responsibilities under provisions of section 260.380 and deliveries made in emergency situations as specified in sections 260.350 to 260.550 or the rules and regulations adopted hereunder. For such exempted deliveries they shall make a record of any waste accepted, its type, quantity, origin and the identity of the person making the delivery and promptly report this information to the department;

(4) Complete, sign and file the facility operator portion of the manifest as specified in rules and regulations adopted under sections 260.350 to 260.430;

(5) Whenever final disposition is to be achieved at another hazardous waste or exempted facility, initiate a new manifest and comply with the other responsibilities of generators specified in sections 260.350 to 260.430 and in rules and regulations and terms and conditions of their permit adopted or issued hereunder;

(6) Collect and maintain such records, submit such reports and perform such monitoring as specified in sections 260.350 to 260.430 and in rules and regulations and terms and conditions of their permit adopted or issued hereunder;

(7) Make available to the department, upon request, samples of wastes received and all records, for inspection and copying, relating to hazardous waste management and allow the department to make unhampered inspections at any reasonable time of all facilities and equipment.

lity without first
facility permit
s specified in section

lity according to the
ulations adopted under
430 and all terms and
;

provided in sections
the rules and regula-
r, accept delivery of
delivery is by a haz-
er holding a license
to 260.430, the ship-
y a manifest properly
generator and trans-
is the destination indi-
on the manifest. Ex-
equirements of this
, when directed by the
sholders, farmers and
d from generator re-
rovisions of section
nade in emergency sit-
sections 260.350 to
id regulations adopted
empted deliveries they
any waste accepted, its
nd the identity of the
verv and promptly re-
partment;
d the facility oper-
anifest as specified in
dopted under sections

disposition is to be
izardous waste or ex-
a new manifest and
esponsibilities of gener-
ns 260.350 to 260.430
lations and terms and
mit adopted or issued

tain such records, sub-
rform such monitoring
260.350 to 260.430 and
and terms and condi-
opted or issued hereun-

the department, upon
astes received and all
nd copying, relating to
gement and allow the
nhampered inspections
e of all facilities and

2. All hazardous waste landfills shall collect, on behalf of the state from each hazardous waste generator or transporter, a tax equal to two percent of the gross charges and fees charged such generator for disposal at the landfill site to be placed in the hazardous waste fund to be used solely for the administration of sections 260.350 to 260.430. The tax shall be accounted for separately on the statement of charges and fees made to the hazardous waste generator and shall be collected at the time of the collection of such charges and fees. All moneys payable under the provisions of this subsection shall be promptly transmitted to the department of revenue, which shall daily deposit the same in the state treasury to the credit of the hazardous waste fund. The hazardous waste management commission shall establish and submit to the department of revenue procedures relating to the collection of the taxes authorized by this subsection. Such procedures shall include, but not be limited to, necessary records identifying the quantities of hazardous waste received, the form and submission of reports to accompany the payment of taxes, the time and manner of payment of taxes, which shall not be more often than quarterly.

3. The owner or operator of a hazardous waste disposal facility must close that facility upon termination of its operation, and shall after closure of the facility provide for protection during a postclosure care period, in accordance with the requirements of the commission, including the funds necessary for same. Protection shall include, but not be limited to, monitoring and maintenance subject to the rules and regulations of the hazardous waste management commission. The owner or operator shall maintain a hazardous waste facility permit for the postclosure care period. The operator and the state may enter into an agreement consistent with the rules and regulations of the hazardous waste management commission where the state may accept deed to, and monitor and maintain the site.

4. All owners or operators of hazardous waste facilities who have obtained, or are required to obtain, a hazardous waste facility permit from the department and who accept, on a commercial basis for remuneration, hazardous waste from off-site sources, but not including wastes generated by the same person at other sites located in Missouri or within a metropolitan statistical area located partially in Missouri and owned or operated by the same person and transferred to the hazardous waste facility, for treatment, storage or disposal, shall pay fees for inspections conducted by the department to determine compliance with sections 260.350 to 260.430 and the rules promulgated thereunder. Hazardous waste facility inspection fees shall be specified by the hazardous waste management commission by rule. The inspection fees shall be used by the department as specified in subsection 3 of section 260.391.

(L. 1977 H.B. 318 § 9, A.L. 1980 2d Ex. Sess. H.B. 5, et al., A.L. 1983 H.B. 528, A.L. 1985 S.B. 110, A.L. 1993 S.B. 80, et al.)

260.391. Hazardous waste fund created—payments—not to lapse—subaccount, funds, purpose.—1. There is hereby created in the state treasury a fund to be known as the "Hazardous Waste Fund". All funds received from hazardous waste permit and license fees, generator fees, taxes collected by contract hazardous waste landfill operators, general revenue, federal funds, gifts, bequests, donations, or any other moneys so designated shall be paid to the director of revenue and deposited in the state treasury to the credit of the hazardous waste fund. The hazardous waste fund, subject to appropriation by the general assembly, shall be used by the department as provided by appropriations and consistent with rules and regulations established by the hazardous waste management commission for the purpose of carrying out the provisions of sections 260.350 to 260.430, relating to hazardous waste, for cleanup of hazardous waste emergencies and abandoned or illegal hazardous waste sites and for payments to other state agencies for such services consistent with sections 260.350 to 260.430, upon proper warrant issued by the commissioner of administration.

2. The unexpended balance in the hazardous waste fund at the end of each fiscal year shall not be transferred to the general revenue fund of the state treasurer, except as directed by the general assembly by appropriation, and shall be invested to generate income to the fund. The provisions of section 33.080, RSMo, relating to the transfer of funds to the general revenue fund of the state by the state treasurer shall not apply to the hazardous waste fund.

3. There is hereby created within the hazardous waste fund a subaccount known as the "Hazardous Waste Facility Inspection Subaccount". All funds received from hazardous waste facility inspection fees shall be paid to the director of revenue and deposited in the state treasury to the credit of the hazardous waste facility inspection subaccount. Moneys from such subaccount shall be used by the de-

partment for conducting inspections at facilities that are permitted or are required to be permitted as hazardous waste facilities by the department.

(L. 1980 2d Ex. Sess. H.B. 5, et al., A.L. 1993 S.B. 80, et al.)

260.393. Technology for treatment of hazardous waste, generators to use best available, exceptions.—1. This section shall not apply to the storage or treatment of hazardous waste by a generator on-site or to the transportation of hazardous waste out of state for treatment, storage or disposal.

2. Generators shall use, to the maximum extent feasible, the best demonstrated available technology for source reduction, recycling, treatment, stabilization, solidification or destruction, including, but not limited to, biodegradation, detoxification, incineration and neutralization before placing waste in a hazardous waste disposal facility. Such hazardous waste may be placed in a hazardous waste disposal facility only after the generator evaluates appropriate technologies and employs those capable of reducing, recycling, treating, stabilizing, solidifying or destroying the waste. In assessing the best demonstrated available technology proposed by a generator, the department shall give consideration to the relative economic feasibility of the technology, including potential future costs of cleanup and environmental damage. Such technology shall render the hazardous waste sufficiently low in toxicity, reactivity and corrosivity as to present the least possible risk to human health and safety and to the environment in the event of a release from a hazardous waste disposal facility before placing hazardous waste in a disposal facility.

(L. 1988 S.B. 535)

260.394. Disposal of untreated hazardous waste, prohibited, exceptions—alternative to landfilling, best demonstrated available technology.—1. Nothing in this section shall apply to the storage or treatment of hazardous waste by a generator on-site or to the disposal on-site of smelter slag waste from the processing of materials into reclaimed metals if the smelter was in operation prior to August 13, 1988, nor preclude the transportation of hazardous waste out of state for treatment, storage or disposal. After August 13, 1988, no person shall dispose of untreated hazardous waste in a hazardous waste disposal facility permitted in the state of Missouri.

2. Before using a hazardous waste disposal facility permitted under sections 260.350 to 260.432, generators of hazardous waste must prove that they have investigated and reviewed alternatives to landfilling to an extent acceptable to the hazardous waste management commission. The generator shall use, to the maximum extent feasible, the best demonstrated available technology for source reduction, recycling, treatment, stabilization, solidification or destruction, including, but not limited to, biodegradation, detoxification, incineration and neutralization, as determined by the commission. In determining the best demonstrated available technology, the commission shall give consideration to the relative economic feasibility of the technology, including potential future costs of cleanup and environmental damage. Such technology shall render the hazardous waste sufficiently low in toxicity, reactivity and corrosivity as to present the least possible risk to human health and safety and to the environment in the event of a release from a hazardous waste disposal facility.

3. The commission shall determine that the best demonstrated available technology is used at hazardous waste disposal facilities in the state of Missouri in accordance with the provisions of sections 260.350 to 260.432, and the federal Resource Conservation and Recovery Act (P.L. 94-580), as amended.

4. Any hazardous waste diluted below the listed concentration threshold shall remain a listed hazardous waste unless the dilution occurs as a normal part of the manufacturing process.

5. The provisions of this section shall not apply to abandoned or uncontrolled sites as listed under section 260.440, or sites listed in the national priority list pursuant to the federal Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (P.L. 96-510), as amended, unless otherwise determined by the department or required by the commission by rule.

(L. 1988 S.B. 485 § 260.393, A.L. 1992 S.B. 480)

260.395. Transportation of hazardous waste, how permitted—fees, how determined—notice prior to issuance of permit—permit not required of whom—permit maintained for post-closure care period—leachate collection system required.—1. After six months from the effective date of the standards, rules and regulations adopted by the commission pursuant to section 260.370, it shall be unlawful for any person to transport any hazardous waste in this state without first obtaining a hazardous

waste transporter license. Any person transporting hazardous waste in this state shall file an application for a license under this subsection which shall:

(1) Be submitted on a form provided for this purpose by the department and shall furnish the department with such equipment identification and data as may be necessary to demonstrate to the satisfaction of the department that equipment engaged in such transportation of hazardous waste, and other equipment as designated in rules and regulations hereunder, is adequate to provide protection of the health of humans and the environment and to comply with the provisions of any federal hazardous waste management act and sections 260.350 to 260.430 and the standards, rules and regulations adopted hereunder. If approved by the department, this demonstration of protection may be satisfied by providing certification that the equipment so identified meets and will be operated in accordance with the rules and regulations of the Missouri public service commission and the federal Department of Transportation for the transportation of the types of hazardous materials for which it will be used;

(2) Include, as specified by rules and regulations, demonstration of financial responsibility, including, but not limited to, guarantees, liability insurance, posting of bond or any combination thereof which shall be related to the number of units, types and sizes of equipment to be used in the transport of hazardous waste by the applicant;

(3) Include, as specified in rules and regulations, a fee payable to the state of Missouri which shall be an amount to be determined by the number of vehicles and the gross weight of each vehicle to be covered by the license but shall not exceed one hundred dollars per vehicle to be covered by the license.

2. If the department determines the application conforms to the provisions of any federal hazardous waste management act and sections 260.350 to 260.430 and the standards, rules and regulations adopted hereunder, it shall issue the hazardous waste transporter license with such terms and conditions as it deems necessary to protect the health of humans and the environment. The department shall act within ninety days after receipt of the application. If the department denies the license, it shall issue a report to the applicant stating the reason for denial of the license.

3. A license may be suspended or revoked whenever the department determines that the equipment is or has been operated in violation of any provision of sections 260.350 to 260.430 or any standard, rule or regulation, order, or license term or condition adopted or issued hereunder, poses a threat to the health of humans or the environment, or is creating a public nuisance.

4. Whenever a license is issued, renewed, denied, suspended or revoked by the department, any aggrieved person, by petition filed with the department within thirty days of the decision, may appeal such decision and shall be entitled to a hearing as provided in section 260.400.

5. A license shall be issued for a period of one year and shall be renewed upon proper application by the holder and a determination by the department that the applicant is in compliance with all provisions of sections 260.350 to 260.430 and all standards, rules and regulations, orders and license terms and conditions adopted or issued hereunder.

6. A license is not required for the transport of any hazardous waste on the premises where it is generated or onto contiguous property owned by the generator thereof, or for those persons exempted in section 260.380. Nothing in this subsection shall be interpreted to preclude the department from inspecting unlicensed hazardous waste transporting equipment and to require that it be adequate to provide protection for the health of humans and the environment.

7. After six months from the effective date of the standards, rules and regulations adopted by the commission pursuant to section 260.370, it shall be unlawful for any person to construct, substantially alter or operate, including postclosure activities and operations specified in the rules and regulations, a hazardous waste facility without first obtaining a hazardous waste facility permit for such construction, alteration or operation from the department. Such person must submit to the department at least ninety days prior to submitting a permit application a letter of intent to construct, substantially alter or operate any hazardous waste disposal facility. The person must file an application within one hundred eighty days of the filing of a letter of intent unless granted an extension by the commission. The department shall publish such letter of intent as specified in section 493.050, RSMo, within ten days of receipt of such letter. The letter shall be published once each week for four weeks in the county where the hazardous waste disposal facility is proposed. Once such letter is submitted, all condi-

tions for the permit application evaluation purposes in existence as of the date of submission shall be deemed frozen, in that no subsequent action by any person to change such conditions in an attempt to thwart a fair and impartial decision on the application for a permit shall be allowed as grounds for denial of the permit. Any person before constructing, substantially altering or operating a hazardous waste facility in this state shall file an application for a permit which shall:

(1) Be submitted on a form provided for this purpose by the department and shall furnish the department with plans, specifications and such other data as may be necessary to demonstrate to the satisfaction of the department that such facility does or will provide adequate protection of the health of humans and the environment and does or will comply with the provisions of any federal hazardous waste management act and sections 260.350 to 260.430 and the standards, rules and regulations adopted hereunder;

(2) Include plans, designs, engineering reports and relevant data for construction, alteration or operation of a hazardous waste facility, to be submitted to the department by a registered professional engineer licensed by this state;

(3) Include, as specified by rules and regulations, demonstration of financial responsibility, including, but not limited to, guarantees, liability insurance, posting of bond or any combination thereof, which shall be related to type and size of facility;

(4) Include such environmental and geologic information, assessments and studies as required by the rules and regulations of the commission;

(5) Submit with the application for a hazardous waste disposal or treatment facility a profile of the environmental and economic characteristics of the area as required by the commission, including the extent of air pollution and groundwater contamination; and a profile of the health characteristics of the area which identifies all serious illness, the rate of which exceeds the state average for such illness, which might be attributable to environmental contamination;

(6) Include a fee payable to the state of Missouri which shall not exceed one thousand dollars, which shall cover the first year of the permit, if issued, but which is not refundable. If the permit is issued for more than one year, a fee equal in amount to the first year's fee shall be paid to the state of Missouri prior to issuance of the permit for each year the permit is to be in effect beyond the first year;

(7) The department shall supervise any field work undertaken to collect geologic and engineering data for submission with the application. The state geologist and departmental engineers shall review the geologic and engineering plans, respectively, and attest to their accuracy and adequacy. The applicant shall pay all reasonable costs, as determined by the commission, incurred by the department under this subsection.

8. (1) Prior to issuing or renewing a hazardous waste facility permit, the department shall issue public notice by press release or advertisement and shall notify all record owners of adjoining property by mail directed to the last known address, and the village, town or city, if any, and the county in which the hazardous waste facility is located; and, upon request, shall hold a public hearing after public notice as required in this subsection at a location convenient to the area affected by the issuance of the permit.

(2) Prior to issuing, reviewing every five years as required in subsection 12 of this section, or renewing a hazardous waste disposal facility permit the department shall issue public notice by press release and advertisement and shall notify all record owners of property, within one mile of the outer boundaries of the site, by mail directed to the last known address; and shall hold a public hearing after public notice as required in this subsection at a location convenient to the area affected by the issuance of the permit.

9. If the department determines that the application conforms to the provisions of any federal hazardous waste management act and sections 260.350 to 260.430 and the standards, rules and regulations adopted hereunder, it shall issue the hazardous waste facility permit, with such terms and conditions and require such testing and construction supervision as it deems necessary to protect the health of humans or the environment. The department shall act within one hundred and eighty days after receipt of the application. If the department denies the permit, it shall issue a report to the applicant stating the reason for denial of a permit.

10. A permit may be suspended or revoked whenever the department determines that the hazardous waste facility is, or has been, operated in violation of any provision of sections 260.350 to 260.430 or any standard, rule or regulation, order or permit term or condition

ch year the permit
the first year;

shall supervise any field
ollect geologic and engi-
ission with the applica-
ist and departmental en-
w the geologic and
spectively, and attest to
dequacy. The applicant
ble costs, as determined
incurred by the depart-
ection.

ng or renewing a hazard-
mit, the department shall
y press release or adver-
otify all record owners of
mail directed to the last
he village, town or city, if
in which the hazardous
ated; and, upon request,
earing after public notice
subsection at a location
a affected by the issuance

ing, reviewing every five
subsection 12 of this sec-
hazardous waste disposal
epartment shall issue pub-
release and advertisement
owners of property,
r boundaries of the
the last known ad-
ld a public hearing after
uired in this subsection at
it to the area affected by
permit.

ent determines that the ap-
the provisions of any fed-
ste management act and
260.430 and the standards,
ns adopted hereunder, it
rdous waste facility permit,
nd conditions and require
nstruction supervision as it
o protect the health of
ironment. The department
hundred and eighty days
application. If the depart-
rmit, it shall issue a report
ating the reason for denial

y be suspended or revoked
rtment determines that the
cility is, or has been, oper-
f any provision of sections
0 or any standard, rule or
r permit term or condition

adopted or issued hereunder, poses a threat to the health of humans or the environment or is creating a public nuisance.

11. Whenever a permit is issued, renewed, denied, suspended or revoked by the department, any aggrieved person, by petition filed with the department within thirty days of the decision, may appeal such decision and shall be entitled to a hearing as provided in section 260.400.

12. A permit shall be issued for a fixed term, which shall not exceed ten years in the case of any land disposal facility, storage facility, incinerator, or other treatment facility. Each permit for a land disposal facility shall be reviewed five years after the date of its issuance or reissuance and shall be modified as necessary to assure that the facility continues to comply with the currently applicable requirements of federal and state law. Nothing in this subsection shall preclude the department from reviewing and modifying a permit at any time during its term. Review of any application for a permit renewal shall consider improvements in the state of control and measurement technology as well as changes in applicable regulations. Each permit issued under this section shall contain such terms and conditions as the department determines necessary to protect human health and the environment, and upon proper application by the holder and a determination by the department that the applicant is in compliance with all provisions of sections 260.350 to 260.430 and all standards, rules and regulations, orders and permit terms and conditions adopted or issued hereunder.

13. A hazardous waste facility permit is not required for:

(1) On-site storage of hazardous wastes where such storage is exempted by the commission by rule or regulation; however, such storage must conform to the provisions of any federal hazardous waste management act and sections 260.350 to 260.430 and the applicable standards, rules and regulations adopted hereunder and any other applicable hazardous materials storage and spill prevention requirements provided by law;

(2) A publicly owned treatment works which has an operating permit under section 644.051, RSMo, and is in compliance with that permit;

(3) A resource recovery facility which the department certifies uses hazardous waste as a supplement to, or substitute for, nonwaste material, and that the sole purpose of the facility is manufacture of a product rather than treatment or disposal of hazardous wastes;

(4) That portion of a facility engaged in hazardous waste resource recovery, when the facility is engaged in both resource recovery and hazardous waste treatment or disposal, provided the owner or operator can demonstrate to the department's satisfaction and the department finds that such portion is not intended and is not used for hazardous waste treatment or disposal.

14. Facilities exempted under subsection 13 of this section must comply with the provisions of subdivisions (3) to (7) of section 260.390 and such other requirements, to be specified by rules and regulations, as are necessary to comply with any federal hazardous waste management act or regulations hereunder. Generators who use such an exempted facility shall keep records of hazardous wastes transported, except by legal flow through sewer lines, to the facility and submit such records to the department in accordance with the provisions of section 260.380 and the standards, rules and regulations adopted hereunder.

15. The owner or operator of any hazardous waste facility in existence on September 28, 1977, who has achieved federal interim status under 42 U.S.C. 6925(e), and who has submitted to the department Part A of the federal facility permit application, may continue to receive and manage hazardous wastes in the manner as specified in the Part A application, and in accordance with federal interim status requirements, until completion of the administrative disposition of a permit application submitted pursuant to sections 260.350 to 260.430. The department may at any time require submission of, or the owner or operator may at any time voluntarily submit, a complete application for a permit pursuant to sections 260.350 to 260.430 and commission regulations. The authority to operate under this subsection shall cease one hundred eighty days after the department has notified an owner or operator that an application for permit pursuant to sections 260.350 to 260.430 must be submitted, unless within such time the owner or operator submits a completed application therefor. Upon submission of a complete application, the authority to operate under this subsection shall continue for such reasonable time as is required to complete the administrative disposition of the permit application. If a facility loses its federal interim status, or the Environmental Protection Agency requires the owner or operator to submit Part B of the federal application, the department shall notify

the owner or operator that an application for a permit must be submitted pursuant to this subsection. In addition to compliance with the federal interim status requirements, the commission shall have the authority to adopt regulations requiring persons operating under the authority of this subsection to meet additional state interim status requirements.

16. A license or permit shall not be issued to any person who is determined by the department to habitually engage in or to have habitually engaged in hazardous waste management practices which pose a threat to the health of humans or the environment or who is determined by the department to habitually violate or to have habitually violated the requirements of the Missouri solid or hazardous waste laws, the solid or hazardous waste laws of other states or federal laws pertaining to hazardous waste. Nor shall a license or permit be issued to any person who has been adjudged in contempt of any court order enforcing the provisions of the Missouri solid or hazardous waste laws, the solid or hazardous waste laws of other states or federal laws pertaining to hazardous waste or who has offered, in person or through an agent, any inducement, including any discussion of potential employment opportunities, to any employee of the department when such person has an application for a permit pending or a permit under review. For the purposes of this subsection, the term "person" shall include any officer or management employee of the applicant, or any officer or management employee of any corporation or business which owns an interest in the applicant, or any officer or management employee of any business which is owned either wholly or in part by any person, corporation, or business which owns an interest in the applicant.

17. No person, otherwise qualified under sections 260.350 to 260.430 for a license to transport hazardous wastes or for a permit to construct, substantially alter or operate a hazardous waste facility, shall be denied such license or permit on the basis of a lack of need for such transport service or such facility because of the existence of other services or facilities capable of meeting that need; except that permits for hazardous waste facilities may be denied on determination made by the department that the financial resources of the persons applying are such that the continued operation of the sites in accordance with sections 260.350 to 260.430 cannot be reasonably assured or on determination made by the department that the probable volume of business is insufficient to ensure and maintain the solvency of then existing permitted hazardous waste facilities.

18. All hazardous waste landfills constructed after October 31, 1980, shall have a leachate collection system. The rules and regulations of the commission shall treat and protect all aquifers to the same level of protection. The provisions of this subsection shall not apply to the disposal of tailings and slag resulting from mining, milling and primary smelting operations.

(L. 1977 H.B. 318 § 10, A.L. 1980 2d Ex. Sess. H.B. 3, et al., A.L. 1983 H.B. 528, A.L. 1985 S.B. 110, A.L. 1988 S.B. 535)

260.396. PCB, definition—facilities, regulation of—list of PCB facilities—compliance with requirements, time limitation.—1. For the purposes of this section, **"PCB"** or **"polychlorinated biphenyls"** shall mean any chemical substance that is limited to the biphenyl molecule which has been chlorinated to varying degrees or any combination of substances which contain such substances at concentrations of fifty parts per million or above; and **"PCB facility"** shall mean any facility, including brokerage, storage, treatment and disposal facilities, which accepts "PCBs and PCB contaminated materials on a commercial basis for remuneration.

2. All commercial PCB facilities located in the state shall be permitted as hazardous waste management facilities in accordance with the provisions of section 260.350 to 260.430, or permitted under the provisions of the federal Toxic Substances Control Act, 15 U.S.C. 2601, et. seq., whichever are more stringent. Such facilities shall require the consignor to prepare a hazardous waste manifest which shall accompany shipments of PCBs and PCB contaminated materials from the point of origin to the final destination.

3. The department of natural resources shall compile and maintain a list of all commercial PCB facilities in the state.

4. All commercial PCB facilities in operation on August 13, 1986, will have one hundred twenty days from August 13, 1986, to meet the requirements of this section. A PCB facility shall be considered in compliance with the provisions of this section if a letter of intent has been filed with the department to construct, alter or operate a commercial PCB facility and the PCB facility otherwise complies with the provisions of subsection 7 of section 260.395, and until such time as the depart-

ment may grant or deny a permit for the facility.

(L. 1986 H.B. 875 & 1649 § 2)

260.400. Procedure for conducting public hearings.—1. At public hearings on variances or appeals of decisions hereunder, all hazardous waste facilities and hazardous waste generators who are involved in such hearings shall have an appropriate person present. All testimony taken before the commission shall be under oath and recorded stenographically. The transcript so recorded, upon payment of the usual charge therefor, shall be made available to any member of the public, the respondent or party to a hearing on a complaint, any party to a hearing on a petition for variance or any party appealing any order or determination of the department or commission.

2. In any hearing, any member of the commission or the hearing officer shall issue in the name of the commission notice of hearing and subpoenas and shall be authorized to require that testimony before such hearing be given under oath. Subpoenas shall be issued and enforced as provided in section 536.077, RSMo. The rules of discovery that apply in any civil case shall apply to hearings held by the commission.

3. All hearings to adopt standards, rules and regulations, or to adopt the state hazardous waste management plan shall be held before at least four members of the commission. All other hearings may be held before one commission member designated by the commission chairman or by a hearing officer who shall be a member of the Missouri bar and shall be appointed by the commission chairman. The hearing officer or commission member shall preside at the hearing and hear all evidence and rule on the admissibility of evidence. The hearing officer or commission member shall make recommended findings of fact and may make recommended conclusions of law to the commission.

4. All final orders or determinations or other final actions by the commission shall be approved in writing by at least four members of the commission. Any commission member approving in writing any final action of the commission, who did not attend the hearing, shall do so only after reviewing all exhibits and reading the entire transcript.

5. The following requirements shall apply to the adoption, amendment and repeal of standards, rules and regulations:

(1) No standard, rule or regulation or any amendment or repeal thereof shall be adopted except after a public hearing to be held after thirty days prior notice as required by the provisions of chapter 536, RSMo, pertaining to administrative rulemaking and by press release or public advertisement containing the date, time and place of the hearing and opportunity given to the public to be heard;

(2) At the hearing, opportunity to be heard by the commission with respect to the subject thereof shall be afforded any interested person upon written request to the commission, addressed to the department, not later than seven days prior to the hearing, and may be afforded to other persons if convenient. In addition, any interested persons, whether or not heard, may submit, within seven days subsequent to the hearings, a written statement of their views. The commission may solicit the views, in writing, of persons who may be affected by, knowledgeable concerning or interested in proposed standards, rules and regulations, the state hazardous waste management plan or any license, permit or variance. Any person heard or represented at the hearing or making written request for notice shall be given written notice of the action of the commission with respect to the subject thereof;

(3) Any standard, rule or regulation, amendment or repeal thereof or state hazardous waste management plan shall not be deemed adopted or in force until it has been approved in writing by at least four members of the commission.

(L. 1977 H.B. 318 § 11, A.L. 1980 2d Ex. Sess. H.B. 5, et al., A.L. 1993 S.B. 52)

260.405. Variances granted, when.—1. Unless prohibited by any federal hazardous waste management act, the commission may grant individual variances from the requirements of sections 260.350 to 260.430 whenever it is found, upon presentation of adequate proof, that compliance with any provision of sections 260.350 to 260.430 or any standard, rule or regulation, order or license or permit term or condition adopted or issued hereunder will result in an arbitrary and unreasonable taking of property or in the practical closing and elimination of any lawful business, occupation or activity, in either case without sufficient corresponding benefit or advantage to the people; except that, no variance shall be granted where the effect of a variance will permit the continuance of a condition which unreasonably poses a present or potential threat to the health of humans or other living orga-

nisms; and except, also, that any variance so granted shall not be so construed as to relieve the person who receives the variance from any liability imposed by other law for the commission or maintenance of a nuisance or damage to the property or rights of any person.

2. In determining under what conditions and to what extent a variance may be granted, the commission shall weigh the equities involved and the advantages and disadvantages to the applicant and to those affected by the hazardous waste management practices of the applicant.

3. Variances shall be granted for a period of time and under such terms and conditions as shall be specified by the commission in its order. In no event shall the variance be granted for a period of time greater than one year and shall not be renewable unless circumstances can be shown which preclude compliance within the one-year period of the variance and the renewal will not result in an unreasonable risk to the health of humans or the environment.

4. (1) Any person seeking a variance shall file a petition for a variance with the department. A filing fee of fifty dollars shall be paid to the state of Missouri with each petition.

(2) Upon the receipt of a request for a variance deemed substantive by the department, the department shall by mail notify all record owners of property within one mile of the outer boundaries of the site, the county, and the village, town or city within which the facility for which the variance is proposed is located. If the variance is substantive, as determined by regulation, the department shall notify the public through press release and a notice placed in a newspaper of general circulation serving the area within which the facility is located. The department shall promptly investigate the petition and make a recommendation to the commission within sixty days after the petition is received as to whether the variance should be granted or denied. The department shall promptly notify the petitioner of its action and at the same time shall issue public notice by press release or advertisement and shall notify all record owners of adjoining property by mail directed to the last known address and the village, town or city, if any, and the county which is the location of the facility for which the variance is sought.

5. If the variance is deemed to be substantive, the commission shall hold a public hearing on the variance as provided in section 260.400. If the variance is deemed to be nonsubstantive, a hearing as provided in section 260.400 shall be held by the commission if requested by the petitioner within thirty days of the date of notice of the recommendation of the department. If the commission grants the variance without a hearing, the matter shall be passed upon at a public meeting no sooner than thirty days from the date of notice of the recommendation of the department, except that upon petition, filed within thirty days from the date of the recommendation, by any person aggrieved by the granting of the variance, a hearing shall be held and such petitioner shall become a party to the proceeding. In any hearing under this section the burden of proof shall be on the person petitioning for a variance.

6. The commission may require the filing of a bond as a condition for the issuance of a variance in an amount determined by the commission to be sufficient to insure compliance with the terms and conditions of the variance. The bond shall be signed by the applicant as principal and by a corporate surety licensed to do business in the state of Missouri and approved by the commission. The commission may require that the bond shall remain in effect until the terms and conditions of the variance are met and the provisions of sections 260.350 to 260.430 and rules and regulations promulgated hereunder are complied with.

7. Upon failure to comply with the terms and conditions of any bond or of any variance as specified by the commission, the variance may be revoked or modified or the bond may be revoked, or both, by the commission after a hearing held upon not less than thirty days written notice. The notice shall be served upon all persons who will be subjected to greater restrictions if the variance is revoked or modified or who have filed with the department a written request for notification.

8. Any decision of the commission made pursuant to a hearing held under this section is subject to judicial review as provided in section 260.415.

(L. 1977 H.B. 318 § 12, A.L. 1980 2d Ex. Sess. H.B. 5, et al.)

Effective 10-31-80

260.410. Department to enforce standards, rules and regulations—appeal authorized.—1. The department shall cause investigations to be made upon the request of the commission or upon receipt of information concerning alleged violations of sections 260.350 to 260.430 or any standard, rule or regulation, order or license or permit term or condition adopted or

vided in section
ommission if re-
within thirty days of
recommendation of
mmission grants the
, the matter shall be
meeting no sooner
date of notice of the
department, except
within thirty days
mmendation, by any
granting of the vari-
held and such peti-
ty to the proceeding.
is section the burden
person petitioning for

y require the filing of
the issuance of a va-
ermined by the com-
to insure compliance
itions of the variance.
d by the applicant as
rate surety licensed to
of Missouri and ap-
ion. The commission
nd shall remain in ef-
conditions of the vari-
provisions of sections
rules and regulations
are complied with.

with the terms
of any variance
nmission, the variance
lified or the bond may
the commission after a
less than thirty days
ce shall be served upon
subjected to greater re-
is revoked or modified
the department a writ-
tion.

the commission made
held under this section
view as provided in sec-

1980 2d Ex. Sess. H.B. 5, et

nt to enforce standards,
-appeal authorized.—1.
cause investigations to
uest of the commission
ormation concerning al-
ions 260.350 to 260.430
or regulation, order or
or condition adopted or

issued hereunder, and may cause to be made any other investigations it deems advisable to further the purposes of sections 260.350 to 260.430. Violations shall include obtaining a permit hereunder by misrepresentation or failure to fully disclose all relevant facts.

2. If, in the opinion of the department, the investigation discloses that a violation does exist, it may, by conference, conciliation or persuasion, endeavor to eliminate the violation.

3. In case of the failure by conference, conciliation or persuasion to correct or remedy any claimed violation, or as required to immediately and effectively halt or eliminate any imminent or substantial threats to the health of humans or other living organisms resulting from the claimed violation, the department may order abatement of the violation or may revoke any license, or any hazardous waste transportation vehicle approval or permit which may have been issued hereunder. The department shall cause to have issued and served upon the person complained against a written notice of the order or revocation which shall include a copy of the order or revocation, which shall specify the provision of sections 260.350 to 260.430, or the standard, rule or regulation, order or license or permit term or condition adopted or issued hereunder of which the person is alleged to be in violation and a statement of the manner in which the person is alleged to violate sections 260.350 to 260.430, or the standard, rule or regulation, order or license or permit term or condition. Service may be made upon any person within or without the state by registered or certified mail, return receipt requested. Any person against whom the department issues an order or revocation may appeal it by filing a petition with the commission within thirty days. The appeal shall stay the enforcement of the order or revocation until final determination by the commission. The commission shall set appeals for a hearing at a time not less than thirty days after the date of the receipt of the petition. The commission may sustain, reverse or modify the department's order or revocation or may make such other orders as the commission deems appropriate under the circumstances. If any order or revocation issued by the department is not appealed within the time herein provided, the order or revocation becomes final and may be enforced as provided in section 260.425.

4. Licenses and permits issued hereunder may be suspended, revoked or modified if obtained in violation of sections 260.350 to 260.430 or by misrepresentation or failing to fully disclose all relevant facts, or when required to prevent violations of any provision of sections 260.350 to 260.430 or any standard, rule or regulation, order or license or permit term or condition adopted or issued hereunder, or to protect the health of humans and other living organisms, when such action is required by a change in conditions or the existence of a condition which requires either a temporary or permanent change in the licensed or permitted hazardous waste management practices, subject to the right of appeal as set forth in section 260.410 *.

5. When the commission schedules a matter for hearing, the petitioner on appeal may appear at the hearing in person or by counsel, and may make oral argument, submit written brief, offer testimony and evidence and cross-examine witnesses.

6. After due consideration of the record, or upon default in appearance of the petitioner at any hearing of which he has been given notice by registered or certified mail the commission shall issue and enter such final order, or make such final determination as it deems appropriate under the circumstances. It shall notify the petitioner or respondent thereof in writing by certified or registered mail.

(L. 1977 H.B. 318 § 13)

*Apparently an incorrect reference since appeal procedure is provided in § 260.415.

260.412. Administrative penalties—not to be assessed for minor violation—conference, conciliation and persuasion—rules and regulations, payment—appeal, effect—unpaid penalty, collection—time limit—review.—1. In addition to any other remedy provided by law, upon a determination by the director that a provision of sections 260.350 to 260.481 or a standard, limitation, order, rule or regulation promulgated pursuant thereto, or a term or condition of any permit has been violated, the director may issue an order assessing an administrative penalty upon the violator under this section. An administrative penalty shall not be imposed until the director has sought to resolve the violations through conference, conciliation and persuasion and shall not be imposed for minor violations of sections 260.350 to 260.481 or minor violations of any standard, limitation, order, rule or regulation promulgated pursuant to sections 260.350 to 260.481 or minor violations of any term or condition of a permit issued pursuant to sections 260.350 to 260.481. If the violation is resolved through conference, conciliation and persuasion, no administrative penalty shall be assessed unless

the violation has caused, or has the potential to cause, a risk to human health or to the environment, or has caused or has potential to cause pollution, or was knowingly committed, or is defined by the United States Environmental Protection Agency as other than minor. Any order assessing an administrative penalty shall state that an administrative penalty is being assessed under this section and that the person subject to the penalty may appeal as provided by this section. Any such order that fails to state the statute under which the penalty is being sought, the manner of collection or rights of appeal shall result in the state's waiving any right to collection of the penalty.

2. The commission shall promulgate rules and regulations for the assessment of administrative penalties. The amount of the administrative penalty assessed per day of violation for each violation under this section shall not exceed the amount of the civil penalty specified in section 260.425. Such rules shall reflect the criteria used for the administrative penalty matrix as provided for in the Resource Conservation and Recovery Act, 42 U.S.C. 6928(a), Section 3008(a), and the harm or potential harm which the violation causes, or may cause, the violator's previous compliance record, and any other factors which the commission may reasonably deem relevant. An administrative penalty shall be paid within sixty days from the date of issuance of the order assessing the penalty. Any person subject to an administrative penalty may appeal to the commission in the manner provided by law. Any appeal will stay the due date of such administrative penalty until the appeal is resolved. Any person who fails to pay an administrative penalty by the final due date shall be liable to the state for a surcharge of fifteen percent of the penalty plus ten percent per annum on any amounts owed. Any administrative penalty paid pursuant to this section shall be handled in accordance with section 7 of article IX of the state constitution. An action may be brought in the appropriate circuit court to collect any unpaid administrative penalty, and for attorney's fees and costs incurred directly in the collection thereof.

3. An administrative penalty shall not be increased in those instances where department action, or failure to act, has caused a continuation of the violation that was a basis for the penalty. Any administrative penalty must be assessed within two years following the department's initial discovery of such alleged violation, or from the date the department in the exercise of ordinary diligence should have discovered such alleged violation.

4. Any final order imposing an administrative penalty is subject to judicial review upon the filing of a petition pursuant to section 536.100, RSMo, by any person subject to the administrative penalty.

5. The state may elect to assess an administrative penalty, or, in lieu thereof, to request that the attorney general or prosecutor file an appropriate legal action seeking a civil penalty in the appropriate circuit court.
(L. 1991 S.B. 45, A.L. 1993 S.B. 80, et al.)

260.415. Appeals—other remedies available, costs.—1. All final orders and determinations of the commission or the department made pursuant to the provisions of sections 260.350 to 260.430 are subject to judicial review pursuant to the provisions of chapter 536, RSMo. All final orders and determinations shall be deemed "administrative decisions" as that term is defined in chapter 536, RSMo. No judicial review shall be available, however, unless all administrative remedies are exhausted.

2. In any suit filed pursuant to section 536.050, RSMo, concerning the validity of the commission's standards, rules or regulations, the court shall review the record made before the commission to determine the validity and reasonableness of such standards, rules or regulations and may hear such additional evidence as it deems necessary.

3. Nothing in this section or in any other provision of sections 260.350 to 260.430 shall exclude or impair any existing civil or criminal remedy, whether statutory or common law, for any wrongful action, including, but not limited to, actions to enjoin public or private nuisances. Any person adversely affected in fact by any violation of sections 260.350 to 260.430 or of any rule or regulation promulgated thereunder may sue for injunctive relief against such violation. The prevailing party in any such action for injunctive relief shall be awarded costs and reasonable attorneys' fees.
(L. 1977 H.B. 318 § 14, A.L. 1980 2d Ex. Sess. H.B. 5, et al.)
Effective 10-31-80

260.420. Imminent hazard, action to be taken.—1. From September 28, 1977, and notwithstanding any other provision of sections 260.350 to 260.430 or any other law to the contrary, upon receipt of information that any activity subject to sections 260.350 to 260.430 may present an imminent hazard, by placing

ice should have dis-
ion.
imposing an administra-
to judicial review upon
ion pursuant to section
ny person subject to the
.

ect to assess an admini-
lieu thereof, to request
eral or prosecutor file an
on seeking a civil penalty
cuit court.
93 S.B. 80, et al.)

—other remedies availa-
al orders and determina-
ssion or the department
he provisions of sections
are subject to judicial re-
provisions of chapter 536,
ders and determinations
ministrative decisions" as
1 in chapter 536, RSMo.
hall be available, however,
rative remedies are ex-

filed pursuant to section
ncerning the validity of the
ards, rules or regulations,
w the record made before
ine the validity and
ndards, rules or reg-
such additional evi-
necessary.
is section or in any other
s 260.350 to 260.430 shall
ny existing civil or criminal
atutory or common law, for
, including, but not limited
oin public or private nui-
adversely affected in fact
sections 260.350 to 260.430
or regulation promulgated
sue for injunctive relief
ion. The prevailing party in
or injunctive relief shall be
reasonable attorneys' fees.
, A.L. 1980 2d Ex. Sess. H.B. 5, et

nent hazard, action to be
eptember 28, 1977, and not-
other provision of sections
30 or any other law to the
eipt of information that any
sections 260.350 to 260.430
mminent hazard, by placing

or allowing escape of any hazardous waste into the environment or exposure of people to such waste which may be cause of death, disabling personal injury, serious acute or chronic disease, or serious environmental harm, the department director or the commission may take action necessary to protect the health of humans and the environment from such hazard. The action the department director, commission or the designee of the commission may take includes, but is not limited to:

(1) Issuing an order directing the hazardous waste generator, transporter, facility operator or any other person who is the custodian or has control of the waste, which constitutes such hazard, to eliminate such hazard. Such action may include, with respect to a site or facility, permanent or temporary cessation of operation;

(2) Issuing an order directing a permitted commercial hazardous waste facility to treat, store or dispose of any waste cleaned up in accordance with this section;

(3) Acquiring by purchase, donation, agreement or condemnation any lands, or rights in lands, sites, objects, or facilities necessary to protect the health of humans and the environment in accordance with sections 260.350 to 260.550 only after it is proven cost effective and all other options have been exhausted by the commission. In the event any property is condemned, then the procedures and assessment of damages shall be in accordance with chapter 523, RSMo;

(4) Selling or leasing any property that has been cleaned up in accordance with sections 260.350 to 260.550 so as to no longer constitute a threat to the health of people or to the environment. The proceeds of such sales or leases shall be deposited in the hazardous waste remedial fund created in section 260.480; and

(5) Causing to be filed by the attorney general or a prosecuting attorney in the name of the people of the state of Missouri, suit for a temporary restraining order, temporary injunction or permanent injunction which action shall be given precedence over all other matters pending in the circuit courts.

2. In any civil action brought pursuant to this section in which a temporary restraining order or temporary injunction is sought, there must be allegations of the types of injury or harm specified in these imminent hazard provisions; it shall be necessary to allege and prove at the proceeding that irreparable damage will occur and that the remedy at law is inadequate, and the temporary restraining order or temporary injunction shall not issue without such allegations and without such proof.

3. This section shall not apply to any alleged imminent hazard that is covered by the federal Occupational Safety and Health Act, so long as the hazardous waste is contained on the site so covered. This subsection shall not prevent the department from taking action necessary to prevent escape of the hazardous waste from such site.

(L. 1977 H.B. 318 § 15, A.L. 1980 2d Ex. Sess. H.B. 5, et al., A.L. 1983 H.B. 528)
Effective 6-27-83

260.423. Facility ordered to accept waste, reimbursement rate disagreement, procedure.—If the director orders a facility to accept waste pursuant to subdivision (2) of subsection 1 of section 260.420, the department shall reimburse the operator at the rate which he normally charges for treating, storing or disposing of similar wastes within sixty days of the treatment, storage or disposal of such waste. In the event of a disagreement about the rate, the director or the operator may appeal to the commission within ninety days. The commission may schedule a hearing within thirty days. No later than thirty days after receipt of the complete record, or following a decision not to hold a hearing, the commission shall provide the operator with a written determination. All final decisions of the commission shall be reviewable under chapter 536, RSMo.
(L. 1983 H.B. 528)
Effective 6-27-83

260.424. Underground injection prohibited.—Notwithstanding any other provision of the law to the contrary, underground injection of hazardous waste is prohibited unless authorized pursuant to section 577.155, RSMo.
(L. 1985 S.B. 110)
Effective 6-27-85

260.425. Violations, how punished.—1. It is unlawful for any person to cause or permit any acts or hazardous waste management practices which violate sections 260.350 to 260.430 or any standard, rule or regulation, order or license or permit term or condition adopted or issued hereunder. In the event the commission or the department determines that any provision of sections 260.350 to 260.430 or any standard, rule or regulation, order or determination, or license or permit term or condition adopted or issued hereunder by the

commission or the department, or any filing requirement under sections 260.350 to 260.430 or any provision which this state is required to enforce under any federal hazardous waste management act, is being, was, or is in imminent danger of being violated, the commission or department may, in addition to other remedies under sections 260.350 to 260.430, cause to have instituted a civil action in any court of competent jurisdiction for injunctive relief to prevent any such violation or further violation or for the assessment of a civil penalty not to exceed ten thousand dollars per day for each day, or part thereof, the violation occurred and continues to occur, or both, as the court deems proper. A civil monetary penalty under this section shall not be assessed for a violation where an administrative penalty was assessed under section 260.412. The commission or the department may request either the attorney general or a prosecuting attorney to bring any action authorized in this section in the name of the people of the state of Missouri. Suit may be brought in any county where the defendant's principal place of business is located or was located at the time the violation occurred, or has or may cause injury or threat to the health of humans or the environment. Any offer of settlement to resolve a civil penalty under this section shall be in writing, shall state that an action for imposition of a civil penalty may be initiated by the attorney general or a prosecuting attorney representing the department under authority of this section, and shall identify any dollar amount as an offer of settlement which shall be negotiated in good faith through conference, conciliation and persuasion.

2. Moneys received pursuant to this section which are not required by article IX, section 7, of the constitution to be distributed to schools shall be deposited in the hazardous waste fund created in section 260.391.

3. Any person who knowingly:

(1) Transports any hazardous waste to a facility which is not authorized to receive such waste pursuant to sections 260.350 to 260.430 or permits or causes any other hazardous waste transportation practice in violation of any provision of sections 260.350 to 260.430;

(2) Treats, stores or disposes of any hazardous waste either:

(a) Without authorization to do so pursuant to sections 260.350 to 260.430; or

(b) In knowing violation of any material condition or requirement of such authorization; or

(c) In violation of any provision of sections 260.350 to 260.430;

(3) Makes any false material statement, representation or certification in any application, label, permit, record, report, manifest or other document filed, maintained, or required to be maintained under sections 260.350 to 260.430;

(4) Falsifies, tampers with, or renders inaccurate any monitoring device or result therefrom used, filed, maintained, or required to be maintained under sections 260.350 to 260.430;

(5) Generates, treats, stores, transports, disposes of or otherwise handles any hazardous waste, and who in connection therewith knowingly destroys, alters or conceals any record required to be maintained pursuant to sections 260.350 to 260.430; or

(6) Owns, maintains or operates any hazardous waste disposal facility in a manner which permits any acts or hazardous waste management practices in violation of sections 260.350 to 260.430, shall, upon conviction, be punished by a fine of not less than twenty-five hundred dollars nor more than twenty-five thousand dollars for each day of violation, or by confinement in the county jail for not more than one year, or by both such fine and confinement. Second and successive convictions for violation of this section shall be punished by a fine of not less than five thousand dollars nor more than fifty thousand dollars for each day of violation, or by imprisonment for not less than ten years, or by both such fine and imprisonment.

4. Whenever the director or his designee observes or has reason to believe any such person is violating or has violated the provisions of sections 260.350 to 260.430 relating to hazardous waste facilities, the director or his designee may request the sheriff or deputy sheriff of the county where the hazardous waste facility is located, or any law enforcement officer otherwise authorized by law to issue a summons, to make investigation. If the officer views any violation of sections 260.350 to 260.430 or has probable cause to believe any violation of sections 260.350 to 260.430 is occurring or has occurred, he shall issue to the owner or operator a summons, in lieu of arrest, which shall state the nature of any alleged violations and shall command the owner or operator to appear in circuit court, associate division, at a stated time and place in answer thereto. If the owner or operator shall fail to appear as commanded by the summons, a warrant of arrest shall be issued.

ny provision of sections

material statement, fication in any applica- ord, report, manifest or maintained, or required ler sections 260.350 to

s with, or renders inac- device or result there- ained, or required to be ons 260.350 to 260.430;

s, stores, transports, dis- handles any hazardous nection therewith know- or conceals any record ned pursuant to sections

s or operates any haz- l facility in a manner cts or hazardous waste in violation of sections hall, upon conviction, be not less than twenty-five more than twenty-five ach day of violation, or county jail for not more both such fine and con- d successive convictions ection shall be punished e thousand dollars d dollars for each prisonment for not r by both such fine and

rector or his designee ob- believe any such person olated the provisions of 260.430 relating to haz- , the director or his des- sheriff or deputy sheriff he hazardous waste facil- law enforcement officer by law to issue a sum- stigation. If the officer of sections 260.350 to ble cause to believe any 260.350 to 260.430 is oc- ed, he shall issue to the ummons, in lieu of arrest, nature of any alleged vio- nand the owner or opera- uit court, associate divi- ne and place in answer or operator shall fail to l by the summons, a war- e issued.

5. In addition to the authority granted to it under chapter 43, RSMo, the Missouri state highway patrol, any of its officers, or any other law enforcement officer, who has probable cause to believe that such a violation of sections 260.350 to 260.430 has been committed may detain any equipment involved in the violation and arrest the person controlling or operating such equipment. Any such officer shall also notify the department or the Missouri public service commission as soon as practicable, which shall, in addition, take whatever civil action they determine is necessary to correct or eliminate such violation or any threat to the health of humans or the environment. It shall be the duty of the Missouri state highway patrol as it pertains to highway use, and all other officers of the state of Missouri charged with enforcement of criminal law, to further the purposes of sections 260.350 to 260.430 and to render and furnish to the department when requested all information and assistance in their possession and in their power.

6. The liabilities which shall be imposed pursuant to any provision of sections 260.350 to 260.430 upon persons violating the provisions of sections 260.350 to 260.430 or any standard, rule or regulation, or license or permit term or condition adopted or issued hereunder shall not be imposed for any violation caused by a strike or an act of God, war, riot or other catastrophe.

7. No provision of sections 260.350 to 260.430 shall be construed to limit any action at law or in equity from being brought by any person or political subdivision aggrieved by any violation of sections 260.350 to 260.430 nor shall any provision be construed to prohibit any person from exercising otherwise existing rights to suppress nuisances.

(L. 1977 H.B. 318 § 16, A.L. 1980 2d Ex. Sess. H.B. 5, et al., A.L. 1983 H.B. 528, A.L. 1993 S.B. 80, et al.)

260.429. No permit in non-karst area of state over groundwater divide.—In non-karst areas of the state, the department of natural resources shall not issue a hazardous waste facility permit for a proposed commercial hazardous waste landfill, if such landfill would be located directly over a groundwater divide. The department of natural resources shall review on a site-by-site basis, whether a proposed site is in a non-karst region.

(L. 1993 S.B. 80, et al. § 16)

260.430. Confidential information—illegal disclosure, penalty.—1. Information obtained under sections 260.350 to 260.430 or any rule or regulation, order or license or permit term or condition adopted or issued hereunder, or any investigation authorized thereby, shall be available to the public unless nondisclosure is requested in writing including justification to the satisfaction of the director that such information constitutes trade secrets or information which is entitled to confidential treatment in order to protect any plan, process, tool, mechanism or compound which is known only to the person claiming confidential treatment and where confidential treatment is necessary to protect such person's trade, business or manufacturing process, where such nondisclosure will not result in an unreasonable threat to the health of humans or other living organisms and disclosure is not required under any federal hazardous waste management act. If the director finds the information does not warrant confidential treatment, the person shall be notified by registered mail. The information may be released to the public after thirty days of receipt of the notice from the director unless the person obtains a restraining order prohibiting disclosure. Any action by the director concerning confidential treatment may be appealed to the hazardous waste management commission which may uphold or reverse such action. Any member of the commission or employee of the department, for a period of two years after the termination of such relationship, who is convicted of willful disclosure or conspiracy to disclose trade secrets or information which is entitled to such confidential treatment to any person other than one entitled to the information under sections 260.350 to 260.430 is guilty of a misdemeanor and, upon conviction, shall be punished by fine of not more than one thousand dollars.

2. No action, ordinance or law, with the exception of local option on location, of any county, city, town, village or other political subdivision of this state shall operate to prevent the location or operation of a hazardous waste facility or transporter holding a current hazardous waste facility permit or transporter license issued hereunder within its boundaries. Nothing in this subsection shall, however, prevent any such political subdivision from challenging a facility's or transporter's compliance with sections 260.350 to 260.430 or any rule or regulation, order or permit or license term or condition adopted or issued hereunder. No hazardous waste disposal facility established after September 28, 1977, shall be located within one-fourth mile of any permanent, occupied residential dwelling house completed

prior to the receipt by the department of a letter of intent for such hazardous waste disposal facility without the written consent of the owner of such residential house. All hazardous waste disposal facilities shall have a minimum three-hundred-foot buffer zone between the property line of the facility and the permitted area. The provisions of this subsection shall not apply to overburden, rocks, tailings, slag, residue or other wastes resulting from mining, milling and smelting.

3. All pending applicants for the development of a hazardous waste disposal facility shall meet all requirements of this act*.

(L. 1977 H.B. 318 § 17, A.L. 1980 2d Ex. Sess. H.B. 5, et al.)

Effective 10-31-80

*Original rolls contain words "this act". Intent may have been to use "sections 260.350 to 260.430", as that subchapter deals with hazardous waste management. "This act", H.B. 5, et al., contains also §§ 260.035 and 260.040.

260.431. Buffer zone required, commercial facility, how determined—limitations, requirements, certain facilities.—1. The department of natural resources shall not issue a permit to an applicant for a commercial hazardous waste facility for the treatment of such waste by incineration in any county unless the facility meets the conditions established in this section. For the purposes of this section, a commercial hazardous waste facility is a facility designed to treat hazardous waste by incineration for a fee regardless of where such waste is generated. Any commercial hazardous waste facility which treats waste by incineration shall be located so as to provide a health and safety buffer zone. The size and nature of the buffer zone shall be determined by the department but shall extend at least three hundred feet from the facility, on property owned or leased by the applicant. The department shall consider the proximity of schools, businesses and houses, the prevailing winds and other factors which it deems relevant when establishing a buffer zone.

2. In any unincorporated area of any county, where there are no zoning requirements, where a commercial hazardous waste or solid waste facility designed to treat such waste by incineration is to be located in an area where fire and police protection is not provided by a municipality or county, a written agreement to provide for fire and police protection from surrounding municipalities, counties or the state of Missouri, including a provision for the use of special units particularly trained for a hazardous waste or solid waste emergency in the event that such an emergency occurs, shall be approved by the department for the protection of the citizens of the area before a permit may be issued. The department shall at least once a year conduct an unannounced inspection of each commercial hazardous waste and solid waste incinerator to ensure such incinerators are operated in compliance with this chapter.

3. Any hazardous waste treatment facility which is sited as a result of a court settlement or an out-of-court agreement which is designed to treat hazardous waste at a single site or group of sites shall not be granted a permit for greater than a five-year period at any one specific location and no renewal permit shall be issued for a treatment facility located at a site permitted originally for such a hazardous waste treatment facility. If the department purports to issue such a renewal permit, such action shall be invalid ab initio.

(L. 1990 S.B. 530)

Effective 7-9-90

260.432. Hazardous waste, collection of small quantities, department to administer—fees—department may enter into contracts for collection—disposal in landfills prohibited, when.—1. The department of natural resources shall establish and promote a program for the collection and disposition of small quantities of hazardous waste from persons, firms, corporations, state departments and institutions, and political subdivisions. The program shall provide for the periodic collection of hazardous waste at points reasonably accessible to all parts of the state. The department may allow small quantity hazardous waste generators to utilize the program on a case by case basis.

2. The department shall establish maximum amounts of hazardous waste which may be accepted without fee or charge from any person at any one collection point. The department may accept additional quantities of hazardous waste; however, in such instances a fee shall be charged in an amount up to that which reflects the actual cost of collecting, handling, transporting, and treating or disposing of the additional quantity of hazardous waste.

3. The department may contract for the collection and disposition of hazardous waste as provided by this section with any person or firm authorized to transport, treat, recover or dispose of hazardous waste under sections 260.350 to 260.430, or the federal Resource Conservation and Recovery Act, P.L. 94-580, as amended. The department may use appro-

priations and accept funds, gifts and services from public and private agencies, businesses or individuals for the purpose of carrying out the provisions of this section.

4. The department shall promulgate rules and regulations necessary to carry out the provisions of this section. The department shall not delegate any authority to promulgate rules and regulations to any person with whom or any firm with which it has executed a contract for services as provided in subsection 3 of this section.

5. (1) The department shall ensure the safe collection and disposal of small quantities of hazardous waste by the date established in this section and shall ensure that such disposal is available to small quantity generators of hazardous waste throughout the state;

(2) After January 1, 1994, small quantities of hazardous waste which are exempt from regulation under the provisions of sections 260.350 to 260.434, except de minimis amounts, shall not be placed in a sanitary landfill;

(3) Any person convicted of knowingly placing small quantities of hazardous waste in a sanitary landfill shall be guilty of an infraction.

(L. 1986 H.B. 875 & 1649 § 1, A.L. 1990 S.B. 530)

260.433. Commercial hazardous waste facilities, prohibited activities (third or fourth class counties).—No person or entity shall operate a commercial hazardous waste facility in any third or fourth class counties by engaging in:

(1) Open burning of hazardous waste; or

(2) Open burning of waste explosives; or

(3) Detonation of waste explosives; or

(4) Any other thermal treatment of any hazardous waste or waste explosives, unless in a manner consistent with the department's standards for owners/operators of permitted hazardous waste treatment, storage, and disposal facilities.

(L. 1987 H.B. 375 § 1)

260.434. Proposed sites, hazardous waste facilities—department to examine transportation routes—department to examine local government's capability to respond to emergency—interagency agreement.—1. The department shall assess the transportation system serving a proposed site for a new hazardous waste resource recovery, treatment or disposal facility as a part of its review of the application for a permit. The department shall examine the transportation route or routes to ensure that the design and maintenance of such route or routes provides adequate safety for the public using or living near the route or routes. The department may designate or prohibit specific routes, limit use of approved routes during certain time periods or impose other reasonable restrictions upon the transportation of hazardous waste to or from the facility.

2. The department shall review the capability of local governments near a proposed site to respond to an emergency involving the transportation of hazardous waste or an emergency at the hazardous waste resource recovery, treatment or disposal facility when it reviews an application for a permit. The department shall reassess that capability whenever the operator proposes recovering, treating or disposing of a hazardous waste which is substantially more toxic, corrosive, ignitable or reactive than those wastes approved under the current permit. The department may require the operator to provide supplemental emergency response capability to ensure public safety.

3. The department shall enter into an interagency agreement with the department of highways and transportation and the department of public safety to permit the sharing of information and to assign responsibility for performing the assessment required in this section.

(L. 1988 S.B. 535 §§ 1, 2)

ABANDONED OR UNCONTROLLED SITES

260.435. Definitions, sections 260.435 to 260.480—definition of hazardous waste not to include certain materials.—The definitions set forth in section 260.360 shall apply to sections 260.435 to 260.480 and, in addition to such definitions, the term "abandoned or uncontrolled" means any property where hazardous waste has been illegally disposed of, or where hazardous waste was disposed of prior to regulation under sections 260.350 to 260.430. However, the term "hazardous waste" as used in sections 260.350 to 260.480 shall not include:

(1) Fly ash waste, bottom ash waste, slag waste and flue gas emission control waste generated primarily from the combustion of coal or other fossil fuels;

(2) Solid waste from the extraction, beneficiation and processing of ores and miner-

Mo. Rev. Stat. (1994)

the violation has caused, or has the potential to cause, a risk to human health or to the environment, or has caused or has potential to cause pollution, or was knowingly committed, or is defined by the United States Environmental Protection Agency as other than minor. Any order assessing an administrative penalty shall state that an administrative penalty is being assessed under this section and that the person subject to the penalty may appeal as provided by this section. Any such order that fails to state the statute under which the penalty is being sought, the manner of collection or rights of appeal shall result in the state's waiving any right to collection of the penalty.

2. The commission shall promulgate rules and regulations for the assessment of administrative penalties. The amount of the administrative penalty assessed per day of violation for each violation under this section shall not exceed the amount of the civil penalty specified in section 260.425. Such rules shall reflect the criteria used for the administrative penalty matrix as provided for in the Resource Conservation and Recovery Act, 42 U.S.C. 6928(a), Section 3008(a), and the harm or potential harm which the violation causes, or may cause, the violator's previous compliance record, and any other factors which the commission may reasonably deem relevant. An administrative penalty shall be paid within sixty days from the date of issuance of the order assessing the penalty. Any person subject to an administrative penalty may appeal to the commission in the manner provided by law. Any appeal will stay the due date of such administrative penalty until the appeal is resolved. Any person who fails to pay an administrative penalty by the final due date shall be liable to the state for a surcharge of fifteen percent of the penalty plus ten percent per annum on any amounts owed. Any administrative penalty paid pursuant to this section shall be handled in accordance with section 7 of article IX of the state constitution. An action may be brought in the appropriate circuit court to collect any unpaid administrative penalty, and for attorney's fees and costs incurred directly in the collection thereof.

3. An administrative penalty shall not be increased in those instances where department action, or failure to act, has caused a continuation of the violation that was a basis for the penalty. Any administrative penalty must be assessed within two years following the department's initial discovery of such alleged violation, or from the date the department in the exercise of ordinary diligence should have discovered such alleged violation.

4. Any final order imposing an administrative penalty is subject to judicial review upon the filing of a petition pursuant to section 536.100, RSMo, by any person subject to the administrative penalty.

5. The state may elect to assess an administrative penalty, or, in lieu thereof, to request that the attorney general or prosecutor file an appropriate legal action seeking a civil penalty in the appropriate circuit court.
(L. 1991 S.B. 45, A.L. 1993 S.B. 80, et al.)

260.415. Appeals—other remedies available, costs.—1. All final orders and determinations of the commission or the department made pursuant to the provisions of sections 260.350 to 260.430 are subject to judicial review pursuant to the provisions of chapter 536, RSMo. All final orders and determinations shall be deemed "administrative decisions" as that term is defined in chapter 536, RSMo. No judicial review shall be available, however, unless all administrative remedies are exhausted.

2. In any suit filed pursuant to section 536.050, RSMo, concerning the validity of the commission's standards, rules or regulations, the court shall review the record made before the commission to determine the validity and reasonableness of such standards, rules or regulations and may hear such additional evidence as it deems necessary.

3. Nothing in this section or in any other provision of sections 260.350 to 260.430 shall exclude or impair any existing civil or criminal remedy, whether statutory or common law, for any wrongful action, including, but not limited to, actions to enjoin public or private nuisances. Any person adversely affected in fact by any violation of sections 260.350 to 260.430 or of any rule or regulation promulgated thereunder may sue for injunctive relief against such violation. The prevailing party in any such action for injunctive relief shall be awarded costs and reasonable attorneys' fees.
(L. 1977 H.B. 318 § 14, A.L. 1980 2d Ex. Sess. H.B. 5, et al.)
Effective 10-31-80

260.420. Imminent hazard, action to be taken.—1. From September 28, 1977, and notwithstanding any other provision of sections 260.350 to 260.430 or any other law to the contrary, upon receipt of information that any activity subject to sections 260.350 to 260.430 may present an imminent hazard, by placing

ATZN-CM-SAC 13 Mar 95

MEMORANDUM FOR STRATEGIC PLANS OFFICE, FORT McCLELLAN, AL

SUBJECT: Fort McClellan Permits

1. Reference TRADOC letter, dated 10 Mar 95, SAB, the proposed reply is provided:

a. Fort McClellan has no knowledge of permit applications submitted in regards to the proposed closure and realignment. The Chemical School, Chemical Defense Training Facility, and Environmental Management Officer have not been asked nor supplied any information to the Department of the Army, Fort Leonard Wood, or the State of Missouri pertaining to environmental permit requirements.

b. Fort McClellan personnel do not know anything regarding publicity of the applications. Furthermore, no one knows what applications, if any, were filed. Permits submitted to State agencies would be considered part of a public record, attainable through the Freedom of Information Act, or upon public request.

c. Environmental Assessments for construction of the CDTF at Fort McClellan began in Feb 81 and were completed in Jun 85. Additional environmental documentation, RCRA Part B, was completed under contract by Rust International and was reviewed by EPA Region IV and the State of Alabama Department of Environmental Management. NEPA documentation (environmental assessment/environmental impact statement) is mandatory, however the requirements in regards to a full EIS or RCRA Part B submissions are not well understood. In today's climate, most incinerators require an EIS. The CDTF incinerator and air filtration system required both Federal and State certification.

2. Point of Contact for these issues is LTC Newing, USACMLS, DSN 865-6228.

DEPARTMENT OF THE ARMY
HEADQUARTERS UNITED STATES ARMY TRAINING AND DOCTRINE COMMAND
FORT MONROE, VIRGINIA 23651-5000

REPLY TO ATTENTION OF

S: 13 Mar 95

ATCS-OR

MAR 10 1995

MEMORANDUM FOR

Commander, U.S. Army Engineer Center and Fort Leonard Wood, ATTN: ATZT-CS, Fort Leonard Wood, MO 65473-5000
Commander, U.S. Army Chemical and Military Police Centers and Fort McClellan, ATTN: ATZN-CS, Fort McClellan, AL 36205-5000

SUBJECT: Fort McClellan Permits

1. Request Fort Leonard Wood and Fort McClellan provide information in response to following questions from The Army Basing Study:

a. What permits have been applied for and when, in regards to the closure of Fort McClellan and realignment of Military Police and Chemical Schools?

b. Are the applications public; if so, how can the public obtain them?

c. Was an EIS done at Fort McClellan when the CDTF was built; if so, how long did it take?

2. Response requested by 1500 hours on 13 Mar 95. Fort McClellan should provide data to Ms. Francine Cole, who will be on site for BRAC 95 installation visit. Fort Leonard Wood should prof data to Ms. Francine Cole, PROFS ID: MON1(COLEF) with copy furnished to Mr. David Taylor, PROFS ID: MON1(TAYLORBD).

FOR THE COMMANDER:

JOSEPH A. ROSZKOWSKI
Colonel, GS
Director, Operations

MAR-01-1995 12:55 DNR AIR POLLUTION CONTROL

Missouri Department of Natural Resources
Air Pollution Control Program
New Source Review Unit
P.O. Box 176, Jefferson City, MO 65102

RECEIVED
'95 MAR 1 PM 3 40
AIR POLLUTION CONTROL PGM

APPLICATION FOR AUTHORITY TO CONSTRUCT

APCP USE ONLY	
Filing Fee: 100	
Check No.: 4487	Check Recd.: 3/1/95
Check Amount: $ 100	Check Date: 3/1/95
Project Number: 3860-0028	

NOTE: INSTRUCTIONS ON BACK OF THIS SHEET

NAME OF COMPANY/FACILITY TO RECEIVE PERMIT:
U.S. Army Engineer Center and Fort Leonard Wood

COMPANY/FACILITY STREET ADDRESS:
ATTN: ATZT -DPW-EE

COMPANY/FACILITY MAILING ADDRESS:
Same

COMPANY/FACILITY CITY:	STATE:	ZIP CODE:
Fort Leonard Wood	MO	65473

COUNTY: Pulaski 35N Section: 21 Township: 8W Range:

WHAT MISSOURI SENATORIAL DISTRICT IS COMPANY/FACILITY IN?

WHAT MISSOURI REPRESENTATIVE DISTRICT IS COMPANY/FACILITY IN?

NAME OF PARENT COMPANY:
Department of Defence

PARENT COMPANY MAILING ADDRESS:

PARENT COMPANY CITY:	STATE:	ZIP CODE:

THIS APPLICATION IS FOR:
☐ MODIFICATION OR ADDITION TO AN EXISTING FACILITY ☒ NEW FACILITY

PROJECTED DATE TO COMMENCE CONSTRUCTION:	PROJECTED DATE OF STARTUP:

DESCRIPTION OF NEW OR MODIFIED PROCESSES/EQUIPMENT:
Thermal Treatment Unit to treat waste from a Chemical Decontamination Training Facility

ESTIMATED COST OF BASIC EQUIPMENT:	ESTIMATED COST OF AIR POLLUTION CONTROL EQUIPMENT:
$ 43M	$ Included in basic equipment

All Applications Must be Accompanied by a $100 Filing Fee. Processing Fees at the Rate of $50 per Hour of Staff Time will be Assessed at the End of the Review.

APPLICANT'S CERTIFICATION STATEMENT:
I certify that I have personally examined and am familiar with the information in this application and believe that the information submitted is accurate and complete. I am aware that making a false statement or misrepresentation in this application is grounds for denying or revoking the construction permit. I may also be guilty of a misdemeanor and upon conviction, may be punished by fine or imprisonment.

SIGNATURE OF RESPONSIBLE MEMBER OF THE COMPANY:	DATE:
Scott Murrell	3/1/95

TYPE OR PRINT NAME OF SIGNER: Scott Murrell

OFFICIAL TITLE OF SIGNER:	TELEPHONE NUMBER:
Cheif, Environmental Division	314 596-0869

State of Missouri

Department of Natural Resources
Air Pollution Control Program
P.O. Box 176
Jefferson City, Missouri 65102

PERMIT APPLICATION

RECEIVED
'95 MAR 1 PM 3 40
AIR POLLUTION
CONTROL PGM

Emissions Inventory Questionnaire (EIQ)

FORM 1.0 GENERAL PLANT INFORMATION

Facility Name	County No.	Plant No.	Year of Data
Chemical Decontamination Training Facility Thermal Treatment Unit	3860		1983
Facility Street Address	**County Name**		**Classification**
ATZT-DPW, Northwest Training Area 246	Pulaski		
City / **ZIP Code**	**Facility Phone Number**		
Fort Leonard Wood / 65473-5000	314-596-0840		
Facility Mailing Address	**Product/Principal Activity**		
USAEC & FLW, ATZT-DPW	Thermal treatment of materials		
City / **ZIP Code**	**Number of Employees**	**Land in Acres**	
Fort Leonard Wood / 65473-5000	51	8	
Facility Contact Person	**Where to Send EIQ in Future (Check One)**		
Scott Murrell	[ ] Facility Mailing Address [X] Parent Co. Mailing Address		

	Latitude	Longitude	UTM Coordinates	CTSR Coordinates		
Degrees	37	92	Horizontal (Km) 5755			
Minutes	44	09		Township	Section	Range
Seconds	30	00	Vertical (Km) 41770	35 north	21	8 west

Parent Company Name	Contact Person	Phone Number	
US Army Engineer Center and Fort Leonard Wood	Scott Murrell	314-596-0869	
Mailing Address	**City**	**State**	**ZIP Code**
ATZT-DPW-EE	Fort Leonard Wood	MO	65473-5000

EMISSIONS STATEMENT

TOTAL PLANT EMISSIONS (TONS PER YEAR)

TSP	PM10	SOx	NOx	VOC	CO	LEAD/Toxic	Other
.25	.35	6.41	1.51	.06	.42	0.00/0.00	.038 lb/yr .055 lb/yr .01 lb/yr

The undersigned hereby certifies that they have personally examined and are familiar with the information and statements contained herein and further certifies that they believe this information and statements to be true, accurate and complete. The undersigned certifies that knowingly making a false statement or misrepresenting the facts presented in this document is a violation of state law.

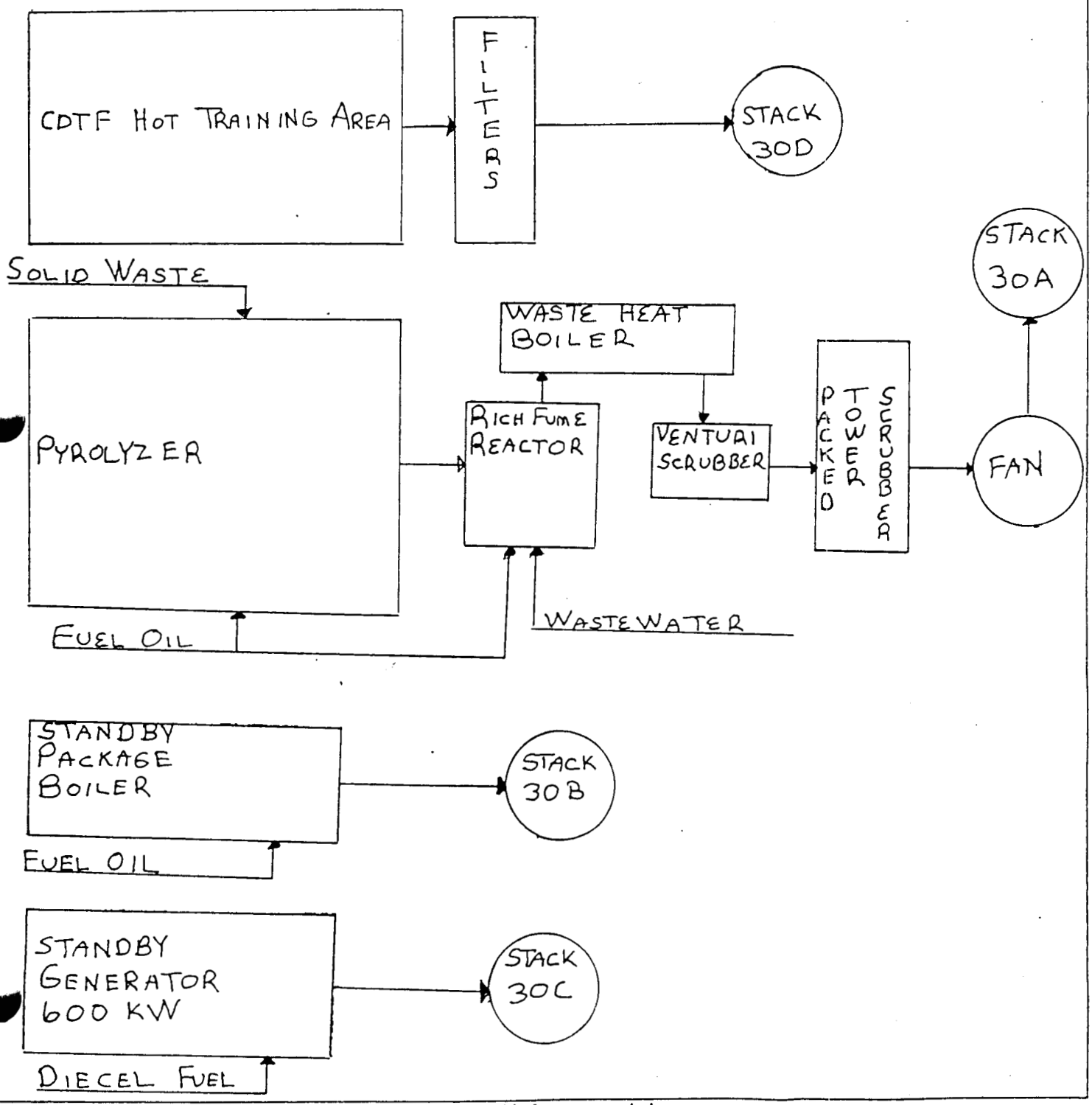
Name of Person Completing Form	Signature	Date
Rory McCarthy Environmental Engineer	Rory McCarthy	1 Mar 95
Name of Authorized Company Representative	**Signature**	**Date**
Scott Murrell	Scott Murrell	1 Mar 95

Form Number MO 780-1431 (10/93)

FORM 1.1 PROCESS FLOW DIAGRAM

Facility Name	County No.	Plant No.	Year of Data
U.S. Army Engineer Center	3860	0004	1995

Please use this page or a separate sheet to provide a Process Flow Diagram per the instructions for Form 1.1 in the Instruction Packet. Do not forget to include all processes used in your facility. Make sure to label each process and piece of equipment and provide an identification number for all emission points (including fugitive emissions) and air pollution control equipment.
MAKE SURE TO USE THE SAME IDENTIFICATION NUMBERS THROUGHOUT THE ENTIRE EIQ.



FORM 1.2 SUMMARY OF EMISSION POINTS

Facility Name	County No.	Plant No.	Year of Data
Thermal Treatment Unit	3860		1983

[1] Total Number of Emission Points

Four

[2] Point No.	[3] Point Description	[4] Worksheet(s) Used with Form 2.0
30A	Stack from treatment unit	
30B	Stack from Standby Package Boiler	
30C	Stack from Standby 600 KW Generator	
30D	Stack from Ventilation System	

Duplicate this form as needed.

Form 2.0 EMISSION POINT INFORMATION

Facility Name	County No.	Plant No.	Year of Data
[redacted]. ARMY ENGINEER CENTER	3860	0004	1995

[1] POINT IDENTIFICATION

Point No.	SIC Code	Point Description
30A		CDTF Thermal Treatment Waste Heat Boiler

Source Classification Code (SCC)	Emission Factor Unit	Number of SCCs Used with this Point
10500205	1000 Gal	

SCC Description: External Combustion Boiler Commercial Distilate Fuel

[2] STACK/VENT PARAMETERS

Stack No.	Height (Ft)	Diameter (Ft)	For a non-circular stack: Diameter = (1.128A)^1/2 (A = Cross Sectional Area in sq. feet)
1	100	3	

Temperature (F)	Velocity (Ft/Min)	Flow Rate (Cu Ft/Min)	List other points sharing this stack.
175	775	5500	

[3] AIR POLLUTION CONTROL EQUIPMENT

Device No.	Device Code	Description of Control Device	CONTROL DEVICE EFFICIENCY TSP	PM10	SOx	NOx	VOC	CO	Lead	Toxics
1	054	Venturi Scrubber	94.95	90.96	84.5	84.5	84.5	84.5	94.95	
2	099	Packed Tower Scrubber								

[4] OPERATING RATE/SCHEDULE

[redacted]al Throughput	Units	Hours/Day	Jan-Mar (%)	Apr-Jun (%)
494	1000 Gallons	8	25.00	25.00
Maximum Hourly Design Rate	**Units**	**Days/Week**	**Jul-Sep (%)**	**Oct-Dec (%)**
.247	1000 Gallons	5	25.00	25.00
		Weeks/Year 50		

EMISSIONS CALCULATIONS

Source of Emission Factor (List below in [6]): 1 CEM; 2 Stack Test; 3 Mass Balance; 4 SCC Factor; 5 AP42; 6 Other

[5] List other worksheets used with this form.

Air Pollutant	[6] Source	[7] Emission Factor (Lbs/Unit)	[8] Ash or Sulfur (%)	[9] Control Efficiency (%)	[10] Actual Emissions (Tons/Yr)	Maximum Hourly (Lbs/Hr)	Potential Controlled (Tons/Yr)	Potential Uncontrolled (Tons/Yr)
TSP	4	2.5		94.95	.03			
PM10	4	2.46		90.96	.05			
SOx	4	143	.05	84.5	2.74			
NOx	4	18		84.5	.69			
VOC	4	.7		84.5	.027			
[redacted]	4	5		84.5	.19			
Lead								
Toxics								

Form 2.0 EMISSION POINT INFORMATION

Facility Name	County No.	Plant No.	Year of Data
[redacted].S. ARMY ENGINEER CENTER	3860	0004	

[1] POINT IDENTIFICATION

Point No.		SIC Code	Point Description
30A			CDTF Thermal Treatment Unit Waste Water

Source Classification Code (SCC)	Emission Factor Unit	Number of SCCs Used with this Point
	1000 Gallons	

SCC Description:

[2] STACK/VENT PARAMETERS

Stack No.		Height (Ft)	Diameter (Ft)	For a non-circular stack: Diameter = (1.128A)^1/2 (A = Cross Sectional Area in sq. feet)
1		100	3	

Temperature (F)	Velocity (Ft/Min)	Flow Rate (Cu Ft/Min)	List other points sharing this stack.
175	777	[illegible]	

[3] AIR POLLUTION CONTROL EQUIPMENT

Device No.	Device Code	Description of Control Device	CONTROL DEVICE EFFICIENCY							
			TSP	PM10	SOx	NOx	VOC	CO	Lead	Toxics
1	054	Venturi Scrubber	94.95	90.96	84.5	84.5	84.5	84.5	94.95	
2	099	Packed Tower Scrubber								

[4] OPERATING RATE/SCHEDULE

Annual Throughput	Units	Hours/Day	Jan-Mar (%)	Apr-Jun (%)
750	1000 Gallons	8	25.00	25.00
Maximum Hourly Design Rate	**Units**	**Days/Week**	**Jul-Sep (%)**	**Oct-Dec (%)**
.375	1000 Gallons	5	25.00	25.00
		Weeks/Year 50		

EMISSIONS CALCULATIONS

Source of Emission Factor (List below in [6]): 1 CEM, 2 Stack Test, 3 Mass Balance, 4 SCC Factor, 5 AP42, 6 Other

[5] List other worksheets used with this form.

Air Pollutant	[6] Source	[7] Emission Factor (Lbs/Unit)	[8] Ash or Sulfur (%)	[9] Control Efficiency (%)	[10] Actual Emissions (Tons/Yr)	Maximum Hourly (Lbs/Hr)	Potential Controlled (Tons/Yr)	Potential Uncontrolled (Tons/Yr)
TSP	5	3.88		94.95	.073			
PM10		3.88		90.96	.131			
SOx		5.3		84.5	.31			
NOx								
[illegible]								
[illegible]								
Lead								
Toxics				GB .0381b/yr(1) VX .0021b/yr(2) HD .011b/yr(3)				

Form 2.0 EMISSION POINT INFORMATION

Facility Name	County No.	Plant No.	Year of Data
[redacted] ARMY ENGINEER CENTER	3860	0004	1995

[1] POINT IDENTIFICATION

Point No.	SIC Code	Point Description
30A		CDTF Solid Waste Thermal Treatment

Source Classification Code (SCC)	Emission Factor Unit	Number of SCCs Used with this Point
	1000 lbs	

SCC Description:

[2] STACK/VENT PARAMETERS

Stack No.	Height (Ft)	Diameter (Ft)	For a non-circular stack: Diameter = (1.128A)^1/2 (A = Cross Sectional Area in sq. feet)
1	100	3	

Temperature (F)	Velocity (Ft/Min)	Flow Rate (Cu Ft/Min)	List other points sharing this stack.
175	777	[illegible]	

[3] AIR POLLUTION CONTROL EQUIPMENT

Device No.	Device Code	Description of Control Device	CONTROL DEVICE EFFICIENCY							
			TSP	PM10	SOx	NOx	VOC	CO	Lead	Toxics
1	054	Venturi Scrubber	94.95	90.96	84.50	84.50	84.5	84.5	94.95	
2	099	Packed Tower Scrubber								

[4] OPERATING RATE/SCHEDULE

Throughput	Units	Hours/Day	Jan-Mar (%)	Apr-Jun (%)
250	1000 Pounds	8	25.00	25.00
Maximum Hourly Design Rate	**Units**	**Days/Week**	**Jul-Sep (%)**	**Oct-Dec (%)**
.125	1000 Pounds	5	25.00	25.00
		Weeks/Year 50		

EMISSIONS CALCULATIONS

Source of Emission Factor (List below in [6]): 1 CEM; 2 Stack Test; 3 Mass Balance; 4 SCC Factor; 5 AP42; 6 Other

[5] List other worksheets used with this form.

Air Pollutant	[6] Source	[7] Emission Factor (Lbs/Unit)	[8] Ash or Sulfur (%)	[9] Control Efficiency (%)	[10] Actual Emissions (Tons/Yr)	Maximum Hourly (Lbs/Hr)	Potential Controlled (Tons/Yr)	Potential Uncontrolled (Tons/Yr)
TSP	6	5.70		94.95	.036			
PM10	6	5.70		90.96	.06			
NOx	6	5.78		84.5	.11			
VOC	6							
CO	6							
Lead								
Toxics								

FORM 2.2P INCINERATOR WORKSHEET - PERMITS

Facility Name	County No.	Plant No.	Year of Data
Thermal Treatment Unit	3860		1983

[1] EQUIPMENT INFORMATION

Point No.	SCC	Make/Model	Serial Number
30		Pyrobatch System	

Incinerator Use (Check One)
☒ Government ☐ Commercial/Institutional ☐ Industrial ☐ Other (Specify)

Equipment Type (Check Appropriate Boxes)
☐ Pathological ☐ Sewage Sludge ☒ Multiple Chambers ☐ Controlled Air ☐ Other (Specify)

Rated Capacity (lbs/hr)	Approximate Firing (lbs/day)	Grate Area (sq. ft.)

Stack Lining
☒ Firebrick ☐ Unlined ☐ Castable

Type of Charging Door
☐ Continuous ☒ Batch ☐ Intermittent

Type of Flue Dampers
☐ Barometric ☐ Guillotine ☒ Both

Type of Draft
☐ Natural ☒ Forced ☒ Induced

Overfire Air (cu. ft./min)	Underfire Air (cu. ft./min)	Excess Air (cu. ft./min)
6663	100	2821

PRIMARY CHAMBER

Burner (BTU/hr)	Volume (cu. ft.)	Temperature (F)
2,594,000	378	Min: 1000° Max:

SECONDARY CHAMBER

Burner (BTU/hr)	Volume (cu. ft.)	Temperature (F)
25,778,000	1010	Min: 1450° Max: 2200°

TERTIARY CHAMBER

Burner (BTU/hr)	Volume (cu. ft.)	Temperature (F)
		Min: Max:

[2] WASTE INFORMATION AND THROUGHPUTS

Process Waste Type	Heat Content (BTU/Units)	Annual Throughput	Units
Type 0 (solid)	4610	250,000	lbs/yr
Type 5 (liquid)	-1,000	6,225,000	lbs/yr
TOTAL ANNUAL THROUGHPUT =		6,475,000	Lbs/Yr
TOTAL ANNUAL THROUGHPUT (Tons/Yr) = {Total Annual Throughput (Lbs/Yr)} / 2000		3,237.5	Tons/Yr

Enter the TOTAL ANNUAL THROUGHPUT (Tons/Yr) in Block 4 on Form 2.0, Emission Point Information.

Form 2.0 EMISSION POINT INFORMATION

Facility Name	County No.	Plant No.	Year of Data
S. ARMY ENGINEER CENTER	3860	0004	1995

[1] POINT IDENTIFICATION

Point No.		SIC Code	Point Description
30B			CDTF Standby Package Boiler

Source Classification Code (SCC)	Emission Factor Unit	Number of SCCs Used with this Point	
10500205	1000 Gallons		

SCC Description: External Combustion Boiler Commercial Distilate Fuel

[2] STACK/VENT PARAMETERS

Stack No.		Height (Ft)	Diameter (Ft)	For a non-circular stack: Diameter = (1.128A)^1/2 (A = Cross Sectional Area in sq. feet)
1[illegible]		30	1.5	

Temperature (F)	Velocity (Ft/Min)	Flow Rate (Cu Ft/Min)	List other points sharing this stack.

[3] AIR POLLUTION CONTROL EQUIPMENT

Device No.	Device Code	Description of Control Device	CONTROL DEVICE EFFICIENCY							
			TSP	PM10	SOx	NOx	VOC	CO	Lead	Toxics

[4] OPERATING RATE/SCHEDULE

[illegible]al Throughput	Units	Hours/Day	Jan-Mar (%)	Apr-Jun (%)
91	1000 Gallons	8	25.00	25.00
Maximum Hourly Design Rate	**Units**	**Days/Week**	**Jul-Sep (%)**	**Oct-Dec (%)**
.0455	1000 Gallons	5	25.00	25.00
		Weeks/Year 50		

EMISSIONS CALCULATIONS

Source of Emission Factor (List below in [6]): 1 CEM; 2 Stack Test; 3 Mass Balance; 4 SCC Factor; 5 AP42; 6 Other

[5] List other worksheets used with this form.

Air Pollutant	[6] Source	[7] Emission Factor (Lbs/Unit)	[8] Ash or Sulfur (%)	[9] Control Efficiency (%)	[10] Actual Emissions (Tons/Yr)	Maximum Hourly (Lbs/Hr)	Potential Controlled (Tons/Yr)	Potential Uncontrolled (Tons/Yr)
TSP	4	2.5			.11			
PM10	4	2.46			.11			
SOx	4	143			3.25			
NOx	4	18			.82			
VOC	4	.7			.03			
C[illegible]	4	5			.23			
Lead								
Toxics								

Form 2.0 EMISSION POINT INFORMATION

Facility Name	County No.	Plant No.	Year of Data
[redacted]S. ARMY ENGINEER CENTER	3860	0004	1995

[1] POINT IDENTIFICATION

Point No.		SIC Code	Point Description
30C			CDTF Standby Generator 600 KW

Source Classification Code (SCC)	Emission Factor Unit	Number of SCCs Used with this Point	
20300101	1000 Gallons		

SCC Description: Reciprocating Internal Combustion Engine

[2] STACK/VENT PARAMETERS

Stack No.		Height (Ft)	Diameter (Ft)	For a non-circular stack: Diameter = (1.128A)^1/2 (A = Cross Sectional Area in sq. feet)

Temperature (F)	Velocity (Ft/Min)	Flow Rate (Cu Ft/Min)	List other points sharing this stack.

[3] AIR POLLUTION CONTROL EQUIPMENT

Device No.	Device Code	Description of Control Device	CONTROL DEVICE EFFICIENCY							
			TSP	PM10	SOx	NOx	VOC	CO	Lead	Toxics

[4] OPERATING RATE/SCHEDULE

[redacted]al Throughput	Units	Hours/Day	Jan-Mar (%)	Apr-Jun (%)
.69	1000 Gallons	1	25.00	25.00
Maximum Hourly Design Rate	**Units**	**Days/Week**	**Jul-Sep (%)**	**Oct-Dec (%)**
.0138	1000 Gallons	1	25.00	25.00
		Weeks/Year 52		

EMISSIONS CALCULATIONS

Source of Emission Factor (List below in [6]): 1 CEM; 2 Stack Test; 3 Mass Balance; 4 SCC Factor; 5 AP42; 6 Other

[5] List other worksheets used with this form.

Air Pollutant	[6] Source	[7] Emission Factor (Lbs/Unit)	[8] Ash or Sulfur (%)	[9] Control Efficiency (%)	[10] Actual Emissions (Tons/Yr)	Maximum Hourly (Lbs/Hr)	Potential Controlled (Tons/Yr)	Potential Uncontrolled (Tons/Yr)
TSP	4	33.5			.01			
PM10	4	32			.01			
SOx	4	31.2			0			
NOx	4	469			.16			
VOC	4	32.1			.01			
C[redacted]	4	102			.04			
Lead								
Toxics								

FORM 2.1P FUEL COMBUSTION WORKSHEET - PERMITS

Facility Name	County No.	Plant No.	Year of Data
[redacted] Thermal Treatment Unit	3860		1983

[1] COMBUSTION EQUIPMENT INFORMATION

Point No. 30

SCC ___-___-___-XX

Firing Method Code No. (Coal Only)

1. Tangential
2. Opposed
3. Front
4. Dry/Wet Bottom
5. Other (Specify)

Equipment Description	Year Put in Service	Firing Code No.	Maximum Design Rate (Million BTU/Hr)
Waste Heat Boiler	1984		31.250
Standby Package Boiler	1984		6.250

Combustion Equipment Use (Check One)

☐ Electric Power Generation ☐ Industrial Use ☐ Commercial/Institutional ☒ Space Heating
☒ Other (Specify) Thermal treatment

Combustion Equipment Category - Coal Use Only (Check One)

☐ Pulverized Coal ☐ Pulverized Coal Dry Bottom ☐ Pulverized Coal Wet Bottom ☐ Cyclone
☐ Fluidized Bed ☐ Spreader Stoker ☐ Overfeed Stoker ☐ Underfeed Stoker
☐ Hand Fired ☐ Other (Specify)

[2] FUEL INFORMATION

Fuel Type (Check One Only)

Oil	Gas	Coal	Other
☒ Distillate (Fuel Oil 1-4)	☐ Natural Gas	☐ Anthracite	☐ Refuse (Use Form 2.2)
☐ Residual (Fuel Oil 5-6)	☐ LPG/Propane	☐ Bituminous	☐ Trade Wastes (Use Form 2.2)
☐ Waste Oil		☐ Lignite	☐ Other (Specify)

Fuel Identifier	Annual Throughput	Units	% Sulfur by Wt as Received *	% Ash by Wt as Received *	Heat Content (BTU/Fuel Unit)
# 2 fuel oil	585	1000 gal		0.50	140,000
Fuel Totals and Weighted Averages					

* Attach a copy of the current supplier statement verifying percentage of sulfur and ash contents of the fuel.

[3] CALCULATION OF MAXIMUM HOURLY DESIGN RATE

Convert the Heat Content units from BTU per Fuel Unit to Million of BTU per Fuel Unit by dividing the BTU figure by 1,000,000. 0.14

TOTAL MAXIMUM HOURLY DESIGN RATE =

[redacted]aximum Design Rate in Million BTU/Hr) / (Heat Content in Million BTU/Fuel Unit)

[redacted]aximum Hourly Design Rate
222.89

Enter the total ANNUAL THROUGHPUT and total MAXIMUM HOURLY DESIGN RATE in Block 4 of Form 2.0, Emission Point Information for this fuel type. Enter the weighted average for the percent ASH/SULFUR in the PM10/SOx box in Block 8 of Form 2.0.

Form 2.0 EMISSION POINT INFORMATION

Facility Name	County No.	Plant No.	Year of Data
ARMY ENGINEER CENTER	3860	0004	1995

[1] POINT IDENTIFICATION

Point No.		SIC Code	Point Description
33D			CDTF Ventilation System

Source Classification Code (SCC)	Emission Factor Unit	Number of SCCs Used with this Point	
	1000 CFM		

SCC Description

[2] STACK/VENT PARAMETERS

Stack No.		Height (Ft)	Diameter (Ft)	For a non-circular stack: Diameter = (1.128A)^1/2 (A = Cross Sectional Area in sq. feet)
1		75	4	

Temperature (F)	Velocity (Ft/Min)	Flow Rate (Cu Ft/Min)	List other points sharing this stack.
Ambient	2515	31,600	

[3] AIR POLLUTION CONTROL EQUIPMENT

Device No.	Device Code	Description of Control Device	CONTROL DEVICE EFFICIENCY							
			TSP	PM10	SOx	NOx	VOC	CO	Lead	Toxics
1		Carbon Filters								99
2		HEPA Filters	99.99	99.99						

[4] OPERATING RATE/SCHEDULE

Throughput	Units	Hours/Day	Jan-Mar (%)	Apr-Jun (%)
496000	1000 CFM	8	25.00	25.00
Maximum Hourly Design Rate	**Units**	**Days/Week**	**Jul-Sep (%)**	**Oct-Dec (%)**
248	1000 CFM	5	25.00	25.00
		Weeks/Year 50		

EMISSIONS CALCULATIONS

Source of Emission Factor : 1 CEM 3 Mass Balance 5 AP42 (List below in [6]) 2 Stack Test 4 SCC Factor 6 Other

[5] List other worksheets used with this form.

Air Pollutant	[6] Source	[7] Emission Factor (Lbs/Unit)	[8] Ash or Sulfur (%)	[9] Control Efficiency (%)	[10] Actual Emissions (Tons/Yr)	Maximum Hourly (Lbs/Hr)	Potential Controlled (Tons/Yr)	Potential Uncontrolled (Tons/Yr)
SP								
M10								
Ox								
Ox								
OC								
O								
ad								
xics								

7/8/85

Case-6

Typical Daily Load, Wastewater 15,000 gals/week, RFR 2200F.

- Typical Daily Load

No	Item Description	No of Bags	Wt (lbs)	Vol (cft)
1	Wet Sludge in plastic lined fiber drum	1	180	3.5
2	Chemistry Lab. Trash	1	25	5
3	Training Bay Trash	4	100	20
4	Medical Lab Trash	1	15	5
5	Laundry Trash	1	15	5
6	Office & Classroom Trash	4	60	20
7	Grounds Trash	1	25	5
revised * 8	Carbon Filters in PVC bags	2	4484	18
9	Extra PVC Bags	5	20	5
10	Hoods, Boots & Gloves	1	6	1
11	Overgarments (Hoods, Boots & Gloves)	1	8	1
12	Overgarments	6	80	30
13	Gas Mask Filters	1	18	1
	Totals	29	1000.4	119.5

- Garbage Composition

1.	Wet Sludge	95% water, 2% solids, 3% drum paper + PVC bag
2.	Chem Lab Trash	20% glass, 10% metal, 20% rags, 50% paper + PVC bag
3.	Training Bay Trash	10% glass, 10% metal, 40% rags, 40% paper + bag
4.	Medical Lab Trash	40% plastic, 30% paper, 30% rags + bag
5.	Laundry Trash	50% cloth, 50% paper + bag
6.	Office & classroom trash	100% paper + bag
7.	Grounds Trash	30% paper, 30% plastic, 20% glass, 20% metal + bag
revised * 8.	Carbon Filters in PVC bags	28% water, 33% metal, 39% Carbon + bag
9.	PVC bags	100% PVC
10.	Hoods, boots & gloves	rubberized material 100%, + bag
11.	" from overgarments	" 100% + bag
12.	Overgarments	" 100% + bag
13.	gas mask filters	inerts 30%, 30% Carbon, 20% metal, 20% plastic + bag

Revised FLOWS

7/8/85

Case-No.	1	2	3	4	5	6
Description	Oil Firing	Oil Firing	Oil Firing	Oil Firing	Oil Firing	Oil Firing
	20% xs air	≈ 100% xs air	20% xs air	20% xs air	20% xs air	20% xs air
	≈ 2800F RFI	2200F RFI	2200F RFI	2200F RFI	2200F RFI	2200F RFI
	No Pyrolysis	No Pyrolysis	No Pyrolysis	400 lbs/hr PVC	100 lbs/hr PVC	Avg Daily Load
	No Wastewater	No Wastewater	3130 lbs/hr water	3130 lbs/hr water	3130 lbs/hr water	3130 lbs/hr water
	12,000 lbs/hr steam 60psig	12000 lbs/hr steam 60psig	12000 lbs/hr steam 60psig	12000 lbs/hr steam 60psig	12000 lbs/hr steam 60psig	12000 lbs/hr steam 60psig
Pyrolysis Furnace: OIL	—	—	—	52.65 lbs/hr	52.65 lbs/hr	52.65 lbs/hr
BTU/hr	—	—	—	1.08×10^6	1.0×10^6	1.0×10^6
Combn Air	—	—	—	913.96 lbs/hr	913.96 lbs/hr	913.96 lbs/hr
RFI Temp °F	≈ 2800	2200	2200	2200	2200	2200
• PILOTS OIL	26.325	26.325	26.325	26.325	26.325	26.325 lbs/hr
BTU/hr	0.5×10^6	0.5×10^6	0.5×10^6	0.5×10^6	0.5×10^6	0.5×10^6 BTU/
Combustion Air	456.98	456.98	456.98	456.98	456.98	456.98 lbs/h
• Wastewater	3130	3130	3130	3130	3130	3130 lbs/h
BTU/hr	41,043	41043	41043	41043	41043	41043 BTU
Combustion Air	46.02	46.02	46.02	46.02	46.02	46.02 lb
• Oil Combustion	763.37	830.594	1024.0705	837.5648	525.4286	854.08 lbs/h
BTU/hr	14.5×10^6	15.775×10^6	19.45×10^6	15.91×10^6	9.98×10^6	16.22×10^6 BTU/hr
Combustion Air	13251	23365	17777	17777	17777	17777 lbs/h
Boiler stack gas Temp	500	520	582	656	662	714 °F
RFR/BOILER FLOWS						
O2	525	2627	699	740	856	409
N2	10435	18134	13916	14612	14613	14625
CO2	2523	2648	3364	3599	3595	4022
H2O	1009	1174	4470	4484	4367	4958
SO2	6.00	6.52	7.99	8.10	7.40	11.73
HCl	—	—	0.80	187.56	467.70	28.61
HF	—	—	0.0018	0.0018	0.0018	0.0018
P_2O_5	—	—	0.0092	0.0092	0.0092	0.0092
Inerts/Ash	0.0826	0.0826	1.5439	3.1784	5.6198	7.2487
NaOH	—	—	0.2297	0.2297	0.2297	0.2297
TOTALS	14498	24590	22460	23634	23912	24062

DOD Hazardous Materials Information System
DoD 6050.5-LR
AS OF October 1994
Proprietary Version - For U.S. Government Use Only

FSC: 6850
[redacted]IN: 007534827
Manufacturer's CAGE: 80706
Part No. Indicator: A
Part Number/Trade Name: DECONTAMINATING AGENT DS2

==========

General Information

==========

Item Name: DECONTAMINATING AGENT
Manufacturer's Name: U.S. ARMY ARMAMENT, MUNITIONS & CHEMICAL COMMAND
Manufacturer's Street: SMCCR-SFS. HDQ, BLDG E5101
Manufacturer's P. O. Box:
Manufacturer's City: ABERDEEN PROVING GROUND
Manufacturer's State: MD
Manufacturer's Country: US
Manufacturer's Zip Code: 21010-5423
Manufacturer's Emerg Ph #: 301-278-5201 (WORK HOURS)
Manufacturer's Info Ph #: 301-278-5201 (AFTER DUTY HOURS)
Distributor/Vendor # 1: POLY RESEARCH CORPORATION (516-758-0460)
Distributor/Vendor # 1 Cage: 64713
Distributor/Vendor # 2: ASTRO DEVELOPMENT LABORATORY INC
Distributor/Vendor # 2 Cage: 7K997
Distributor/Vendor # 3: TIMMERMAN
Distributor/Vendor # 3 Cage: TIMMR
Distributor/Vendor # 4: WRIGHT CHEMICAL CORP
Distributor/Vendor # 4 Cage: 5U648
[redacted]fety Data Action Code:
[redacted]ety Focal Point: A
Record No. For Safety Entry: 003
Tot Safety Entries This Stk#: 006
Status: SMU
Date MSDS Prepared: 28SEP84
Safety Data Review Date: 15JAN92
Supply Item Manager: CX
MSDS Preparer's Name:
Preparer's Company:
Preparer's St Or P. O. Box:
Preparer's City:
Preparer's State:
Preparer's Zip Code:
Other MSDS Number:
MSDS Serial Number: BFNDS
Specification Number: MIL-D-50030
Spec Type, Grade, Class: REV F
Hazard Characteristic Code: J6
Unit Of Issue: CN
Unit Of Issue Container Qty: 1.3 QUARTS
Type Of Container:
Net Unit Weight:
NRC/State License Number:
Ne[redacted]Explosive Weight:
Ne[redacted]Propellant Weight-Ammo:
[redacted]t Guard Ammunition Code:

Report for NIIN: 00753482?

Ingredients/Identity Information

Proprietary: NO
Ingredient: DIETHYLENE TRIAMINE
Ingredient Sequence Number: 01
Percent: 69.-71.
Ingredient Action Code:
Ingredient Focal Point: A
NIOSH (RTECS) Number: IE1225000
CAS Number: 111-40-0
OSHA PEL: 1 PPM
ACGIH TLV: S, 1 PPM; 9192
Other Recommended Limit:

Proprietary: NO
Ingredient: 2-METHOXYETHANOL (EGME) (SARA III)
Ingredient Sequence Number: 02
Percent: 27.-29.
Ingredient Action Code:
Ingredient Focal Point: A
NIOSH (RTECS) Number: KL5775000
CAS Number: 109-86-4
OSHA PEL: S, 25 PPM
ACGIH TLV: S, 5 PPM; 9192
Other Recommended Limit:

Proprietary: NO
Ingredient: SODIUM HYDROXIDE (SARA III)
Ingredient Sequence Number: 03
Percent: 1.9-2.1
Ingredient Action Code:
Ingredient Focal Point: A
NIOSH (RTECS) Number: WB4900000
CAS Number: 1310-73-2
OSHA PEL: 2 MG/M3
ACGIH TLV: C 2 MG/M3; 9293
Other Recommended Limit:

Proprietary: NO
Ingredient: MATERIAL MANUFACTURED FOR ARMY IAW THE REQMTS OF SPEC.; ARMY'S CHEM. RES. & DEV. CTR. PROVIDED THE MASTER MSDS.
Ingredient Sequence Number: 04
Percent:
Ingredient Action Code:
Ingredient Focal Point: A
NIOSH (RTECS) Number: 99999999ZZ
CAS Number:
OSHA PEL:
ACGIH TLV:
Other Recommended Limit:

Physical/Chemical Characteristics

Appearance And Odor: CLEAR AMBER SOLUTION WITH AMMONIA-LIKE ODOR
Boiling Point: 380F,193C
Melting Point: N/K

Report for NIIN: 007534827

Vapor Pressure (MM Hg/70 F): N/K
Vapor Density (Air=1): N/K
Specific Gravity: 0.97 - 0.98
Decomposition Temperature: UNKNOWN
Evaporation Rate And Ref: UNKNOWN
Solubility In Water: UNKNOWN
Percent Volatiles By Volume: N/K
Viscosity: N/K
pH: >12.5
Radioactivity:
Form (Radioactive Matl):
Magnetism (Milligauss):
Corrosion Rate (IPY): UNKNOWN
Autoignition Temperature: N/K

Fire and Explosion Hazard Data

Flash Point: 168F,76C
Flash Point Method: N/K
Lower Explosive Limit: N/K
Upper Explosive Limit: N/K
Extinguishing Media: CARBON DIOXIDE, ALCOHOL FOAM, WATER
Special Fire Fighting Proc: NONE CITED
Unusual Fire And Expl Hazrds: NEVER MIX OR STORE WITH ACIDS, OXIDIZING AGENT OR STB (UPER TROPICAL BLEACH); FIRE OR EXPLOSION MAY RESULT.

Reactivity Data

Stability: YES
Cond To Avoid (Stability): EXPOSURE TO AIR, DS2 WILL DETERIORATE IN AIR. EXPOSURE OF 48 HOURS OR MORE TO OPEN AIR PRODUCES GELATIN-LIKE BODIES.
Materials To Avoid: CORROSIVE. INCOMPATIBLE WITH AL, CD, ZN, PAINT, WOOL, OXIDIZING MATERIALS.
Hazardous Decomp Products: NONE CITED
Hazardous Poly Occur: NO
Conditions To Avoid (Poly):

Health Hazard Data

LD50-LC50 Mixture: N/K
Route Of Entry - Inhalation: YES
Route Of Entry - Skin: YES
Route Of Entry - Ingestion: YES
Health Haz Acute And Chronic: ACUTE: CORROSIVE TO TISSUE & HIGHLY IRRITANT TO RESPIRATORY TRACT; CHRONIC: REPEATED EXPOSURE TO "DETA" CAN CAUSE SKIN SENSITIZATION & ASTHMA; SUFFICIENT EXPOSURE TO "EGME" MAY CAUSE "CNS" DEPRESSION & LIVER DAMAGE. ALTHOUGH NOT DEFINITELY ESTABLISHED IN HUMANS, REPRODUCTIVE EFFECTS ARE ALSO A MAJOR CONCERN.
Carcinogenicity - NTP: NO
Carcinogenicity - IARC: NO
Carcinogenicity - OSHA: NO
Explanation Carcinogenicity:
Signs/Symptoms Of Overexp: NO TOX. DATA AVAILABLE ON DS2. HOWEVER, DS2: [redacted]ALI WHICH ON CONTACT WILL CORRODE TISSUE. EFFECTS EXHIBITED ARE A JNCTION OF ROUTE OF EXPOS., AMT. OF SUBST. PRESENT & DURATION OF EXPOSURE; HEALTH EFFECTS RANGE FROM MILD BURNS & PRIMARY IRRITATION TO CORNEAL OPACIFICATION, SEVERE BURNS, NAUSEA, VOMITING(SEE SUPPL DATA)

Report for NIIN: 007534827

Med Cond Aggravated By Exp: PRE-EXISTING RESPIRATORY CONDITIONS.
Emergency/First Aid Proc: SKIN: FLUSH AWAY W/WATER UNTIL "SOAPINESS" IS NO [redacted]GER PRESENT; EYES: IMMEDIATELY FLUSH W/COPIOUS AMTS. OF WATER FOR AT [redacted]AST 15 MINS. IN EITHER CASE, SEEK MEDICAL ATTN.; INHAL: REMOVE TO FRESH AIR -GIVE CPR/O*2 AS SITUATION DICTATES. ADDITIONAL SUPPORTIVE MEASURES MAY BE REQUIRED; INGEST: IF CONSCIOUS, GIVE PATIENT AS MUCH MILK OR WATER AS POSSIBLE. DO NOT INDUCE VOMITING. GET MED. ATTN. IMMED.

Precautions for Safe Handling and Use

Steps If Matl Released/Spill: SPILLS ON POROUS SURFACES(CONCRETE, WOOD, ETC.) SHOULD BE CLEANED & NEUTRALIZED IMMEDIATELY. OTHERWISE, IT WILL BE ABSORBED & BECOME AN INDEFINITE HAZARD. CONTAIN SPILL, NEUTRALIZE, ABSORB ON VERMICULITE, CLAY OR DIATOMACEOUS EARTH. SCOOP UP IN DRUM!
Neutralizing Agent: SODIUM BISULFATE
Waste Disposal Method: CHOICE OF METHOD DEPENDS ON PHYSICAL CONDITION OF WASTE & FACILITY'S CAPABILITY.FOR EXCESS STOCK,COORDINATE W/LOCAL DRMO; OVERSEAS:OPERATE W/IN HOST COUNTRY & DRMO REGS.; WASTE CORROSIVE(PH >12.5) W/EPA HAZ. NO:D002: INCINERATE OR NEUTRALIZE.
Precautions-Handling/Storing: AVOID EXTREME TEMPERATURES(I.E. 160F/71C) FOR STORAGE! AVOID CONTACT W/LEAKING LIQUID OR VAPOR.
Other Precautions: SPILL/RELEASE PROCEDURE CONTD: SCOOP UP MATERIAL & CONTAMIN. MATTER, PLACE IN EPOXY COATED DRUM W/REMOVABLE HEAD, IAW EPA & DOT RQMTS.; DURING CLEAN-UP,WEAR FULL FACE RESPIR. W/ORGANIC VAPOR CARTRIDGE, ARM-LENGTH RUBBER GLOVES & RUBBER APRON.

Control Measures

[redacted]piratory Protection: FOR DS2 AIRBORNE CONC. <5 PPM, USE FULL FACEPIECE & ONE OF THE FOLLOWING: A) CHEM. CARTRIDGE RESP. W/AMINE CARTDGE; B) SUPPL. AIR RESP; C) SUPPL. AIR RESP. IN POSITIVE PRESS. ON CONTIN. FLOW MODE; FOR CONC. >5 PPM OR EMERGENCIES,USE "SCBA"
Ventilation: LOCAL EXHAUST: NECESSARY IF TLV(TWA) EXCEEDED.
Protective Gloves: BUTYL RUBBER: ARM'S LENGTH TYPE
Eye Protection: SPLASHPROOF GOGGLES /FULL FACE SHIELD
Other Protective Equipment: AS REQUIRED FOR TASK AT HAND: CORROSIVE RESISTANT(I.E. RUBBER) GAUNTLET, BOOTS, & APRON
Work Hygienic Practices: USE MATERIAL IAW THE GUIDELINES & INSTRUCTIONS SET FORTH IN USER'S TECH MANUAL.
Suppl. Safety & Health Data: SIGNS & SYMPTOM OVEREXP. CONTD: RESPIRATORY IRRITATION, SKIN SENSITIZATION.

Transportation Data

Transportation Action Code:
Transportation Focal Point: A
Trans Data Review Date: 92276
DOT PSN Code: DWE
DOT Symbol:
DOT Proper Shipping Name: CORROSIVE LIQUIDS, N.O.S.
DOT Class: 8
D[redacted] ID Number: UN1760
D[redacted] Pack Group: II
[redacted]Label: CORROSIVE
DOT/DoD Exemption Number:
IMO PSN Code: AFB
IMO Proper Shipping Name: ALKALINE CAUSTIC LIQUIDS, N.O.S.

Report for NIIN: Ø07534827

IMO Regulations Page Number: SEE 8136
IMO UN Number: 1719
IMO UN Class: 8
IMO Subsidiary Risk Label: -
IATA PSN Code: PSU
IATA UN ID Number: 1719
IATA Proper Shipping Name: CAUSTIC ALKALI LIQUID, N.O.S.
IATA UN Class: 8
IATA Subsidiary Risk Class:
IATA Label: CORROSIVE
AFI PSN Code: PSU
AFI Symbols:
AFI Prop. Shipping Name: CAUSTIC ALKALI LIQUIDS, N.O.S.
AFI Class: 8
AFI ID Number: UN1719
AFI Pack Group: I
AFI Label: CORROSIVE
AFI Special Prov:
AFI Basic Pac Ref: 12-4
MMAC Code:
N.O.S. Shipping Name: ALKALINE (CORROSIVE) LIQUID, N.O.S.
Additional Trans Data:

Disposal Data

Disposal Data Action Code:
Disposal Data Focal Point:
Disposal Data Review Date:
[illegible] # For This Disp Entry:
Tot Disp Entries Per NSN:
Landfill Ban Item:
Disposal Supplemental Data:
1st EPA Haz Wst Code New:
1st EPA Haz Wst Name New:
1st EPA Haz Wst Char New:
1st EPA Acute Hazard New:
2nd EPA Haz Wst Code New:
2nd EPA Haz Wst Name New:
2nd EPA Haz Wst Char New:
2nd EPA Acute Hazard New:
3rd EPA Haz Wst Code New:
3rd EPA Haz Wst Name New:
3rd EPA Haz Wst Char New:
3rd EPA Acute Hazard New:

Label Data

Label Required: YES
Technical Review Date: Ø5SEP91
Label Date: UNKNOWN
MFR Label Number: NONE
[illegible]el Status: D
[illegible]mon Name: DECONTAMINATING AGENT DS2
[illegible]onic Hazard: X
Signal Word: WARNING!
Acute Health Hazard-None:
Acute Health Hazard-Slight:

Report for NIIN: 007534627

Acute Health Hazard-Moderate: X
Acute Health Hazard-Severe:
C[redacted]tact Hazard-None:
[redacted]tact Hazard-Slight:
Contact Hazard-Moderate: X
Contact Hazard-Severe:
Fire Hazard-None:
Fire Hazard-Slight: X
Fire Hazard-Moderate:
Fire Hazard-Severe:
Reactivity Hazard-None:
Reactivity Hazard-Slight: X
Reactivity Hazard-Moderate:
Reactivity Hazard-Severe:
Special Hazard Precautions: CORROSIVE TO TISSUE & HIGHLY IRRITANT TO RESPIRATORY TRACT; REPEATED EXPOSURE TO "DETA" CAN CAUSE SKIN SENSITIZATION & ASTHMA; SUFFICIENT EXPOSURE TO "EGME" MAY CAUSE "CNS" DEPRESSION & LIVER DAMAGE. AVOID EXTREME TEMPERATURES(I.E. 160F/71C) FOR STORAGE! AVOID CONTACT W/LEAKING LIQUID OR VAPOR. FIRST AID: SKIN: FLUSH AWAY W/WATER UNTIL "SOAPINESS IS NO LONGER PRESENT; EYES: IMMEDIATELY FLUSH W/COPIOUS AMTS. OF WATER FOR AT LEAST 15 MINS. IN EITHER CASE, SEEK MEDICAL ATTN.; INHAL: REMOVE TO FRESH AIR -GIVE CPR/O*2 AS SITUATION DICTATES/ ADDITIONAL SUPPORTIVE MEASURES MAY BE REQUIRED. INGEST: IF CONSCIOUS, GIVE PATIENT MILK OR WATER. GET DOCTOR
Protect Eye: X
Protect Skin: X
Protect Respiratory: X
Label Name: U.S. ARMY ARMAMENT,MUNITIONS & CHEMICAL
C[redacted]ND
[redacted] Street: ATTN: SMCCR-SFS, HDQ. BLDG. E5101
Label P.O. Box:
Label City: ABERDEEN PROVING GROUND
Label State: MD
Label Zip Code: 21010-5423
Label Country: US
Label Emergency Number: 301-671-4411 (0800 - 1630 EST)
Year Procured: 1974

DOD Hazardous Materials Information System
DoD 6050.5-LR
AS OF October 1994
Proprietary Version - For U.S. Government Use Only

FSC: 6850
NIIN: 002976653
Manufacturer's CAGE: PENNS
Part No. Indicator: A
Part Number/Trade Name: DECONTAMINATING AGENT, STB

General Information

Item Name: DECONTAMINATION AGENT, SUPER TROPICAL BLEACH (STB)
Manufacturer's Name: PENNSALT CHEMICAL CORPORATION
Manufacturer's Street: COMPANY SHUT DOWN STB PLANT IN 1954
Manufacturer's P. O. Box:
Manufacturer's City:
Manufacturer's State:
Manufacturer's Country: US
Manufacturer's Zip Code:
Manufacturer's Emerg Ph #:
Manufacturer's Info Ph #:
Distributor/Vendor # 1:
Distributor/Vendor # 1 Cage:
Distributor/Vendor # 2:
Distributor/Vendor # 2 Cage:
Distributor/Vendor # 3:
Distributor/Vendor # 3 Cage:
Distributor/Vendor # 4:
Distributor/Vendor # 4 Cage:
Safety Data Action Code:
Safety Focal Point: D
Record No. For Safety Entry: 001
Tot Safety Entries This Stk#: 005
Status: S
Date MSDS Prepared: 04NOV92
Safety Data Review Date: 04NOV92
Supply Item Manager: CX
MSDS Preparer's Name: DGSC-SSH
Preparer's Company: DEFENSE GENERAL SUPPLY CENTER
Preparer's St Or P. O. Box: 8000 JEFFERSON DAVIS HWY
Preparer's City: RICHMOND
Preparer's State: VA
Preparer's Zip Code: 23297
Other MSDS Number:
MSDS Serial Number: BPFWX
Specification Number: MIL-12468
Spec Type, Grade, Class: NOT APPLICABLE
Hazard Characteristic Code: D2
Unit Of Issue: DR
Unit Of Issue Container Qty: 8 GALLONS
Type Of Container: SPECIAL DRUM
Net Unit Weight: 50 LBS.
N' 'State License Number: N/R
N Explosive Weight: N/R
Propellant Weight-Ammo: N/R
Last Guard Ammunition Code: N/R

Report for NIIN: 00297665S

Ingredients/Identity Information

[redacted]oprietary: NO
Ingredient: CHLORINATED LIME
Ingredient Sequence Number: 01
Percent: 93.4
Ingredient Action Code:
Ingredient Focal Point: D
NIOSH (RTECS) Number: 1008716CL
CAS Number: UNKNOWN
OSHA PEL: 0.5 PPM (CHLORINE)
ACGIH TLV: 0.5 PPM (CHLORINE)
Other Recommended Limit: NONE RECOMMENDED

Proprietary: NO
Ingredient: CALCIUM OXIDE
Ingredient Sequence Number: 02
Percent: 6.6
Ingredient Action Code:
Ingredient Focal Point: D
NIOSH (RTECS) Number: EW3100000
CAS Number: 1305-78-8
OSHA PEL: 5 MG/M3
ACGIH TLV: 2 MG/M3; 9293
Other Recommended Limit: NONE RECOMMENDED

Physical/Chemical Characteristics

[redacted]ppearance And Odor: WHITE POWDER, STRONG CHLORINE ODOR.
Boiling Point: N/R
Melting Point: UNKNOWN
Vapor Pressure (MM Hg/70 F): UNKNOWN
Vapor Density (Air=1): 1.2 (HCL)
Specific Gravity: 0.75
Decomposition Temperature: >120F,>49C
Evaporation Rate And Ref: NOT APPLICABLE
Solubility In Water: APPRECIABLE
Percent Volatiles By Volume: N/R
Viscosity: N/R
pH: BASIC
Radioactivity: N/R
Form (Radioactive Matl): N/R
Magnetism (Milligauss): N/R
Corrosion Rate (IPY): FAST
Autoignition Temperature: NONE

Fire and Explosion Hazard Data

Flash Point: NONE
Flash Point Method: N/R
L[redacted]r Explosive Limit: UNKNOWN
U[redacted]r Explosive Limit: UNKNOWN
[redacted]nguishing Media: USE WATER, PREFERABLY IN FORM OF SPRAY.
Special Fire Fighting Proc: WEAR A NIOSH APPROVED SELF-CONTAINED BREATHING APPARATUS AND FULL PROTECTIVE EQUIPMENT WHEN FIGHTING FIRES.
Unusual Fire And Expl Hazrds: POWERFUL OXIDIZING MATERIAL. NOT COMBUSTIBLE

BUT EVOLVES OXYGEN AT HIGHER TEMPERATURES. READILY IGNITES COMBUSTIBLE OR ORGANIC MATERIALS WHEN IN CONTACT.

Reactivity Data

Stability: NO
Cond To Avoid (Stability): HIGH TEMPERATURES AND MOIST CONDITIONS.
Materials To Avoid: MOISTURE, SOLVENTS, ACIDS, AND ORGANIC MATERIALS.
Hazardous Decomp Products: MAY UNDERGO ACCELERATED DECOMPOSITION WITH EVOLUTION OF HEAT, HYDROGEN CHLORIDE AND CHLORINE GAS.
Hazardous Poly Occur: NO
Conditions To Avoid (Poly): NOT APPLICABLE

Health Hazard Data

LD50-LC50 Mixture: ORAL LD50 (RAT) IS 900 MG/KG (HCL)
Route Of Entry - Inhalation: YES
Route Of Entry - Skin: YES
Route Of Entry - Ingestion: YES
Health Haz Acute And Chronic: EYE, SKIN & RESPIRATORY TRACT IRRITATION.
Carcinogenicity - NTP: NO
Carcinogenicity - IARC: NO
Carcinogenicity - OSHA: NO
Explanation Carcinogenicity: NONE OF THE COMPOUNDS IN THIS PRODUCT IS LISTED BY IARC, NTP, OR OSHA AS A CARCINOGEN.
Signs/Symptoms Of Overexp: CAN CAUSE BURNS TO EYES AND SKIN. INHALATION OF VAPORS, FUMES AND DUST CAN CAUSE IRRITATION TO MUCOUS MEMBRANES.
Med Cond Aggravated By Exp: OVEREXPOSURE MAY AGGRAVATE EXISTING CHRONIC RESPIRATORY CONDITIONS SUCH AS ASTHMA, BRONCHITIS AND INFLAMMATORY OR FIBROTIC RESPIRATORY DISEASE.
Emergency/First Aid Proc: INHALATION: REMOVE TO FRESH AIR. IF NOT BREATHING, GIVE ARTIFICIAL RESPIRATION. GET MEDICAL ATTENTION. EYES: IMMEDIATELY FLUSH WITH PLENTY OF WATER FOR 15 MINUTES. GET MEDICAL ATTENTION. SKIN: FLUSH WITH WATER. REMOVE CONTAMINATED CLOTHING. INGESTION: POISON! IF CONSCIOUS, GIVE MILK, EGG WHITE, STARCH PASTE OR MILK OF MAGNESIA BY MOUTH. DO NOT INDUCE VOMITING. GET IMMEDIATE MEDICAL ATTENTION.

Precautions for Safe Handling and Use

Steps If Matl Released/Spill: ELIMINATE SOURCES OF IGNITION. WEAR NIOSH APPROVED RESPIRATOR OR SCBA, GOGGLES, GLOVES & BOOTS. KEEP AWAY FROM ORGANIC MATERIAL. MIX WITH DRY EARTH OR SAND AND PLACE IN DISPOSAL DRUM. FLUSH RESIDUE WITH LARGE QUANTITIES WATER.
Neutralizing Agent: DILUTE WITH LARGE AMOUNTS OF WATER
Waste Disposal Method: DISPOSAL SHOULD BE MADE IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE AND LOCAL LAWS AND REGULATIONS.
Precautions-Handling/Storing: STORE IN COOL, DRY PLACE AWAY FROM ALL SOURCES OF HEAT. DO NOT STORE NEAR COMBUSTIBLES, ACIDS OR OTHER ORGANIC MATTER. PROTECT & INSPECT CONTAINERS.
Other Precautions: KEEP CONTAINERS CLOSED WHEN NOT IN USE. PROTECT AGAINST PHYSICAL DAMAGE. DRUMS MAY RUPTURE FROM EXPOSURE TO HEAT. AVOID STORAGE FOR PROLONGED PERIODS, PARTICULARLY AT SUMMER TEMPERATURES.

Control Measures

Respiratory Protection: SELECT A NIOSH APPROVED RESPIRATOR BASED ON CONTAMINATION LEVELS FOUND IN THE WORK PLACE. FOR HIGH LEVELS, A SELF-

Report for NIIN: 002976653

CONTAINED BREATHING APPARATUS WITH FULL FACEPIECE OPERATED IN PRESSURE DEMAND OR POSITIVE PRESSURE IS RECOMMENDED.
[redacted]tilation: LOCAL EXHAUST WHERE DUST MIGHT OCCUR.
[redacted]otective Gloves: RUBBER, NEOPRENE OR PVC
Eye Protection: FACE SHIELD/SAFETY GOGGLE
Other Protective Equipment: EYE WASH STATION AND SAFETY SHOWER. INDUSTRIAL-TYPE WORK CLOTHING AND APRON AS REQUIRED. SHOULD WEAR SAFETY BOOTS.
Work Hygienic Practices: WASH THOROUGHLY AFTER HANDLING AND BEFORE EATING, DRINKING OR SMOKING. LAUNDER CONTAMINATED CLOTHING BEFORE REUSE.
Suppl. Safety & Health Data: SUPERTROPICAL BLEACH IS A MIXTURE OF CHLORINATED LIME AND CALCIUM OXIDE IN A WHITE POWDER FORM. WHEN MANUFACTURED IT CONTAINS 30 PERCENT AVAILABLE CHLORINE. STB DECOMPOSES SLOWLY IN STORAGE EASILY RECOGNIZED BY THE CHLORINE LIKE ODOR. IT IS CORROSIVE TO MOST METALS AND INJURIOUS TO MOST FABRICS.

Transportation Data

Transportation Action Code:
Transportation Focal Point: D
Trans Data Review Date: 92309
DOT PSN Code: CQW
DOT Symbol:
DOT Proper Shipping Name: CALCIUM HYPOCHLORITE MIXTURES, DRY,
DOT Class: 5.1
DOT ID Number: UN2208
DOT Pack Group: III
DOT Label: OXIDIZER
[redacted]DoD Exemption Number: N/R
IMO PSN Code: CFB
IMO Proper Shipping Name: BLEACHING POWDER
IMO Regulations Page Number: SEE 5138
IMO UN Number: 2208
IMO UN Class: 5.1
IMO Subsidiary Risk Label: -
IATA PSN Code: EYV
IATA UN ID Number: 2208
IATA Proper Shipping Name: CALCIUM HYPOCHLORITE MIXTURES,DRY
IATA UN Class: 5.1
IATA Subsidiary Risk Class:
IATA Label: OXIDIZER
AFI PSN Code: EYV
AFI Symbols:
AFI Prop. Shipping Name: CALCIUM HYPOCHLORITE MIXTURES,DRY
AFI Class: 5.1
AFI ID Number: UN2208
AFI Pack Group: III
AFI Label: OXIDIZER
AFI Special Prov: A1,A29,N34
AFI Basic Pac Ref: 9-10
MMAC Code:
N[redacted]S. Shipping Name: CHLORINATED LIME
Ad[redacted]tional Trans Data: THIS MATERIAL DOES NOT CONTAIN CALCIUM [redacted]CHLORITE.

Report for NIIN: 002976653

Disposal Data

[redacted]posal Data Action Code:
Disposal Data Focal Point:
Disposal Data Review Date:
Rec # For This Disp Entry:
Tot Disp Entries Per NSN:
Landfill Ban Item:
Disposal Supplemental Data:
1st EPA Haz Wst Code New:
1st EPA Haz Wst Name New:
1st EPA Haz Wst Char New:
1st EPA Acute Hazard New:
2nd EPA Haz Wst Code New:
2nd EPA Haz Wst Name New:
2nd EPA Haz Wst Char New:
2nd EPA Acute Hazard New:
3rd EPA Haz Wst Code New:
3rd EPA Haz Wst Name New:
3rd EPA Haz Wst Char New:
3rd EPA Acute Hazard New:

Label Data

Label Required: YES
Technical Review Date: 04NOV92
Label Date: UNDATED
[redacted] Label Number: N/R
Label Status: D
Common Name: DECONTAMINATING AGENT, STB
Chronic Hazard: X
Signal Word: DANGER!
Acute Health Hazard-None:
Acute Health Hazard-Slight:
Acute Health Hazard-Moderate: X
Acute Health Hazard-Severe:
Contact Hazard-None:
Contact Hazard-Slight:
Contact Hazard-Moderate:
Contact Hazard-Severe: X
Fire Hazard-None:
Fire Hazard-Slight: X
Fire Hazard-Moderate:
Fire Hazard-Severe:
Reactivity Hazard-None:
Reactivity Hazard-Slight: X
Reactivity Hazard-Moderate:
Reactivity Hazard-Severe:
Special Hazard Precautions: MAY BE FATAL IF SWALLOWED. MAY CAUSE BURNS. HARMFUL IF INHALED. STRONG OXIDANT. USE EXTREME CAUTION WHEN OPENING - C[redacted]ENTS MAY SPRAY! AVOID CONTACT WITH EYES, SKIN, AND CLOTHING. AVOID B[redacted]ATHING DUST. USE WITH ADEQUATE VENTILATION. WASH THOROUGHLY AFTER [redacted]LING. AVOID CONTAMINATION OF CHLORINATED LIME WITH ACIDS AND OXIDIZABLE [redacted]TERIALS SUCH AS FUELS, OILS, PAINT PRODUCTS, DISINFECTANTS, AND AMMONIA. SUCH CONTAMINATION CAN CAUSE RELEASE OF HAZARDOUS GASES. POISONOUS GASES MAY BE PRODUCED WHEN HEATED. KEEP CONTAINER CLOSED AND STORED IN A COOL DRY

Report for NIIN: 00297665

PLACE. MIX ONLY IN ACCORDANCE WITH DIRECTIONS FOR USE. SEE MSDS FOR FIRST AID INFORMATION.
Protect Eye: X
Protect Skin: X
Protect Respiratory: X
Label Name: PENNSALT CHEMICAL CORPORATION
Label Street: COMPANY SHUT DOWN STB PLANT IN 1954
Label P.O. Box:
Label City:
Label State:
Label Zip Code:
Label Country: US
Label Emergency Number:
Year Procured: 1954

Appendix V--Examples of Potentially Incompatible Waste

Many hazardous wastes, when mixed with other waste or materials at a hazardous waste facility, can produce effects which are harmful to human health and the environment, such as (1) heat or pressure, (2) fire or explosion, (3) violent reaction, (4) toxic dusts, mists, fumes, or gases, or (5) flammable fumes or gases.

Below are examples of potentially incompatible wastes, waste components, and materials, along with the harmful consequences which result from mixing materials in one group with materials in another group. The list is intended as a guide to owners or operators of treatment, storage, and disposal facilities, and to enforcement and permit granting officials, to indicate the need for special precautions when managing these potentially incompatible waste materials or components.

This list is not intended to be exhaustive. An owner or operator must, as the regulations require, adequately analyze his wastes so that he can avoid creating uncontrolled substances or reactions of the type listed below, whether they are listed below or not.

It is possible for potentially incompatible wastes to be mixed in a way that precludes a reaction (e.g., adding acid to water rather than water to acid) or that neutralizes them (e.g., a strong acid mixed with a strong base), or that controls substances produced (e.g., by generating flammable gases in a closed tank equipped so that ignition cannot occur, and burning the gases in an incinerator).

In the lists below, the mixing of a Group A material with a Group B material may have the potential consequence as noted.

Group 1-A

Acetylene sludge

Alkaline caustic liquids

Alkaline cleaner

Alkaline corrosive liquids

Alkaline corrosive battery fluid

Caustic wastewater

Lime sludge and other corrosive alkalies

Lime wastewater

Lime and water

Spent caustic

Group 1-B

Acid sludge

Acid and water

Battery acid

Chemical cleaners

Electrolyte, acid

Etching acid liquid or solvent

Pickling liquor and other corrosive acids

Spent acid

Spent mixed acid

Spent sulfuric acid

Potential consequences: Heat generation; violent reaction.

Group 2-A

Aluminum

Beryllium

Calcium

Lithium

Magnesium

Potassium

Sodium

Zinc powder

Other reactive metals and metal hydrides

Group 2-B

Any waste in Group 1-A or

1-B

Potential consequences: Fire or explosion; generation of flammable hydrogen gas.

Group 3-A

Alcohols

Water

Group 3-B

Any concentrated waste in Groups 1-A or 1-B

Calcium

Lithium

Metal hydrides

Potassium

SO_2Cl_2, $SOCl_2$, PCl_3, CH_3SiCl_3

Other water-reactive waste

Potential consequences: Fire, explosion, or heat generation; generation of flammable or toxic gases.

Group 4-A

Alcohols

Aldehydes

Halogenated hydrocarbons

Nitrated hydrocarbons

Unsaturated hydrocarbons

Other reactive organic compounds and solvents

Group 4-B

Concentrated Group 1-A or 1-B wastes

Group 2-A wastes

Potential consequences: Fire, explosion, or violent reaction.

Group 5-A

Spent cyanide and sulfide solutions

Group 5-B

Group 1-B wastes

Potential consequences: Generation of toxic hydrogen cyanide or hydrogen sulfide gas.

Group 6-A

Chlorates

Chlorine

Chlorites

Chromic acid

Hypochlorites

Nitrates

Nitric acid, fuming

Perchlorates

Permanganates

Peroxides

Other strong oxidizers

Group 6-B

Acetic acid and other organic acids

Concentrated mineral acids

Group 2-A wastes

Group 4-A wastes

Other flammable and combustible wastes

Potential consequences: Fire, explosion, or violent reaction.

Source: "Law, Regulations, and Guidelines for Handling of Hazardous Waste." California Department of Health, February 1975.

Appendix V--Examples of Potentially Incompatible Waste

Many hazardous wastes, when mixed with other waste or materials at a hazardous waste facility, can produce effects which are harmful to human health and the environment, such as (1) heat or pressure, (2) fire or explosion, (3) violent reaction, (4) toxic dusts, mists, fumes, or gases, or (5) flammable fumes or gases.

Below are examples of potentially incompatible wastes, waste components, and materials, along with the harmful consequences which result from mixing materials in one group with materials in another group. The list is intended as a guide to owners or operators of treatment, storage, and disposal facilities, and to enforcement and permit granting officials, to indicate the need for special precautions when managing these potentially incompatible waste materials or components.

This list is not intended to be exhaustive. An owner or operator must, as the regulations require, adequately analyze his wastes so that he can avoid creating uncontrolled substances or reactions of the type listed below, whether they are listed below or not.

It is possible for potentially incompatible wastes to be mixed in a way that precludes a reaction (e.g., adding acid to water rather than water to acid) or that neutralizes them (e.g., a strong acid mixed with a strong base), or that controls substances produced (e.g., by generating flammable gases in a closed tank equipped so that ignition cannot occur, and burning the gases in an incinerator).

In the lists below, the mixing of a Group A material with a Group B material may have the potential consequence as noted.

DDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD

Group 1-A	Group 1-B
Acetylene sludge	Acid sludge
Alkaline caustic liquids	Acid and water
Alkaline cleaner	Battery acid
Alkaline corrosive liquids	Chemical cleaners
Alkaline corrosive battery fluid	Electrolyte, acid
Caustic wastewater	Etching acid liquid or
Lime sludge and other corrosive alkalies	
Lime wastewater	Pickling liquor and oth corrosive acids
Lime and water	Spent acid
Spent caustic	Spent mixed acid
	Spent sulfuric acid

DDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD

Potential consequences: Heat generation; violent reaction.

DDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD

Group 2-A

Aluminum
Beryllium
Calcium
Lithium
Magnesium
Potassium
Sodium
Zinc powder
Other reactive metals and metal hydrides

Group 2-B

Any waste in Group 1-A

DDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD

Potential consequences: Fire or explosion; generation of flammable hydrogen gas.

DDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD

Group 3-A

Alcohols

Water

Group 3-B

Any concentrated waste
Groups 1-A or 1-B
Calcium
Lithium
Metal hydrides
Potassium
SO2Cl2, SOCl2, PCl3, CH3SiCl3
Other water-reactive was

DDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD

Potential consequences: Fire, explosion, or heat generation; generation of flammable or toxic gases.

DDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD

Group 4-A

Alcohols

Group 4-B

Concentrated Group 1-A or 1 wastes

Aldehydes
Halogenated hydrocarbons
Nitrated hydrocarbons
Unsaturated hydrocarbons
Other reactive organic compounds and solvents

Group 2-A wastes

DDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD

Potential consequences: Fire, explosion, or violent reaction.

DDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD

Group 5-A

Spent cyanide and sulfide solutions

Group 5-I

Group 1-B wastes

DDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD

Potential consequences: Generation of toxic hydrogen cyanide or hydrogen sulfide gas.

DDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD

Group 6-A

Chlorates

Chlorine
Chlorites
Chromic acid
Hyphochlorites

Nitrates
Nitric acid, fuming
Perchlorates
Permanganates
Peroxides
Other strong oxidizers

Group 6-B

Acetic acid and other or acids
Concentrated mineral ac
Group 2-A wastes
Group 4-A wastes
Other flammable and comt wastes

DDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD

Potential consequences: Fire, explosion, or violent reaction.

Source: "Law, Regulations, and Guidelines for Handling of Hazardous Waste." California Department of Health, February 1975.

ADEM

ALABAMA
DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

Mailing Address:
State Capitol
Montgomery, AL
36130
205/277-3630

Field Offices:

P. O. Box 953
Decatur, AL
35602
205/353-1713

Unit 806, Building 8
225 Ozmoor Circle
Birmingham, AL
35209
205/942-6168

4358 Midmost Drive
Mobile, AL
36609
205/[redacted]941

3263 Demetropolis Rd.
Suite 10
Mobile, AL
36609
205/660-0150

November 2, 1983

U.S. Army MP and Chemical Schools/Training Centers
Director of Engineering and Housing
(ATZN-FEE, Col. Lindsay)
Fort McClellan, AL 36205

Re: Facility No. 301-0017

Dear Col. Lindsay:

The enclosed Permit to Construct is issued pursuant to the Department's air pollution control rules and regulations. Please note the conditions which must be observed in order to retain this permit.

The staff has determined that a permit is not necessary for the 6.25 MMBTU/HR package standby boiler as long as it burns only No. 2 fuel oil. If, in the future, a change of fuel for this boiler is contemplated, please notify this Division before taking any action.

If you have questions or require clarification of permit conditions, please write or call Bob Cowne at 834-6570 in Montgomery.

Yours very truly,

Richard E. Grusnick, Chief
Air Division

REG/dm
Enclosure

cc: James J. Smith
Staff Engineer-Environmental
Rust International Corporation

Corps of Engineers, Mobile District
(SAMEN-CP, Mr. Battaglia)

Permit No. 301-0017-X007

STATE OF ALABAMA
DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

PERMIT TO CONSTRUCT
AN AIR EMISSIONS SOURCE

Issued to: U.S. ARMY MP AND CHEMICAL SCHOOLS/TRAINING CENTERS

Location: FORT MCCLELLAN, ALABAMA

Permit Number:	Description of Source:
301-0017-X007	Chemical Agent Incinerator with Scrubber

This Permit to Construct is issued pursuant to the provision of Section 18 of the Alabama Air Pollution Control Act of 1971, Act No. 769 (Regular Session, 1971), and Sections 3,4,5,6 and 8 of the Alabama Environmental Act, Act No. 612 (Regular Session, 1982), as amended, and in accordance with the application filed with the Commission, and subject to the conditions appended hereto, both of which are considered a part of this Permit. This Permit shall be subject to all applicable laws of the State of Alabama and Rules, Regulations, and Orders of the Commission or the Director of the Department of Environmental Management, and shall be effective from the date of issuance.

This Permit is to be kept under file or on display at all times at the location described above and is to be made readily available for inspection by any and all persons who may request to see it. This Permit is not transferable.

Date of Issuance: November 2, 1983

Page 1 of 4 pages

Alabama Department of Environmental Management

U.S. ARMY MP AND CHEMICAL SCHOOLS/TRAINING CENTERS

Permit No. 301-0017-X007

1. This permit is issued on the basis of Rules and Regulations existing on the date of issuance. In the event additional Rules and Regulations are adopted, it shall be the permit holder's responsibility to comply with such rules.

2. This permit is not transferable. Upon sale or legal transfer, the new owner, or operator must apply for a permit within 30 days.

3. Each point of emission will be provided with sampling ports, ladders, platforms, and other safety equipment to facilitate testing performed in accordance with procedures established by Part 60 of Title 40 of the Code of Federal Regulations, as the same may be amended or revised.

4. This permit expires and the application is cancelled if construction has not begun within 24 months of the date of issuance of the permit.

5. On completion of construction of the device for which this permit is issued, notification of the fact is to be given to the Department within 10 days.

6. The device for which this permit is issued may not be operated until a Permit to Operate is obtained from the Department.

7. Detailed descriptions and engineering drawings of the incinerator, scrubber and associated equipment will be supplied to this Division for review before construction or installation of these items commences.

8. The system will be equipped to continously monitor and record the temperatures of the primary and secondary combustion chambers, the ph and flow rate of the scrubbing liquid through the scrubber, waste feed rates, combustion gas velocity or flow rate, and stack exhaust CO concentration. Anticipated values and/or limits for these parameters will be furnished this Division with the detailed description of the system required above in Proviso No. 7.

9. The system will have automatic safety features to stop the waste feed to the incinerator if the temperatures in the combustion chambers drop below a prescribed minimum temperature; if the scrubber's caustic solution drops below a prescribed ph value or flow rate; if the stack gas CO concentration varies beyond prescribed limits; and if the combustion gas velocity or flow rate varies beyond prescribed limits. These controls should be described in the equipment specifications required in Proviso 7.

10. Emission tests are to be conducted for the following pollutants:

    a. Particulate
    b. HCl
    c. Asbestos
    d. Diethylenetriamine
    e. GB
    f. VX
    g. HD

11. The tests are to be conducted to determine compliance with the following standards, and, for HCl and asbestos, to determine whether standards should be set.

    a. Particulate - 0.2 lbs per 100 lbs of waste charged (the weight of water in the waste will be subtracted from the total waste weight to determine the waste weight to be used in compliance calculations).

    b. HCl - Percent of chlorine removal by scrubber and amount of HCl emitted to the atmosphere.

    c. Asbestos - Percent of asbestos removal by scrubber and amount emitted to the atmosphere.

    d. Diethylenetriamine - 99.99% destruction and removal efficiency.

    e. GB - 99.99% destruction and removal efficiency.

    f. VX - 99.99% destruction and removal efficiency.

    g. HD - 99.99% destruction and removal efficiency.

12. The Division must be notified in writing at least ten (10) working days prior to the testing date. The notification shall include the following information:

    a. The date the test crew will arrive on site and the date and time of the start of the first test run.

    b. The names of the testing company and the test crew chief.

    c. A description of the sampling equipment and procedure to be used for each parameter to be tested.

    d. The laboratory analytical equipment, techniques and procedures to be used in the analysis of the samples collected.

    e. The laboratory analytical equipment, techniques and procedures to be used to determine the constituents, and amount there of, of the waste feed to be burned during the test.

    f. The operational parameters that the incinerator and scrubber will maintain during the test. These will include the parameters listed in Proviso No. 8 above.

Preliminary test results will be reported to the Division within 15 days of the completion of the test and the final written report is due within 30 days, unless an extension of time is specifically approved by the Division. A pretest meeting may be held at the request of the source owner, testing company, or the Division. The necessity for such a meeting and the attendees will be determined on a case-by-case basis.

Lee B. Brockwood

Alabama Department of Environmental Management

October 31, 1983

Date

ADEM

ALABAMA
DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

Guy Hunt
Governor

Leigh Pegues, Director

1751 Federal Drive
Montgomery, AL
36130
205/271-7700

Field Offices:

Unit 806, Building 8
225 Oxmoor Circle
Birmingham, AL
35209
205/942-6168

P.O. Box 953
Decatur, AL
35602
205/353-1713

2204 Perimeter Road
Mobile, AL
36615
205/479-2336

June 1, 1987

Department of the Army
U. S. Army Chemical and Military Police Centers
and Fort McClellan
Director of Engineering and Housing
(Lt. Col. George S. Pincince)
ATTN: Natural Resources Management Division
Fort McClellan, AL 36205-5000

Dear Col. Pincince:

Re: Facility No. 301-0017

The enclosed Air Permit is issued pursuant to the Department's air pollution control rules and regulations. Please note the conditions which must be observed in order to retain this permit.

If you have questions or require clarification of permit conditions, please write or call Bob Cowne at 271-7861 in Montgomery.

Sincerely,

Ronald W. Gore

Richard E. Grusnick, Chief
Air Division

REG/BC:um

Enc.

ADEM

ALABAMA
DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

AIR PERMIT

PERMITTEE: U. S. ARMY CHEMICAL AND MILITARY POLICE CENTERS AND FORT McCLELLAN

LOCATION: FORT McCLELLAN, ALABAMA

PERMIT NUMBER	DESCRIPTION OF EQUIPMENT, ARTICLE OR DEVICE
301-0017-Z007	Chemical Decontamination Training Facility (CDTF) Incinerator with Wet Scrubber

*In accordance with and subject to the provisions of the Alabama Air Pollution Control Act of 1971, as amended, **Code of Alabama 1975**, §§ 22-28-1 to 22-28-23 (the "AAPCA") and the Alabama Environmental Management Act, as amended, **Code of Alabama 1975**, §§ 22-22A-1 to 22-22A-15, and rules and regulations adopted thereunder, and subject further to the conditions set forth in this permit, the Permittee is hereby authorized to construct, install and use the equipment, device or other article described above.*

ISSUANCE DATE: June 1, 1987

Alabama Department of Environmental Management

U. S. ARMY CHEMICAL AND MILITARY POLICE CENTERS AND FORT McCLELLAN

Permit No. 301-0017-Z007

1. This permit is issued on the basis of Rules and Regulations existing on the date of issuance. In the event additional Rules and Regulations are adopted, it shall be the permit holder's responsibility to comply with such rules.

2. This permit is not transferable. Upon sale or legal transfer, the new owner or operator must apply for a permit within 30 days.

3. A new permit application must be made for new sources, replacements, alterations or design changes which may result in the issuance of, or an increase in the issuance of, air contaminants, or the use of which may eliminate or reduce or control the issuance of air contaminants.

4. In the event there is a breakdown of equipment in such a manner as to cause increased emission of air contaminants, the waste feed will be stopped immediately and not resumed until the problem is corrected.

5. All air pollution control devices and capture systems for which this permit is issued shall be maintained and operated at all times in a manner so as to minimize the emissions of air contaminants. Procedures for ensuring that the above equipment is properly operated and maintained so as to minimize the emission of air contaminants shall be established.

6. The system will continuously monitor and record the temperatures of the Pyrolizer Furnace and the Rich Fume Incinerator (RFI), the pH and flow rate of the scrubbing brine, the liquid waste feed rate, the combustion gas velocity and the exhaust gas CO concentration in ppm. The weight of solid waste fed to the Pyrolizer Furnace will be manually recorded. These records will be maintained in a manner suitable for inspection for a period of at least two years.

7. Liquid waste fed to the RFI will automatically stop when any of the following conditions occur:

   (a) The temperature of the RFI falls below 2,200°F for more than 30 seconds.

   (b) The pH of the scrubber brine falls below 7.5 for more than 60 seconds.

   (c) The stack gas CO concentration exceeds 200 ppm for more than 30 seconds.

   (d) A positive pressure exists in the RFI for more than 30 seconds.

8. A temperature of at least 1500°F will be maintained for a minimum of 15 minutes for each load of solid waste placed in the Pyrolizer Furnace.

9. Submission of other reports regarding monitoring records, fuel analyses, operating rates, and equipment malfunctions may be required as authorized in the Department's air pollution control rules and regulations.

10. Additions and revisions to the conditions of this Permit will be made, if necessary, to ensure that the Department's air pollution control rules and regulations are not violated.

11. Nothing in this permit or conditions thereto shall negate any authority granted to the Department pursuant to the Alabama Environmental Management Act or regulations issued thereunder.

12. All instances of automatic cut off of the waste feed, or manual cut off required by Proviso 4 above, will be noted in a log book to show date/time of occurrence, duration of occurrence, cause and corrective action taken. This record will be maintained in a manner suitable for inspection for a period of at least two years.

June 1, 1987
Date

ADEM

ALABAMA
DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

Leigh Pegues, Director

1751 Cong. W. L.
Dickinson Drive
Montgomery, AL
36130
(205) 271-7700
FAX 271-7950
270-5612

Field Offices:

110 Vulcan Road
Birmingham, AL
35209
(205) 942-6168
FAX 941-1603

P.O. Box 953
Decatur, AL
35602
(205) 353-1713
FAX 340-9359

22[redacted]imeter Road
Mobile, AL
36615
(205) 450-3400
FAX 479-2593

Guy Hunt
Governor

December 17, 1992

Department of the Army
U. S. Army Chemical and Military
Police Center and Fort McClellan
Director of Engineering and Housing
ATTN: Environmental Management Division
Mr. Shih-Chi Wang
Fort McClellan, AL 36205-5000

Dear Mr. Wang:

RE: Permit No. 301-0017-Z007 (CDTF)

The enclosed revised Air Permit is issued pursuant to the Department's air pollution control rules and regulations. It reflects the installation of a steam autoclave at the CDTF to recycle Battle Dress Overgarments. Note the conditions which must be observed in order to retain this permit. Please return the original copy of Air Permit No. 301-0017-Z007 dated June 1, 1987 which you presently hold.

If you have any questions or require clarification of permit conditions, please write or call Nathan Hartman at 205/271-7861 in Montgomery.

Sincerely,

Ronald W. Gore

Richard E. Grusnick, Chief
Air Division

REG/NH:klh

Enclosure

cc: Doug Lipsey

ADEM

Alabama
Department of Environmental Management

AIR PERMIT

PERMITTEE: U.S. ARMY CHEMICAL AND MILITARY POLICE CENTERS AND FORT MCCLELLAN

LOCATION: FORT MCCLELLAN, ALABAMA

PERMIT NUMBER	DESCRIPTION OF EQUIPMENT, ARTICLE OR DEVICE
301-0017-Z007	Chemical Decontamination Training Facility (CDTF) Incinerator with Wet Scrubber

*In accordance with and subject to the provisions of the Alabama Air Pollution Control Act of 1971, as amended, **Code of Alabama 1975**, §§22-28-1 to 22-28-23 (the "AAPCA") and the Alabama Environmental Management Act, as amended, **Code of Alabama 1975**, §§22-22A-1 to 22-22A-15, and rules and regulations adopted thereunder, and subject further to the conditions set forth in this permit, the Permittee is hereby authorized to construct, install and use the equipment, device or other article described above.*

ISSUANCE DATE: December 17, 1992

Alabama Department of Environmental Management

U.S. ARMY CHEMICAL AND MILITARY POLICE CENTERS AND FORT MCCLELLAN

Permit No. 301-0017-Z007

1. This permit is issued on the basis of Rules and Regulations existing on the date of issuance. In the event additional Rules and Regulations are adopted, it shall be the permit holder's responsibility to comply with such rules.

2. This permit is not transferable. Upon sale or legal transfer, the new owner or operator must apply for a permit within 30 days.

3. A new permit application must be made for new sources, replacements, alterations or design changes which may result in the issuance of, or an increase in the issuance of, air contaminants, or the use of which may eliminate or reduce or control the issuance of air contaminants.

4. Each point of emission will be provided with sampling ports, ladders, platforms, and other safety equipment to facilitate testing performed in accordance with procedures established by Part 60 of Title 40 of the Code of Federal Regulations, as the same may be amended or revised.

5. In the event there is a breakdown of equipment in such a manner as to cause increased emission of air contaminants, the waste feed will be stopped immediately and not resumed until the problem is corrected. The Department shall be notified when the breakdown has been corrected.

6. All air pollution control devices and capture systems for which this permit is issued shall be maintained and operated at all times in a manner so as to minimize the emissions of air contaminants. Procedures for ensuring that the above equipment is properly operated and maintained so as to minimize the emission of air contaminants shall be established.

7. The system will continuously monitor and record the temperatures of the Pyrolizer Furnace and the Rich Fume Incinerator (RFI), the pH and flow rate of the scrubbing brine, the liquid waste feed rate, the combustion gas velocity and the exhaust gas CO concentration in ppm. System capability to record data at 2 minute intervals is considered continuous monitoring and recording. The weight of solid waste and numer of batteries fed to the Pyrolizer Furnace will be manually recorded. These records will be maintained in a manner suitable for inspection of a period of at least two years.

8. Liquid waste feed and gases/condensate feed from the autoclaves to the RFI will not start and will automatically stop when any of the following conditions occur:

   a. The temperature of the RFI falls below 1,700° F for more than 30 seconds when burning GB and VX decontamination waste water.

   b. The temperature of the RFI falls below 2,200° F for more than 30 seconds when burning HD decontamination waste water.

   c. The pH of the scrubber brine falls below 7.5 for more than 60 seconds.

   d. The stack gas CO concentration exceeds 200 ppm for more than 30 seconds.

   e. A positive pressure exists in the RFI for more than 30 seconds.

9. A temperature of at least 1,500° F (1,000° F when decontaminating lithium/sulfur dioxide batteries and/or wherlerlite filters) will be maintained for a minimum of 15 minutes for each load of solid waste placed in the Pyrolizer Furnace. Temperature will not exceed 2,500° F. Maximum total load to the Pyrolizer is 1,000 pounds. Maximum battery load is 10. The following conditions will be maintained when the pyrolizer is in operation:

   (a) RFI temperature $\geq$ 1,700° F when burning GB and VX contaminated residue.

   (b) RFI temperature $\geq$ 2,200° F when burning HD contaminated residue.

   (c) Scrubber brine pH $\geq$ 7.5.

   (d) Stack Gas CO concentration $\leq$ 200 ppm.

   (e) Negative RFI pressure.

10. Gases and or condensate from the autoclave system will not be fed to the RFI when the pyrolizer is in use.

11. Submission of other reports regarding monitoring records, fuel analyses, operating rates, and equipment malfunctions may be required as authorized in the Department's air pollution control rules and regulations. The Department may require stack emission testing at any time.

12. Additions and revisions to the conditions of this Permit will be made, if necessary, to ensure that the Department's air pollution control rules and regulations are not violated.

13. Nothing in this permit or conditions thereto shall negate any authority granted to the Department pursuant to the Alabama Environmental Management Act or regulations issued thereunder.

14. All instances of automatic cut off of the waste feed, or manual cut off required by Proviso Nos. 5 and 8 above, will be noted in a log book to show date/time of occurrence, duration of occurrence, cause and corrective action taken. This record will be maintained in a manner suitable for inspection for a period of at least two years.

December 17, 1992
Date

ALABAMA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
AIR DIVISION

PERMIT APPLICATION FOR
MANUFACTURING OR PROCESSING OPERATION

Do Not Write in This Space
☐☐☐ ☐☐☐☐ ☐☐☐ ☐

1. Type of unit or process (e.g., calcining kiln, cupola furnace)

To be determined

Make _____ Model _____ Date Installed _____

Capacity (manufacturer's or designer's guaranteed maximum) _____

_____

Operating capacity (specify units) _____

Briefly describe the operation of this unit or process in your facility:

[redacted]

2. Normal operating schedule

Hours per day 24 Days per week 7 Weeks per year 35 (Approximately)

Peak production season (if any) Directly dependent on training load

3. Materials used in unit or process (including solid fuels)

Material	Process Weight (lb/hour) Average	Maximum	Quantity/year	Units of Consumption
Battle Dress Overgarments	Appr. 800 lb	Appr. 800 lb	Appr. 10 loads per month	Appr. 10,000 units

4. Fuels used (excluding heat supplied by indirect heat exchangers)

Coal _____ tons/yr Percent sulfur _____ Percent ash _____

Oil _____ gal/yr Percent sulfur _____ Grade No. _____

Natural gas 440,050 Thousand cu.ft/yr L.P. gas _____ gal/yr

ALABAMA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
AIR DIVISION

NOTE:

This form (APC-106) is intended to be an application for those methods of waste disposal with a potential for causing air pollution. This form does not replace or substitute for the forms of approval necessary for refuse disposal sites. Applications for such approval should be made to:

Permit Coordination Center
Alabama Department of Environmental Management
State Capitol
Montgomery, AL 36130

DATA SHEET
FOR
REFUSE DISPOSAL

SECTION I
General

DO NOT WRITE IN THIS SPACE
☐☐☐ ☐☐☐☐ ☐☐☐☐

1. NAME OF FIRM OR ORGANIZATION Department of Army

2. PLANT LOCATION Ft. McClellan, AL

3. DATA ARE SUBMITTED FOR:

- ☐ EXISTING FACILITY (Initial Application)
- ☐ NEW EQUIPMENT (To Be Constructed)
- ☒ MODIFICATION
- ☐ CHANGE OF OWNERSHIP
- ☐ CHANGE OF LOCATION
- ☐ OTHER (Specify) _____

4. IS REFUSE DISPOSED OF BY OPEN BURNING? ☐ Yes ☒ No

5. IS ANY ASBESTOS CONTAINING WASTE GENERATED AT THIS SITE? ☐ Yes ☒ No

6. IS THERE AN INCINERATOR AT THIS SITE? ☒ Yes ☐ No
If "yes", please complete Section II.

NAME OF PERSON SUBMITTING APPLICATION Doug Lipsey

TITLE Project Manager SIGNATURE _____

DATE August 25, 1992 PHONE (205) 820-7848

ADEM-106a Rev. 6/83
(ADEM 106 replaces APC 103)

SECTION II

Incinerators

1. MANUFACTURER'S INFORMATION:

   A. NAME OF MANUFACTURER Midland Ross

   B. MODEL NUMBER JC 3056

   C. RATED CAPACITY 1000 Lbs Solids
   (Specify Units)

   D. TYPE OF WASTE Assorted trash previously used for toxic training

2. TYPE OF INCINERATOR (Check All Applicable)

   ☐ SINGLE CHAMBER

   ☒ MULTIPLE CHAMBER

   ☐ MODIFIED WITH CONTROL (An "APPLICATION FOR PERMIT TO CONSTRUCT AIR POLLUTION CONTROL DEVICE," Form ADEM-110, must be completed and attached.)

   ☐ OTHER (Specify) _____

3. AUXILIARY EQUIPMENT (Check All Applicable)

   ☐ PRIMARY BURNER

   FUEL Natural Gas
   (Type)

   BTU/hr. RATING _____

   ☐ SECONDARY BURNER

   FUEL Natural Gas
   (Type)

   BTU/hr. RATING 567,000

   ☐ BAROMETRIC DAMPER

   ☐ GUILLOTINE DAMPER

   ☒ OTHER (Specify) Butterfly Dampers

4. STACK DATA

   INSIDE DIAMETER 42" (Inches)

   HEIGHT ABOVE GRADE 100' (Feet)

5. COMBUSTION AIR

   ☐ NATURAL DRAFT

   ☒ INDUCED DRAFT

   ☐ FORCED DRAFT

   ☐ STARVED AIR

   ☐ OTHER (Specify) _____

6. DATE OF FIRST OPERATION April (Month) 1987 (Year)

7. WASTE FEED METHOD

- [ ] FLUE FED
- [ ] CHUTE FED
- [ ] CONTINOUS DIRECT
- [X] BATCH DIRECT

8. OPERATING SCHEDULE (Average)

HOURS PER DAY 24

DAYS PER WEEK 7

WEEKS PER YEAR 35

FROM _____ (Time)

TO _____ (Time)

ON M T W T F S S

(Circle all applicable)

9. EMISSIONS

POLLUTANT	EXPECTED EMISSIONS (POUNDS PER HOUR AT RATED CAPACITY)		EXPECTED EMISSIONS (TONS PER YEAR)		ALLOWABLE EMISSIONS (POUNDS PER HOUR AT RATED CAPACITY)
PARTICULATE	0.50	.15	0.55	.15	
CARBON MONOXIDE	1.90	1.04	2.0	1.05	
HYDROCARBONS	0.50	.08	0.50	.08	
SULFUR OXIDES	15.7	.018	17.5	.018	
NITROGEN OXIDES	5.10	4.16	5.70	4.19	
OTHER _____ (Specify)	Fuel Oil	Natural Gas	Fuel Oil	Natural Gas	

BASIS OF ESTIMATE FOR NUMBERS USED ABOVE:
- Fuel analysis and EPA-AP-42 factors.
- For chemical agents, RCRA requirement of 99.99% efficiency was used.
- Used sulfur content of 0.5% by weight, from Table 26 in Chapter 5 of STEAM-Its Generation and Use, 1978, 39th Edition, by Babcock & Wilcox

10. GAS DATA

GAS TEMPERATURE AT EXIT: 160 DEGREES FAHRENHEIT

MOISTURE CONTENT OF EXIT GAS 30 %

GAS VELOCITY AT EXIT 12.9 FEET PER SECOND

BASIS OF ESTIMATES: Previous ADEM test burn performed by Southern Research Institute

5. Products of process or unit:

Products	Quantity/year	Units of Production
Battle Dress Overgarments	Appr. 10,000	75

6. Emissions to the atmosphere (each point of emission should be listed separately and numbered so that it can be located on the flow sheet)

Emission Point	Stack Height (ft)	Stack Diameter (ft at top)	Gas Discharged (ACFM)	Exit Temp. (Deg. F)	Gas Velocity (FPS)
Stack Exhaust	100 ft.	3 ft.	15,500	175	36.5

7. Air contaminants emitted

Emission Point	Pollutant	Amount Per Hour		Amount Per Year		Basis of Estimate
Stack	Particulate	0.50	lb	0.55	tons	See Attached [illegible] pg
Stack	Nitrogen Oxide	5.10	lb	5.70	tons	"
Stack	Carbon Monoxide	1.90	lb	2.0	tons	"
Stack	Hydrocarbons	0.50		0.50		"

8. Emissions allowed by Regulation [redacted]

Emission Point	Pollutant	Allowable Per Hour	Basis of Estimate
Stack Exhaust	Particulate	9.40 (see att. #3)	Previous Application Dated October 1983

9. Are any volatile organic materials stored on premises? Yes ☐ No ☒

Material Stored	Size of Tank (gallons)	Vapor Control Devices

ATTACHMENT [redacted]

ADEM Air Division
Permit Application for Manufacturing or Processing Operation

8. Emissions allowed by Regulation

-Fuel analysis and EPA-AP-42 factors
-Chemical agent emissions: GB 1.90×10^{-5} pounds per hour
VX 2.66×10^{-6} pounds per hour
HD 4.94×10^{-6} pounds per hour
(NOTE: RCRA requirement of 99.99% efficiency was used for chemical agents)
-Used average sulfur content of 0.5% by weight, from Table 26 in Chapter 5 of Steam - Its Generation and Use, 1978, 39th edition, by Babcock and Wilcox

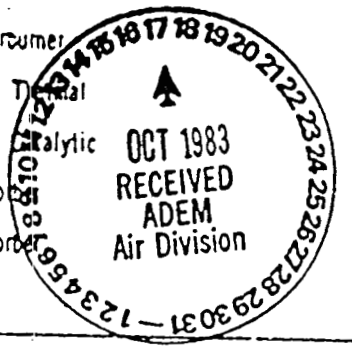
ATTACHMENT #3

APPLICATION FOR PERMIT TO CONSTRUCT AIR POLLUTION CONTROL DEVICE

DO NOT WRITE IN THIS SPACE

1. Type of Pollution Control Device (if more than one, check each)

- [ ] Settling Chamber
- [ ] Dry Inertial Collector
- [ ] Cyclone
- [ ] Multiclone
- [ ] Baghouse
- [ ] Electrostatic Precipitator
  - [ ] Dry
  - [ ] Wet
- [ ] Afterburner
  - [ ] Thermal
  - [ ] Catalytic
- [ ] Absorber
- [ ] Adsorber



- [X] Wet Scrubber (Kind) TO BE DETERMINED
- [ ] Other (Describe) _____

Manufacturer TO BE DETERMINED

Model Name _____

Model Number _____

Source to Which Device Is To Be Installed Incinerator/waste heat boiler

Permit Number of Source _____

3. Date Construction Is To Be Initiated September 1983 for facility; May 1984 for incinerator and control equipment

Date Construction Is To Be Completed July 1985

Compliance Date of Source September 1985

4. Emission Parameters

Pollutants Removed	Particulate		
Mass Emission Rate (#/hr.)			
Designed	0.50		
Manufacturer's Guaranteed	TO BE DETERMINED		
Required by Regulation	9.40 lb/hr		
Exit Concentration (gr/SCFD or ppm)			
Designed	0.01		
Manufacturer's Guaranteed	TO BE DETERMINED		
Removal Efficiency (%)			
Designed	90		
Manufacturer's Guaranteed	TO BE DETERMINED		

APC 110-1

10. Are any organic solvents used or produced? Yes [ ] No [X]

Type	Principal Use	Quantity Per Year (gallons) Consumed	Produced

11. Is there any emission control equipment on this unit or process? Yes [X] No [ ]

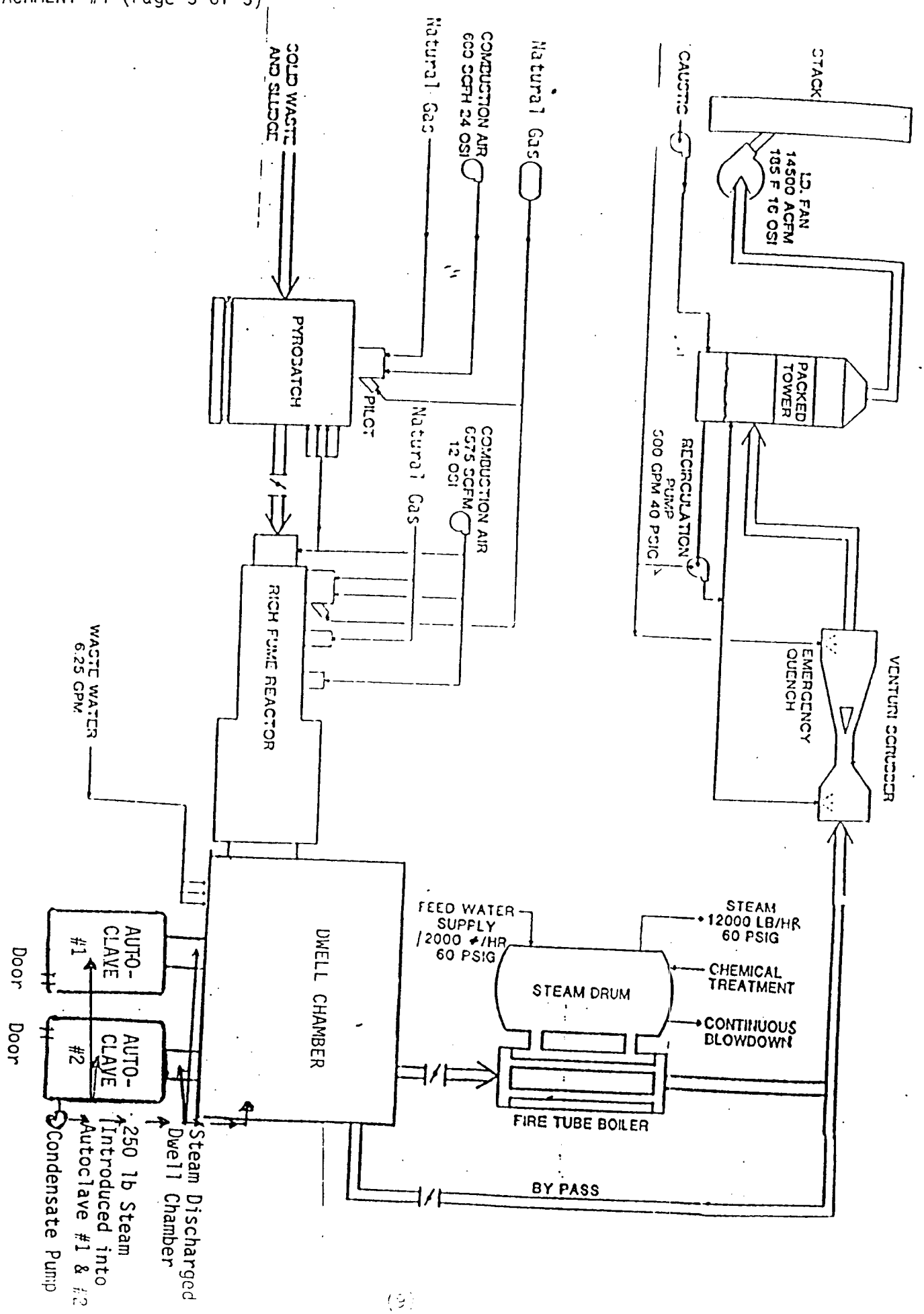
Where a gas cleaning device exists, "DATA SHEET FOR GAS CLEANING DEVICES", Form ADEM 110 must accompany Form ADEM 105.

12. Using a flow diagram: (1) Illustrate input of raw materials, (2) label production processes, process fuel combustion, process equipment, and air pollution control equipment, (3) illustrate locations of air contaminant release so that emission points under Item 6 can be identified. Attach extra pages as needed.

See Attachment #4

13. Permit application is made for:

Existing Unit (initial application)	[ ]	New Unit (to be constructed)	[ ]
Modification	[X]	Ownership Change	[ ]
Change of Location	[ ]	Other (specify)	[ ]


STACK
I.D. FAN
14500 ACFM
185 F 16 OSI
CAUSTIC
PACKED TOWER
RECIRCULATION PUMP
300 GPM 40 PSIG
EMERGENCY QUENCH
VENTURI SCRUBBER
COLD WASTE AND SLUDGE
COMBUSTION AIR
600 SCFH 24 OSI
Natural Gas
Natural Gas
PYROBATCH
PILOT
Natural Gas
COMBUSTION AIR
6575 SCFM
12 OSI
RICH FUME REACTOR
WASTE WATER
6.25 GPM
DWELL CHAMBER
FEED WATER SUPPLY
12000 #/HR
60 PSIG
STEAM
12000 LB/HR
60 PSIG
CHEMICAL TREATMENT
STEAM DRUM
CONTINUOUS BLOWDOWN
FIRE TUBE BOILER
BY PASS
AUTO-CLAVE #1
AUTO-CLAVE #2
Door
Door
Steam Discharged
Dwell Chamber
250 lb Steam
Introduced into
Autoclave #1 & #2
Condensate Pump

ATTACHMENT #4 (Page 1 of 2)

The Chemical Defense Training Facility [illegible] at Fort McClellan, AL, is presently preparing to reuse the [illegible] Overgarments (BDOs), used in agent training. In order [illegible] BDOs, a steam autoclave is proposed to drive off any possible [illegible] contamination as well as make the clothing hygienically safe.

The proposed plan for accomplishing [illegible] ization process in the autoclave system is as follows:

PLAN

Two identical autoclave units are to be installed to operate when needed in conjunction with the existing incinerator system. The autoclave will be operated under eleven (11) pounds of pressure while reaching an operating temperature of 250 degrees F. Once the desired temperature has been reached for fifteen (15) minutes, the spent steam will be released into the dwell chamber of the incinerator as per flow diagram. Although no condensate is expected, should any accumulate inside the autoclave, it will be pumped into the dwell chamber for destruction. The autoclave system will have the capability to shut exhaust dampers, from the autoclave, in case of loss of any incinerator operating parameters. It should be noted that prior to the BDOs being subjected to the autoclave, they will first be certified to be a the 3X level.

3X (XXX) - indicates that the item has been surface decontaminated by approved procedures, bagged or contained, and that appropriate tests or monitoring have verified that vapor concentrations are at or less than the standards specified in DOD 6055.9-STD.

XXX items may be handled or operated by qualified agent related personnel without restriction, except that the items may only be heated or disassembled in an area having controlled ventilation. Maintenance or disassembly of such items must be accomplished by personnel knowledgeable about agent symptoms and characteristics, and in facilities equipped with safeguards to control potential hazards. Personnel not qualified to handle XXX items should not be allowed routine access to XXX items.

All existing operational parameters presently in place dealing with the incinerator system will be strictly enforced throughout the autoclave process. At no time will the autoclave process be utilized during a pyrolyzer burn. This will preclude the slim possibility of toxic fumes, which might be produced during the pyrolyzing process, being released into the autoclave.

ATTACHMENT #1 (Page 1 of

(Remarks)

1. By having the [illegible]tilization procedure on line, the current proce[illegible]g the used BDOs will be reduced by a 4th of what [illegible]y being destroyed.

2. Enclosed is a [illegible]m (Attachment #5), which shows the Army's propos[illegible]adding additional procedures for inspecting, ha[illegible]ntrolling, and issuing the autoclaved BDOs as well as [illegible] BDOs. Also, the Army's narrative plan (Attachment #6), for the BDO reutilization.

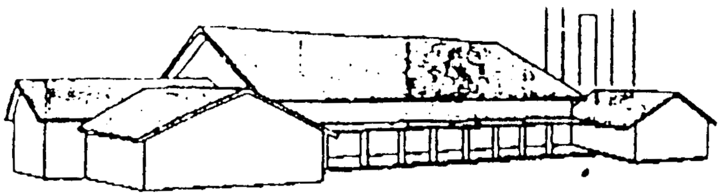
Should any other information be needed concerning the implementation of the BDO Reutilization Procedure, please do not hesitate to call

Doug Lipsey
Project Manager

DL/gb

Attachments
As Stated

ATTACHMENT #5



NEW MOPP SUIT (STORAGE)

1. REUSABLE MOPP SUITS WILL BE ISSUED FIRST. ONCE A SIZE IS NOT AVAILABLE, A NEW SUIT WILL BE INSPECTED AND ISSUED.

2. MOPP SUIT ISSUE AND DONNING

3. TOXIC AGENT EXPOSURE IN CDTF TRAINING BUILDING

GB AND VX CONCENTRATIONS WILL NOT EXCEED IDLH (IMMEDIATELY DANGEROUS TO LIFE OR HEALTH)

4. DOFF AREA

DOFF OPERATORS [illegible] MOPP SUITS [illegible]

1) DAMAGED AND NON-USABLE MOPP SUITS ARE PLACED IN CLOTHES BIN

2) NON-DAMAGED AND REUSABLE MOPP SUITS ARE PLACED IN SEALED CABINET

NO GO → CLOTHES BIN

GO → SEALED CABINET

HOT LAUNDRY ROOM

--ALLOW BOTH AREAS TO OFFGAS

--CONDUCT SAMPLING WITH MINICAMS TO CERTIFY CLOTHING IS 3X (XXX)

--ALL ITEMS WILL BE BROUGHT TO 3X LEVEL BEFORE AUTOCLAVE OR INCINERATION

CLOTHES BIN

SEALED CABINET

3X TRASH

1). UNSERVICEABLE MOPP SUITS BAGGED, SEALED, AND MARKED 3X.

2). UNSERVICEABLE 3X BAGGED SUITS ARE INCINERATED.

INCINERATION

1) INCINERATED TO 5X

2) ASHES SEALED AND BURIED IN LAND FILL (IAW ADEM PERMIT)

5. AUTOCLAVE

1) DECON MOPP SUIT IAW OPERATING PROCEDURES.

2) MONITOR ALL AUTOCLAVE EXHAUST CONTINUOUSLY WITH MINICAM.

3) EXHAUST AUTOCLAVES AND MOVE DECONNED SUITS TO COLD LAUNDRY.

6. COLD LAUNDRY AREA

1) INSPECT MOPP SUITS FOR DAMAGE

2) MARK NUMBER OF USES ON EACH SUIT.

3) ROTATE TO SERVICEABLE STOCK

GO → 1.

NO GO → 3X TRASH

MINICAM MONITOR LEVELS

VX----.00001 mg/m3

GB--- .0001 mg/m3

PROPOSED PROCEDURES FOR THE REUSE OF BDO AT THE CDTF

Detailed procedures which describe the reuse of Battledress Overgarments after subjection to the autoclave process and inspection are keyed to the attached flow chart. Special emphasis is placed on those added/revised procedures necessary to ensure adequate safety and quality control of the process.

Step 1. Initial Issue

a. Storage/Inventory--BDO which have been cycled through the autoclave process will be stocked separately from the new BDO inventory. Each BDO will be specially marked utilizing a color coding system to indicate the number of cycles that BDO has been subjected to. The BDOs which have been cycled the most times will be used first to preclude any possible degradation of the BDO because of long-term storage. (Color coding system is described in Step 6).

b. Inspection--Primary instructors (PIs) and alternate instructors (AIs) inspect autoclaved BDO for rips, holes, and broken zippers and snaps before issue to trainees. If a particular size of BDO is not available from the autoclaved stock, a new garment will be inspected and issued.

Step 2. Donning by Trainees--Trainees will personally inspect and don the BDO in preparation for agent training.

Step 3. Toxic Agent Exposure in the CDTF

a. The trainees will conduct decontamination training IAW existing procedures. PIs and AIs will dilligently observe the trainees during the exercises. If there is any evidence that any trainee has become contaminated with liquid chemical agent, that trainee will be immediately removed from the exercise and the BDO incinerated IAW current operating procedures.

b. Current operating procedures require that the VX and GB concentrations in the CDTF will not exceed IDLH (Immediately Dangerous to Life and Health).

Step 4. Doff Area.

a. Doff operators will assist trainees in the removal of BDO to preclude damage to the ensemble.

b. Doff operators will inspect the BDO for tears, holes, broken zippers/buttons, or evidence of any contamination with either chemical agent or liquid DS-2.

c. BDO deemed to be unserviceable for any reason will be placed in the clothes bin identified for the incineration of BDO. This includes all BDO color coded with a yellow button (3 cycles).

d. BDO meeting the inpection criteria for reuse will be hung in a cabinet specially designed to be completely sealed and monitored during for off-gassing of chemical agent vapors.

e. Once hung in the cabinet, it will be sealed and allowed to off-gas any entrapped chemical agent vapors resulting from operating in the live agent environment.

f. After off-gassing, the sealed cabinet will be monitored with MINICAMs and certified to be at 3X (XXX) level of decontamination (.00001 mg/m3 VX and .0001 mg/m3 GB).

Step 5. Autoclave Decontamination

a. 3X garments will be individually hung in the autoclave, each garment having heat sensitive autoclave tape applied to insure proper time/temperature requirements are reached for each BDO.

b. The BDO will be autoclaved at 250 degrees F., 15 psi. for no less than 15 minutes. Total autoclave cycle time is estimated to be 30-45 minutes.

c. MINICAMs will be installed to continuously monitor effluent and exhaust from the autoclave. All effluent and exhaust will be contained in the existing toxic waste disposal system at the CDTF and incinerated/neutralized.

d. Mass spectrometry and DAAMS will be used to periodically verify reliability and accuracy of the MINICAMS.

Step 6. Cold Laundry/Locker Room Procedures.

a. After venting/drying, the BDO will be taken to the cold laundry area where each BDO will be inspected. In addition to inspecting for rips, holes, tears and zippers; the autoclave tape on each BDO will be inspected to verify proper decontamination. If th tape indicates proper time/temperature requirements were not met, the BDO will be recycled through the autoclave. (all recycled BDO will be considered to have gone through two cycles and marked accordingly).

b. BDO which are deemed unserviceable will be bagged and marked for destruction.

c. After inspection, each BDO will be tagged with a color coded button corresponding to the number of autoclave cycles experienced by that BDO. Color coding description is as follows:

After One autoclave cycle--Blue Button

After Two autoclave cycles--Green Button

After Three autoclave cycles--Yellow Button

NOTE: During inspection after autoclaving, any BDO having a yellow button already will be considered unserviceable and destroyed.

d. After inspection and marking, the BDO will be returned to stock for reuse (Step 1). Instructors will insure that BDO with the most autoclave cycles are used first. The order of precedence of use will be: Yellow, Green, Blue, New.

NOTE: Current occupational safety requirements for employees working in all areas of the CDTF remain in effect. Level B ensemble is required when working in the Hot Laundry area (off-gassing, inspection, autoclave). Once autoclaved, the BDO will be considered safe for handling in the cold laundry area.

14. If application is being made to construct or modify, provide the following:

Name of installer or contractor EG&G Ft. McClellan

Mailing address P.O. Box 5398, Ft. McClellan, AL Phone (205) 820-7848

Date construction or modification to begin To Be Determined

Date construction or modification to be complete To Be Determined

15. Does the input material or product from this process or unit contain finely divided materials which could become airborne? Yes ☐ No ☒

Is this material stored in piles or in some other way as to make possible the creation of dust problems? Yes ☐ No ☒

List storage piles (if any)

Type of Material	Particle Size (diameter or screen size)	Pile Size (average tons on piles)	Pile Wetted (Yes or No)	Pile Covered (Yes or No)

Name of person submitting this report Doug Lipsey

Title Project Manager

Date 8/25/92 Phone (205) 820-7848

ADEM-105d Rev. 6/83
(ADEM 105 replaces APC 102)