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Military Munitions Rule

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION I

In the Matter of:	**U.S. EPA Region I**
Training Range and Impact Area, Massachusetts Military Reservation	**EPA Docket No.: RCRA 1-2001-0014**
National Guard Bureau and Massachusetts National Guard,	
Respondents.	**ADMINISTRATIVE ORDER FOR USE OF CONTROLLED DETONATION CHAMBER FOR REGULATED MUNITIONS**
Proceeding Under Section 7003 of the Resource Recovery and Conservation Act, 42 U.S.C. § 6973	**WASTES**

9933

ADMINISTRATIVE ORDER
FOR: MASSACHUSETTS MILITARY RESERVATION
TRAINING RANGE AND IMPACT AREA

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I. JURISDICTION

1. This Administrative Order (Order) is issued to Respondents National Guard Bureau and Massachusetts National Guard pursuant to the authority vested in the Administrator of the United States Environmental Protection Agency (EPA) by Section 7003 of the Solid Waste Disposal Act, commonly referred to as the Resource Recovery and Conservation Act of 1976 (RCRA), as amended by the Hazardous and Solid Waste Amendments of 1984, 42 U.S.C. § 6973. The Administrator of EPA has delegated the authority to take these actions to the Regional Administrator of EPA Region I by EPA Delegation No. 8-22-A and 8-22-B dated March 20, 1985.

2. In the interests of environmental protection and public health, EPA hereby orders Respondent National Guard Bureau to undertake all actions required by this Order. With respect to actions to be conducted, Respondent Massachusetts National Guard shall only be responsible to assist Respondent National Guard Bureau for Work under Section XVII (Access) and Section XX (Creation of Danger, Emergency Response).

II. STATE COORDINATION

3. Pursuant to Section 7003(a) of RCRA, 42 U.S.C. § 6973(a), the Commonwealth of Massachusetts has been notified in writing of the issuance of this Order.

III. PARTIES BOUND

4. This Order shall apply to and be binding upon the Respondents, and upon their affiliated organizations, agents, contractors, and consultants.

IV. PURPOSE

5. This Order requires the Respondent National Guard Bureau to employ a controlled detonation chamber for the disposal of certain munitions and unexploded ordnance which have been buried or otherwise disposed of, within the meaning of RCRA, at the Massachusetts Military Reservation (MMR) Training Range and Impact Area. The required actions are described more fully in the Statement of Work (SOW) attached to this Order as Appendix A, which is enforceable hereunder.

V. DEFINITIONS

6. All other terms, not otherwise defined herein, shall have their ordinary meanings unless defined in RCRA, in which case the RCRA definition shall control.

> "Contractor" shall mean any person, including the contractors, subcontractors, or agents, retained or hired by Respondent(s) to undertake any Work under this Order.

"Day" shall mean a calendar day, unless otherwise specified.

"DEP" shall mean the Massachusetts Department of Environmental Protection.

"Order" shall mean this RCRA § 7003 Administrative Order, any attachments or appendices to this Order, and all documents that are to be produced or submitted pursuant to this Order. All attachments or appendices to this Order, and all documents that are to be produced or submitted pursuant to this Order are incorporated into this Order, and shall be enforceable hereunder.

"Work" shall mean all tasks and activities required by this Order or related to the performance of tasks and activities required by this Order.

VI. **FINDINGS OF FACT**

7. Respondent National Guard Bureau (NGB) is an agency of the United States. The National Guard Bureau oversees, provides funding for and sets requirements for training activities conducted by the Massachusetts National Guard and other National Guard units at MMR.

8. Respondent Massachusetts National Guard, and its divisions, the Massachusetts Army National Guard and the Massachusetts Air National Guards, are agencies of the Commonwealth of Massachusetts.

9. The Massachusetts Military Reservation (MMR) is a 21,000-acre facility located on Cape Cod, in the townships of Bourne, Falmouth, Mashpee and Sandwich in Barnstable County, Massachusetts. The Massachusetts Army National Guard and Massachusetts Air National Guard conduct operations at MMR, under the direction of the National Guard Bureau.

10. On July 13, 1982, EPA determined that the Cape Cod Aquifer is the sole or principal source of drinking water for Cape Cod, Massachusetts, and that the Cape Cod Aquifer, if contaminated, would create a significant hazard to public health. 47 Fed. Reg. 30282. Among the findings on which EPA based this determination are the following:

a. The Cape Cod Aquifer is a single continuous aquifer, which then served as the "sole source" of drinking water for the approximately 147,725 permanent residents and 424,445 peak seasonal residents of Cape Cod;
b. There is no existing alternative drinking water source, or combination of sources, which provides fifty percent or more of the drinking water to the designated areas, nor is there any reasonably available alternative future source capable of supplying Cape Cod's drinking water demands; and
c. As a result of its highly permeable soil characteristics, the Cape Cod aquifer is susceptible to contamination through its recharge zone from a number of sources. Since

groundwater contamination can be difficult or impossible to reverse, and since this aquifer is relied on for drinking water purposes by the general population, contamination of the aquifer would pose a significant hazard to public health.

11. Currently, the Cape Cod Aquifer serves as the sole drinking water source for approximately 200,000 permanent and 520,000 seasonal residents of Cape Cod.

12. A study conducted by the Defense Department's Joint Program Office at MMR in April of 1999 estimated that in the year 2020, there will be a water supply shortage of between 9.8 and 11 million gallons per day for the regional water supply, that is the combined supplies of Bourne, Falmouth, Mashpee, Sandwich, South Sagamore and for Otis Air National Guard Station, which serves all users on MMR.

13. Approximately 14,000 acres of MMR constitute the Training Range and Impact Area.

14. The Training Range and Impact Area lie directly over the Sagamore Lens, the most productive part of the Cape Cod Aquifer. The Training Range and Impact Area is a major groundwater recharge area, located near to the apex of the Sagamore Lens. Groundwater flows radially in all directions from the Training Range and Impact Area.

15. The Sagamore Lens has been identified by the Cape Cod Commission as the portion of the Cape Cod Aquifer most capable of supplying sufficient water to satisfy future demand for drinking water on Cape Cod. If MMR is excluded from the list of potential future water supply areas on Cape Cod, only approximately 5 percent of Cape Cod lies over groundwater which is suitable as a future water supply. If MMR is included in the analysis, approximately 19 percent of Cape Cod is suitable as a future water supply area.

16. The part of an aquifer that directly supplies a public water supply well is known as a "wellhead protection area". The Training Range and Impact Area lie directly above segments of several wellhead protection areas on Cape Cod.

17. For over fifty years, military and law enforcement training has been conducted in the Training Range and Impact Area, including training conducted by and directed by Respondents. This training and associated activities has included, but has not been limited to:

a. Small arms firing at several ranges in the Training Range and Impact Area involving the use of small caliber munitions;

b. Artillery firing and mortar firing into the Impact Area from gun and mortar firing points located within and/or near the Training Range;

c. Burning of excess propellant bags at firing ranges and gun and mortar locations;

d. Detonation practice for explosives at demolition ranges in or near the Training Range and Impact Area;

e. Detonation of unexploded ordnance (UXO) found in and near the Impact Area, including detonation of high explosive mortar and artillery rounds.

f. Training activities with various other munitions including pyrotechnic devices, rockets, grenades, and mines;

g. Packing, testing and development of weapons by Department of Defense contractors at ranges under lease from the United States Department of Army;

h. The disposal and abandonment of unexploded ordnance, partially exploded ordnance and used ordnance at various locations in and around the Training Ranges and Impact Area; and

i. The storage of munitions, including explosives, at Ammunition Supply Points.

18. On February 27, 1997, pursuant to Section 1431 of the Safe Drinking Water Act (SDWA), 42 U.S.C. 300i, EPA issued Administrative Order SDWA I-97-1019, which required the National Guard Bureau to investigate contamination at and emanating from the Training Ranges and Impact Area.

19. On April 10, 1997, EPA issued Administrative Order SDWA I-97-1030, which required the National Guard Bureau and the Massachusetts National Guard to cease certain training activities pending the completion of environmental investigations at the Training Ranges and Impact Area. Administrative Order SDWA I-97-1030 was later modified on July 25, 1997.

20. On January 7, 2000, EPA issued Administrative Order SDWA I-2000-0014, which required the National Guard Bureau and the Massachusetts National Guard to undertake rapid response actions and remedial actions to address contamination in certain areas at the Training Ranges and

Impact Area. Administrative Order SDWA I-2000-0014 required the National Guard Bureau, among other things, to undertake a feasibility study to address unexploded ordnance (UXO) and munitions which have been disposed of at the Training Ranges and Impact Area, and upon approval by EPA, to implement remedial measures relating to UXO and munitions.

21. Munitions and other materials used at the Training Ranges and Impact Area, both currently and in the past, contain solid wastes, hazardous constituents and/or hazardous wastes, including the compounds detected in groundwater and soil discussed in paragraph 28 below. A partial list of the munitions used at MMR and their components is contained in the Ordnance and Explosives Archive Search Report (Army Corps of Engineers, March, 1999), the Draft Range Use History Report (Ogden Environmental, June, 1997) and Draft Chemical Composition of Munitions Report (Ogden Environmental, June, 1997).

22. Munitions used by Respondents in artillery and mortar firing at MMR contained explosive compounds. High explosives used at MMR in the past for mortar, rocket and artillery firing and for grenades include trinitrotoluene (TNT) and Royal Demolition Explosive (RDX), hexahydro-1,3,5-trinitro-1,3,5-triazine.

23. Propellants used in the past at MMR for artillery include single base propellants. The constituents of single base propellants include, among other things, dinitrotoluene (DNT), dibutylphthalate and diphenylamine. The isomers 2,4-DNT and 2,6-DNT are compounds that compose technical grade DNT.

24. Propellants that were used at MMR for mortar and rocket firing included double-base propellants, including M7, M8, and M9 propellants. Generally, double-base propellants include nitroglycerin as one of the constituents. Nitroglycerin and diethylphthalate together account for 46% of the reported weight of M8 propellants. M9 propellants also contain diphenylamine.

25. Munitions used by Respondents at MMR contained metals that have been found in soil in the Training Ranges and Impact Area, including lead, antimony, beryllium, molybdenum, copper, barium, aluminum, magnesium, cadmium, and thallium.

26. Pyrotechnics were also used in training operations at MMR. Available information indicates that many of the pyrotechnics have hazardous constituents, including but not limited to contaminants detected in soil and groundwater in the Impact Area and Training Range. Many pyrotechnics used at MMR contain hazardous constituents such as lead thiocyanate, nitroglycerin, diethylphthalate, hexachlorobenzene, magnesium, aluminum, and acetone.

27. Portions of the Training Ranges and Impact Area have been investigated for groundwater, soil and sediment contamination pursuant to EPA's Administrative Order SDWA I-97-1019. To date, this study has revealed that a number of areas in the Training Ranges and Impact Area have been contaminated by Respondents' disposal and training related activities. Contamination from explosives, propellants, metals, herbicides, pesticides, volatile organic compounds, semivolatile

organic compounds and UXO have been discovered in soil and/or groundwater in numerous areas. Investigations regarding the nature and extent of contamination at the Training Ranges and Impact Area are ongoing.

28. Information gathered to date under this study indicates that specific areas at or near the Training Ranges and Impact Area require response action, as described in Administrative Order SDWA I-2000-0014. The specific areas, and some of the levels of contamination detected, are as follows:

A. Demolition Area I: Demolition Area I, a training area used primarily for demolition, is located south of the Impact Area and north of Pocasset-Forestdale Road. Types of materials used for training purposes at this location included C4, TNT, dynamite, shape charges, cratering charges, bangalore torpedoes, claymore mines and detonating cord. This area was also used for open burn/open detonation disposal of munitions.

RDX has been detected in groundwater monitoring wells in the vicinity or downgradient of Demolition Area 1 at concentrations in excess of EPA's Health Advisory for RDX of 2 ppb, as follows:

MW 19	260 ppb
MW 34	6.2 ppb
MW 31	370 ppb
MW 73	63 ppb
MW-76	37 ppb
MW 77	150 ppb

MW34 is approximately one half mile west of Demolition Area 1.

2,4,6-TNT has been detected in groundwater in MW 19 at Demolition Area 1 at 16 ppb, which is in excess of EPA's Lifetime Health Advisory for TNT of 2 ppb.

The following is an incomplete list of contaminants which have also been detected in surface and subsurface soils at Demolition Area 1:

Surface Soils:

RDX	14,000,000 ppb
HMX	1,300,000 ppb
2A-4,6-DNT	800 ppb
4A,2,6-DNT	400 ppb
2,4,-DNT	1,800 ppb
Hexachlorobenzene	7,400 ppb
dioxin (TEQ 2,3,7,8-TCDD)	27.03 pg/g

2,6-DNT	40 ppb
Di-N-Butylphthalate	290 ppb
N-nitrosodiphenylamine	930 ppb

Subsurface Soils:

RDX	9,300 ppb
HMX	380 ppb
2A-4,6-DNT	360 ppb
4A-2,6-DNT	340 ppb
2,4-DNT	150 ppb
Di-N-Butylpthalate	200 ppb
N-nitrosodiphenylamine	34 ppb

The contaminants found in soil and groundwater in and downgradient of Demolition Area 1 lie within the zone of contribution for active public water supply wells in Bourne, Massachusetts. A zone of contribution defines the land area from which groundwater flows into a drinking water well under pumping conditions. Contaminants in soil and groundwater in a zone of contribution may be drawn into a drinking water well.

The contamination in soils at Demolition Area 1 has entered and is likely to continue to enter the underlying groundwater.

B. Chemical Spill (CS)-19: The CS-19 site is a small area in the west-central region of the Impact Area that was used for the disposal of munitions, among other things.

RDX has been detected in groundwater monitoring wells in the vicinity or downgradient of CS-19, in excess of EPA's Health Advisory of 2 ppb for RDX as follows:

MW 25	4.1 ppb
58 MW 0002	20 ppb
58MW0009E	17 ppb

Contaminants have also been detected in surface and subsurface soils at at CS-19, including, but not limited to, the following:

Surface Soils:

RDX	580 ppb
HMX	2,713 ppb
diethylphthalate	14,000 ppb
Hexachlorobenzene	4,600 ppb
2,4-DNT	710 ppb
N-nitrosodiphenylamine	380 ppb

OCDD	3.5 ppb
dioxin (2,3,7,8-TCDD TEQ)	11.38 pg/g
DCDF	2.9 ppb
Total HpCDD	.31 ppb
MCPP	232,000 ppb
Aluminum	26,100 ppm
Lead	1,830 ppm
Magnesium	12,200 ppm

Subsurface Soils:

HMX	789 ppb
Hexachlorobenzene	3,500 ppb
OCDD	1.9 ppb
Total HxCDF	.68 ppb
Total Hp CDF	.67 ppb
DCDF	3.9 ppb
Aluminum	9,050 ppm
Lead	1,500 ppm
Magnesium	2,100 ppm

Contamination in soils at CS-19 has entered and is likely to continue to enter the underlying groundwater.

The soil and groundwater contamination related to CS-19 lie within the zone of contribution for Long Range Water Supply 8, a potential water supply well site being investigated as a future public drinking water well.

C. Southeast Corner of the Ranges: This area is close to the top of the groundwater mound of the Sagamore Lens. Explosives have been detected in wells outside of the Impact Area north of Snake Pond close to the J Ranges. Explosives were disposed on the ground surface and into underground holding tanks.

RDX has been detected in groundwater monitoring wells in the vicinity or downgradient of the J Ranges in excess of EPA's Health Advisory of 2 ppb for RDX as follows:

90WT 013	5.2 ppb
90MW 0022	5.4 ppb
MW-58	7.4 ppb

HMX has been detected in a well installed near the melt-pour facility on the J-3 Range at concentrations ranging to 12 ppb.

Contaminants have also been detected in surface soils at the steel lined pit at the J Ranges including the following:

RDX	24,000 ppb
HMX	9,300 ppb
2,4-DNT	200 ppb
di-n-butylphthalate	80 ppb
pentachlorophenol	70 ppb
aluminum	24,600 ppm
lead	616 ppm
magnesium	2,720 ppm
barium	1,140 ppm
copper	2,350 ppm
cadmium	33.3 ppm

Contamination in soils at the steel lined pit is likely to enter the underlying groundwater. The soil and groundwater contamination related to the J Ranges lie within the zone of contribution for Long Range Water Supply Wells 95-6 and 95-15, potential water supply well sites which are being investigated for future public drinking water wells. This contamination may also lie within the zone of contribution for the J Well, a current water supply well for MMR.

D. Groundwater under and emanating from the Central Impact Area: Numerous detections of explosives in groundwater at various depths in the aquifer track back to, or originate from, the center of the Impact Area. The Impact Area contains numerous target areas where mortar and artillery, including high explosive and white phosphorous warheads, were fired over time.

RDX has been detected in groundwater monitoring wells in the vicinity or downgradient of the targets in the Central Impact Area at levels in excess of EPA's Health Advisory of 2 ppb for RDX, as follows:

MW-107	4.0 ppb	MW-2	13 ppb
MW-23	6.6 ppb	MW-85	29.0 ppb
MW-38	3.0 ppb	MW-86	2.5 ppb
MW-1M2	4.6 ppb	MW-1S	3.1 ppb
MW-90	3.4 ppb	MW-105	5.9 ppb
MW-25	4.1 ppb	MW-91S	12.0 ppb
MW-91M1	18.0 ppb	MW-40	3.0 ppb
MW-37	3.6 ppb	MW-101	2.5 ppb
MW-100	4.3 ppb	MW-99	6.9 ppb
MW-87	6.5 ppb	MW-89	8.3 ppb
MW-93M1	2.2 ppb	MW-98	2.1 ppb

MW-93M2	5.2 ppb	MW-107	4.0 ppb
MW-88	7.0 ppb	MW-95	2.2 ppb

MW-2 and MW-23 are located within the zone of contribution for Long Range Water Supply Well 95-6, a potential water supply well site being investigated for a future public drinking water well.

RDX at levels below the Health Advisory of 2 ppb has also been detected at numerous wells within and downgradient of the Impact Area.

The detection of RDX emanating from the Impact Area at levels below and above the Health Advisory indicates that RDX has been introduced into the aquifer in the Impact Area, that it is migrating in groundwater at concentrations above the Health Advisory level from source areas toward potential drinking water supplies, and that it has migrated as far as 9,000 feet from its probable source.

In addition, the following contaminant has been found in surface soils in Study Area 2 within the Impact Area, which lies within the zone of contribution for Long Range Water Supply Well 95-6, a water supply well site which is being investigated for a potential drinking water supply well:

1,2-dibromoethane	190 ppb

The contamination in soils in Study Area 2 is likely to enter the underlying groundwater.

E. The KD Range: The KD Range is located southeast of the Impact Area, on Pocasset-Forestdale Road. Ordnance known to have been used at KD Range has included: all pistol calibers; 5.56 mm and 7.62 mm ball and tracer rounds; 14.5 mm subcaliber training devices; 40 mm High Explosive (HE) and practice grenades; Dragon High Explosive Anti-tank (HEAT) and practice artillery rockets, 90 mm recoilless rifle HEAT and practice rounds, and TOW practice rounds. The area was primarily used for rocket training.

The following contaminants, including but not limited to explosives and propellants, have been found in surface soil near targets used in the KD Range:

RDX	43,000 ppb
HMX	10,100 ppb
TNT	2,100 ppb
2A-4,6-DNT	220 ppb
4A-2,6-DNT	140 ppb
copper	1,820 ppm

lead	816 ppm
dieldrin	1,800 ppb
nitroglycerin	6,400 ppb

In profile samples collected during drilling, 2,6-DNT and HMX were detected in MW 61M at 10.2 feet below the water table and 20.2 feet below the water table, respectively. Consultants for NGB have concluded that shallow detections of 2,6-DNT and HMX in MW-61 are likely to have originated from the KD Range target area.

In addition, the following contaminant (a constituent of propellants) was found in surface soil near the firing position for the KD Range:

Nitroglycerin	130,000 ppb

Contamination in soils at the KD Range is likely to enter the underlying groundwater. The contaminants in soil at the KD Range are within the zone of contribution of current public drinking water wells of Bourne, Massachusetts.

F. J-3 Wetland: The J-3 Wetland is located south of the J-3 Range and north of Snake Pond. The property on which the J-3 Wetland is located was formerly part of the MMR.

The following contaminants, which include propellants and their byproducts, as well as the pesticide dieldrin, have been detected in sediment samples at the following levels at the J-3 Wetland:

Nitroglycerin	5,200 ppb
Di-n-butyl phthalate	37 ppb
N-nitrosodiphenylamine	240 ppb
Dieldrin	200 ppb

The NGB has conducted a rapid response action to address contamination in soils and sediments at the J-3 Wetland pursuant to EPA Administrative Order No. SDWA I-2000-0014.

G. Gun Positions: The following contaminants, which include propellants, propellant breakdown products, pesticides and metals, have been found in soils at the following gun positions:

i. Gun Position 7

2,4-DNT	1,300 ppb
2,6-DNT	26 ppb

ii. Gun Position 16

2,4-DNT	600 ppb

iii. Gun Position 9

2,4-DNT	17,000 ppb
2,6-DNT	960 ppb
N-nitrosodiphenylamine	930 ppb
Pentachlorphenol	180 ppb
Arsenic	17 ppb
Di-N-butylthalate	16,000 ppb

In addition, contamination, most notably the explosive and propellant component 2,4-dinitrotoluene, has been found at numerous other gun and mortar firing positions. Contamination in soils at these gun positions is likely to enter the underlying groundwater.

H. Armored Personnel Carrier: The following explosives and explosives breakdown products have been found in soil beneath a pile of UXO and debris near the Armored Personnel Carrier to the east of Turpentine Road in the Impact Area:

Surface Soils

2A46 DNT	230 ppb
RDX	1,150 ppb
HMX	150 ppb

Soils 6-12" below Surface

2A46 DNT	155 ppb
RDX	565 ppb
HMX	150 ppb

The NGB has conducted a rapid response action to address contaminants in soil at the Armored Personnel Carrier pursuant to EPA Administrative Order No. SDWA 1-2000-0014.

29. During environmental studies at the Training Ranges and Impact Area, numerous items of unexploded ordnance and other munitions have been found. Military munitions have likely come to be located on the ranges in one of two ways. First, military munitions employed on military ranges fail to function as intended, which can result in Unexploded Ordnance (UXO) remaining on the range. The generally accepted percentage of munitions that fail to function as designed is between 10 and 20%. Second, military munitions, or components thereof, may have been

disposed of or buried on the ranges. UXO and other munitions are located either on the surface, or if they were buried or fired, below the surface.

30. In December, 1997, contractors working on behalf of the National Guard Bureau discovered a burial cache of approximately 1112 projectiles (60mm and 81mm mortar rounds), 26 scrap pieces of ordnance and 125 pieces of fuzes for munitions at the J-1 range at MMR. Most of the buried projectiles were determined to be inert (not filled with explosives), except for one 105 mm low order projectile fragment. In addition, two fuzed 105mm projectiles were found in the burial cache.

31. The National Guard Bureau has conducted surveys to locate UXO and buried munitions at several locations in the Training Ranges and Impact Area, as required by Administrative Orders SDWA I-97-1019 and SDWA-I-2000-0014. To date, surveys for UXO and buried munitions have resulted in the discovery of UXO and/or buried munitions at the following areas:

i. J-1, J-2 and J-3 ranges
ii. High-use target areas in the Central Impact Area
iii. Demolition Area 1; and
iv. Other areas throughout the Training Ranges and Impact area where surveys were necessary to conduct environmental investigations and ensure the safety of site workers.

32. In July, 2000, contractors working on behalf of the National Guard Bureau found a burial pit at the J-2 Range which contained 92 inert (wax-filled) 81-mm mortar rounds with live high-explosive fuzes. These rounds were remotely moved from the excavation to an area adjacent to the disposal pit and open detonated. Post-detonation soil sampling indicated explosive (RDX) residues in excess of 103,000 ppb.

33. Between September 20 and September 25, 2000, contractors working on behalf of the National Guard Bureau found three burial pits on the J-1 range which contained a total of 1,263 unfuzed 60 mm and 81 mm mortars (312 practice, 917 potentially containing high explosives, 34 potentially containing white phosphorous); numerous items of 105 mm debris; and approximately 810 fuzes (both inert and/or functioned). The majority of these 1,263 items have been set aside for disposal in a controlled detonation chamber.

34. Between November 30 and December 4, 2000, contractors working on behalf of the National Guard Bureau found a burial pit on the J-1 range, which contained 360 60mm and 81mm mortars, three of which had deteriorated fuzes. The majority of these 360 items have been set aside for disposal in a controlled detonation chamber.

35. As well as presenting a safety hazard, UXO and buried munitions may leak propellant, explosive and pyrotechnic components to the environment, causing a threat to human health and/or the environment.

i. According to the Draft Fate and Transport of Munitions Report prepared by the NGB for MMR, " undetonated explosive compounds contained in UXO have the potential to leach into the environment." (Ogden, June 1977). Metals from UXO can also build up over time in the environment.

ii. According to a military technical manual, shells containing TNT and Amatol can exude TNT even under the controlled conditions of above ground storage in an ammunition supply point. (War Department Technical Manual TM 9-1900, Ammunition-General)

iii. A DOD Pamphlet entitled **Unexploded Ordnance (UXO): An Overview** states that "UXO may also be found in parts or fragments. All UXO, whether intact or in parts, presents a potential hazard because it may contain chemical agents that could become exposed."

iv. A Sandia National Laboratory fact sheet on UXO states that at number of its environmental restoration sites unexploded ordnance/high explosives may be present. " The UXO/HE found include high explosive chunks....[and] five-inch shells with recrystallized TNT seeping from threads...."

v. A June 1998 report prepared by the Department of Army Defense Ammunition Center on UXO exhumed from the J Range at MMR in December 1997 found the vast bulk of the exhumed ordnance to be "corroded" or "extremely corroded;" that much of the ordnance found presented "exposed filler"; and that one 155mm round presented exposed RDX to the environment. This was a low order detonation which, in the report's words, resulted in "open projectile. Dirt in Body."

vi. A March 1999 report prepared by the Army Corps of Engineers states that "virtually every type of OE (live ammunition or components, debris derived from live ammunition, CWM or explosives that have been lost, abandoned, discarded, buried, fired or thrown from demolition pits or burning pads)" has been discovered in various areas of MMR.

vii. Until the mid-1970s, land burial of unexploded ordnance was an authorized method of disposal. According to an Army Corps of Engineers guidance document: "It was much cheaper to dig a trench and bury ammunition than it was to destroy it by burning or detonation.... It was much easier to discard unneeded ammunition into a pond or lake than fill out the required paperwork and return it to the ammunition supply point."

viii. According to a February 1999 U.S. Army Corps of Engineers Report, "Conceptual Model and Process Descriptor Formulations for Fate and Transport of UXO," UXO can exist on firing ranges in a number of physical states that greatly affect the fate and transport of explosives contained in the UXO. Intact delivery systems may occur at the firing range from either deliberate burial or fired munitions that failed to detonate. Explosives contamination from intact delivery systems results from corrosion and development of pinhole cracks that may occur over time or

leaking through screw threads linking the fuse assembly to the main charge. Incomplete detonation or breakup of the delivery system without detonation may also occur, leading to the survival of part or all of the explosive. These explosives may be scattered over the firing range as free product or partially encased in the remains of the delivery system.

ix. According to a September 1997 U.S. Army Corps of Engineers Report, "Assessment of Sampling Error Associated with Collection and analysis of Soil Samples at a Firing Range Contaminated with HMX," a 7 gram sample of metallic rocket debris collected at a firing range was contaminated with residues of HMX and TNT at concentrations of 50 mg/kg and 0.1 mg/.kg, respectively.

36. Proper disposal of UXO and/or buried munitions depends on the type of munition, its condition, and whether the munition is unstable and must be detonated in place, or whether the munition is safe enough to be moved and disposed of in a controlled environment. To avoid continued contamination of groundwater through open burning/open detonation, as has historically occurred at Demolition Area 1, EPA and the Respondent NGB have agreed upon the following process for disposal of UXO at MMR. When a UXO is determined to be unsafe to move by Explosive Ordnance Division ("EOD") technician, it is exploded in place through open detonation, and all contaminants found in soil following the detonation will be remediated by Respondent National Guard Bureau. If a UXO is determined to be safe to move, it is set aside for disposal in a controlled detonation chamber.

37. In response to EPA's request to implement an alternative to in-place explosion as a method for disposal of UXO and other munitions, the National Guard Bureau in June 2000 obtained a Donovan T-10 controlled detonation chamber which is to be used to dispose of UXO and other munitions which are of appropriate size and are deemed safe to move. As of mid-October 2000, over 1,235 UXO items not subject to regulation as solid waste under RCRA have been disposed in this chamber.

38. Detonating UXO and buried munitions in place (i.e., in the locations where they have been found) causes or may cause further releases of solid wastes and/or hazardous constituents into the environment. Since July 1997, the National Guard Bureau's EOD contractors and Massachusetts National Guard EOD personnel have exploded numerous items of UXO in place. UXO considered unsafe to move are exploded in place by attaching a small booster charge of explosive to the item, and then detonating the item where it was found. Sampling conducted by the National Guard Bureau's contractors following "blow-in-place" events since 1999 have shown that explosive compounds or other solid wastes and/or hazardous constituents are detected in soil after UXO has been blown in place in approximately half of all cases. Some of the results of the sampling efforts are summarized below.

i. Following an emergency open detonation on October 2, 1999 of two crates of artillery simulators at Demolition Area 2, the explosives RDX and HMX were detected in the

detonation crater at concentrations ranging to 42,000 ppb and 3,300 ppb, respectively. Artillery simulators do not contain RDX or HMX; however, the supplemental charge of C-4 explosive used to detonate the items is composed of 91% RDX. HMX is an impurity which is typically not removed during the manufacture of RDX.

ii. Following the detonation in place on December 28, 1999 of a 105 mm high explosive fuzed projectile found at CS-19, the explosive 2,4,6-trinitrotoluene (TNT) was detected at 330 and 840 ppb in composite and discrete soil samples, respectively.

iii. Following the detonations in place on January 18, 2000, explosives were detected in soil samples at the following locations where UXO were blown in place:

- at the location of 3.5 inch rocket round (fired US rockets M28 with base detonating fuzes) found at Demolition Area 1, 2-nitrotoluene was detected at 160 ppb;

-at the location of an 81mm mortar round east of Turpentine Road in the central Impact Area, RDX was detected at 18,000 and 23,000 ppb in composite and discrete soil samples, respectively;

-at the location of an 81mm mortar found west of Turpentine Road, RDX and HMX were detected in a composite sample at 32,000 and 170 ppb, respectively, and RDX was detected at 8,400 ppb in a discrete soil sample.

iv. Following detonations in place on March 3, 2000, explosives were detected in soil samples at the following locations where UXO were blown in place:

- at the location of a 37mm fuzed high explosive projectile at Demolition Area 1, the explosive compounds TNT, 4A-2,6-DNT, and RDX were detected at estimated concentrations of 2,000 ppb, 130 ppb, and 120 ppb, respectively, in a discrete soil sample. In addition, TNT, 2A-4,6-DNT and 4A-2,6-DNT were detected at estimated concentrations of 1,500 ppb, 140 ppb, and 150 ppb, respectively, in a composited soil sample.

- at the location of a 60mm LAW rocket found at the J-2 range, the explosive compound HMX was detected in soils at an estimated 920 ppb.

v. Following detonations in place in April, 2000, explosives were detected in soil samples at the following locations where UXO were blown in place:

- at the location of two 81 mm high explosive mortars found at Target 9 in the Central Impact Area, RDX and pentaerythritol tetranitrate (PETN) were detected in

a composite soil sample at concentrations of 8,900 ppb and 200,000 ppb, respectively. RDX was also detected in a discrete soil sample at 14,000 ppb.

- at the location of a 105 mm high explosive anti-tank projectile found in the Central Impact Area, RDX and HMX were detected in a composite soil sample at concentrations of 1,700,000 ppb and an estimated 510 ppb, respectively. RDX and HMX were also detected in a discrete soil sample at concentrations of 1,200,000 ppb and an estimated 380 ppb, respectively.

- at the location of a 66 mm light anti-tank weapon (LAW) rocket found at the J-2 Range, RDX and HMX were detected in soils at a concentration of 200,000 ppb and an 250 ppb, respectively.

- at the location of a second 66 mm LAW rocket at the J-2 Range, RDX and HMX were detected in soils at a concentration of 2,000,000 ppb and an estimated 760 ppb, respectively.

- at the location of a 60 mm high explosive fuzed mortar, RDX was detected in soil at an estimated 480 ppb.

vi. Following detonations in place in May 2, 2000, explosives were detected in soil samples at the following locations where UXO were blown in place:

- at the location of an 81 mm mortar at the J-2 Range, RDX was detected at a concentration of 346 ppb. Post-detonation, it was determined the round was inert; however, the shaped-charge explosive used to supplement the detonation contained mainly RDX.

- at the location of a 66 mm LAW rocket found at the J-2 Range, RDX and HMX were detected in soils at a concentration of 613,000 ppb and an 7,613 ppb, respectively. Post-detonation, it was determined the round was inert; however, the shaped-charge explosive used to supplement the detonation contained mainly RDX.

- at the location of a 105 mm high explosive anti-tank projectile found in the Central Impact Area, the explosives TNT, PETN, and Picric Acid were detected in soils at a concentration of 2,250 ppb, 7,165 ppb, and 589 ppb, respectively.

vii. Following the detonation in place on May 19, 2000 of an 81 mm mortar at the J-2 Range, RDX was detected at in soil samples at 19,000 ppb. Post-detonation, it was determined the round was inert; however, the shaped-charge explosive used to supplement the detonation contained mainly RDX.

viii. Following detonations in place in June 8, 2000, explosives were detected in soil samples at the following locations where UXO were blown in place:

- at the location of a 37 mm round at the Former Gravity Anti-Tank Range, RDX and HMX were detected at concentrations of 349 ppb and 288 ppb, respectively.

- at the location of a second 37 mm round at the Former Gravity Anti-Tank Range, RDX was detected in soils at 61,127 ppb. Post-detonation, it was determined the round was inert; however, the shaped-charge explosive used to supplement the detonation contained mainly RDX.

ix. Following detonations in place in July 18, 2000, explosives were detected in soil samples at the following locations where UXO were blown in place:

- at the location of a 155 mm artillery round at the J-2 Range, RDX was detected at in soil samples at concentrations ranging to 57,000 ppb. Post-detonation, it was determined the round was inert; however, the shaped-charge explosive used to supplement the detonation contained mainly RDX.

- at the location of a second 155 mm artillery round at the J-2 Range, RDX was detected at in soil samples at concentrations ranging to 1,220 ppb. Post-detonation, it was determined the round was inert; however, the shaped-charge explosive used to supplement the detonation contained mainly RDX.

39. In addition to the data indicating the presence of munitions-related contaminants following blow-in-place events at MMR, numerous studies show that open detonation of munitions and/or UXO causes or may cause releases of solid wastes and/or hazardous constituents into the environment.

i. Demolition Area 1 at MMR was used for demolition training and disposal of munitions and UXO. As stated above, at Demolition Area 1 contaminants including RDX and 2,4,6-TNT were detected were detected in groundwater at levels greater than health advisories. Contaminants including RDX, HMX, 2A-4,6-DNT, 4A-2,6-DNT, 2,4-DNT were detected in surface soils and subsurface soils.

ii. AEHA 1983, Hazardous Waste Management Study No. 37-26-0442-84, Phase 2 of AMC Open-Burning/Open-Detonation Grounds Evaluation, Ravenna Army Ammunition Plant, Ravenna, Ohio, 31 October - 3 November 1983, U.S. Army Environmental Hygiene Agency (AEHA), Aberdeen Proving Ground, MD.

iii. AEHA 1985, Ground-Water Monitoring Study No. 38-26-0457-86, AMC Open Burning/Open Detonation Facilities, February 1984 - March 1985, U.S. Army Environmental Hygiene Agency (AEHA), Aberdeen Proving Ground, MD.

iv. AMCCOM 1992, Development of Methodology and Technology for Identifying and Quantifying Emission Products for Open Burning and Open Detonation Thermal Treatment Methods, Field Test Series A, B, and C, Volume 1, Test Summary, Headquarters U.S. Army Armament, Munitions and Chemical Command (AMCCOM), Rock Island, IL.

v. Craig, H.D., A. Markos, H. Lewis, and C. Thompson 1993, Remedial Investigation of Site D at Naval Submarine Base Bangor, Washington, In: Proceedings of the 1993 Federal Environmental Restoration Conference, Washington, D.C., Hazardous Materials Control Resources Institute, May 25-27, 1993.

vi. Racine, C.H., M.W. Walsh, C.M. Collins, D.J. Calkins, B.D. Roebuck, and L. Reitsma 1992, Waterfowl Mortality in Eagle River Flats, Alaska, The Role of Munitions Residues, U.S. Army Corps of Engineers, Cold Regions Research and Engineering Laboratory (CRREL), Special Report 92-5, Hanover, NH.

vii. Racine, C.H., M.W. Walsh, C.M. Collins, S. Taylor, B.D. Roebuck, L. Reitsma, and B. Steele 1993, White Phosphorus Contamination of a Salt Marsh Pond Sediments at Eagle River Flats, Alaska, U.S. Army Corps of Engineers, Cold Regions Research and Engineering Laboratory (CRREL), Special Report 93-17, Hanover, NH.

viii. Walsh, M.E., and C.M. Collins 1993, Distribution of White Phosphorus Residues From the Detonation of 81-mm Mortar WP Smoke Rounds at an Upland Site, U.S. Army Corps of Engineers, Cold Regions Research and Engineering Laboratory (CRREL), Special Report 93-18, Hanover, NH.

ix. Walsh, M.E., C.M. Collins, and C.H. Racine 1995, Persistence of White Phosphorus Particles in Sediment, U.S. Army Corps of Engineers, Cold Regions Research and Engineering Laboratory (CRREL), Special Report 95-23, Hanover, NH.

x. NRC 1996, Open Burning/Open Detonation, UXO Baseline Volume 1 - Final Report, prepared by Nichols Research Corporation (NRC) for U.S. Army Engineer Division, Huntsville, AL, January 31, 1996.

xi. Murphy, W.L., and R. Wade 1998, Final Report: RCRA Facility Investigation, Phase II Release Assessment for Surface Water SWMU 03/10 Ammunition Burning Ground, Technical Report GL-98-2, U.S. Army Corps of Engineers, Waterways Experiment Station, Vicksburg, MS.

xii. COE 1999, Draft Operable Unit C OB/OD Pad, Ft. Richardson, Alaska Interim Closure Plan, prepared by CH2M Hill for U.S. Army Corps of Engineers (COE), Alaska District, Contract No. DACA85-95-D-0015.

xiii. Jenkins. T.F., T.A. Ranney, P.H. Miyares, N.H. Collins, and A.D. Hewitt 2000, Use of Surface Snow Sampling to Estimate the Quantity of Explosives Residues Resulting from Land Mine Detonations, U.S. Army Corps of Engineers, Cold Regions Research and Engineering Laboratory (CRREL), ERDC/CRREL TR-00-12, Hanover, NH.

xiv. Jenkins, T.F., T.A. Ranney, M.E. Walsh, P.H. Miyares, A.D. Hewitt, and N.H. Collins 2000, Evaluating the Use of Snow-Covered Ranges to Estimate the Explosives Residues that Result from Detonation of Army Munitions, U.S. Army Corps of Engineers, Cold Regions Research and Engineering Laboratory (CRREL), ERDC/CRREL TR-00-15, Hanover, NH.

VII. ENDANGERMENT AND RESPONSE

40. The detection of contaminants in soils discussed above demonstrates the release or threat of release of solid wastes and other contaminants from in-place explosions of UXO and other munitions at the Training Ranges and Impact Area.

41. Contaminants found in soil at the Training Range and Impact Area have leached to groundwater, as discussed in paragraph 28 above.

42. EPA has established Lifetime Health Advisories for certain contaminants. Lifetime Health Advisories establish the concentration of a chemical in drinking water that is not expected to cause any adverse non-carcinogenic effect over a lifetime of exposure with a margin of safety.

43. Consumption of large amounts of RDX by humans has caused seizures, indicating that the nervous system is a primary target organ. A 1984 Department of Defense study of female mice showed an increased incidence of liver tumors following chronic oral exposure to RDX. In its cancer classification system, EPA has classified RDX as a possible human carcinogen (Group C carcinogen). The Lifetime Health Advisory for RDX is 2 ppb.

44. Chronic exposure to TNT by humans has been associated with skin irritation and cataracts. Exposure to very high levels of TNT in the workplace has been associated with disorders of the blood and abnormal liver functions. Oral and inhalation exposures to TNT in animals have resulted in adverse effects on the blood and liver as well as the spleen and immune system. TNT has been found to cause serious effects on the male reproductive system in rats following high exposures to TNT. In a 1984 U.S. Army study, TNT was found to cause urinary bladder tumors in female Fisher rats. In its cancer classification system, EPA has classified TNT as a possible human carcinogen (Group C carcinogen). The Lifetime Health Advisory for TNT is 2 ppb.

45. Animal studies indicate that HMX may be harmful to humans and may cause liver damage and central nervous system damage if ingested or absorbed through the skin. EPA has established a Lifetime Health Advisory for HMX in drinking water of 400 ppb.

46. Pentaerythritol tetranitrate (PETN) can cause illness in humans if ingested or inhaled. Dermatitis, irritability, sleep disturbance, digestive trouble, intolerance to alcohol and altered EEG readings have been observed in workers exposed to industrial PETN. Long term exposure to industrial PETN has resulted in withdrawal complications consisting of transient angina conditions. PETN is also used as a vasodilator in angina patients.

47. The presence of RDX, TNT, HMX, PETN, 2A-4,6-DNT, 4A-2,6-DNT and other contaminants in soils following explosions in place of UXO and other munitions, and the likely release of these contaminants to groundwater through a natural leaching process, may present an imminent and substantial endangerment to the health or the environment.

48. The Work required under this Order is necessary to prevent, minimize, and/or mitigate the threat of an imminent and substantial endangerment to health and the environment posed by the actual or potential releases of solid wastes and hazardous constituents into the soils and/or groundwater at and emanating from the Training Ranges and Impact Area.

VIII. **CONCLUSIONS OF LAW**

Based on the foregoing, EPA makes the following conclusions of law:

49. Respondent National Guard Bureau is a "person" as that term is defined in Section 1004(15) of RCRA, 42 U.S.C. § 6903(15).

50. Respondent Massachusetts National Guard is a "person" as that term is defined in Section 1004(15) of RCRA, 42 U.S.C. § 6903(15).

51. UXO and munitions which have been disposed of or buried on the Training Ranges and Impact Area, where such burial is not a result of product use, are "solid wastes," as that term is defined in Section 1004(27) of RCRA, 42 U.S.C. § 6903(27), and as defined in 40 C.F.R. §§ 261.2(a) and 266.202.

52. The lead, RDX, TNT, DNT, 2,4,6 TNT, HMX, 2A-4,6-DNT, 4A-2,6-DNT, 2,4-DNT, 2,6-DNT, N-nitrosodiphenylamine, picric acid, furans, dioxins, aluminum, magnesium, hexachlorobenzene, di-n-butylphthalate, pentachlorophenol, antimony, molybdenum, thallium, barium, copper, cadmium, 1,2-dibromoethane, nitroglycerin, dieldrin, arsenic contained in UXO, found in soil and/or found in groundwater beneath or near the Training Ranges and Impact Area are "solid wastes," as that term is defined in Section 1004(27) of RCRA, 42 U.S.C. § 6903(27), and/or "hazardous constituents," as defined in 40 C.F.R. Part 261 App. VII and 40 C.F.R. Part 264 App. IX.

53. The lead, RDX, TNT, DNT, 2,4,6 TNT, HMX, 2A-4,6-DNT, 4A-2,6-DNT, 2,4-DNT, 2,6-DNT, N-nitrosodiphenylamine, picric acid, furans, dioxins, aluminum, magnesium, hexachlorobenzene, di-n-butylphthalate, pentachlorophenol, antimony, molybdenum, thallium,

barium, copper, cadmium, 1,2-dibromoethane, nitroglycerin, dieldrin, and/or arsenic contained in UXO, found in soil and/or found in groundwater beneath or near the Training Ranges and Impact Area are present in or likely to enter the Sagamore Lens of the Cape Cod Aquifer.

54. The solid wastes which are present in the soil, and which are present in or likely to enter the underground source of drinking water, may present an imminent and substantial endangerment to the health or the environment, within the meaning of Section 7003(a) of RCRA, 42 U.S.C. § 6973(a).

IX. **DETERMINATIONS**

Based on the foregoing and the Administrative Record for this Site, EPA has determined that:

55. The past or present handling, storage, treatment and/or disposal of solid wastes including buried and disposed-of munitions, UXO and the RDX, TNT, HMX, 2A-4,6-DNT, 4A-2,6-DNT, PETN and 2-nitrotoluene found in soil and/or groundwater at, beneath or near the Training Ranges and Impact Area, may present an imminent and substantial endangerment to health or the environment.

56. Respondents have contributed or are contributing to the handling, storage, treatment, or disposal of solid wastes at the Training Range and Impact Area.

57. In accordance with the requirements of Section 7003 of RCRA, EPA has provided notice to the Commonwealth of Massachusetts of this Order.

58. The actions required by this Order and as described in the Statement of Work appended hereto are necessary to prevent further release or threat of release of solid wastes and/or hazardous constituents to the environment and to protect the health of persons. Use of a controlled detonation chamber for the disposal of munitions and UXO will prevent, minimize, and/or mitigate damage caused by the discharge of solid wastes and/or hazardous constituents to the environment which are associated with in-place detonations of munitions and UXO. Based on the endangerment described above, the actions in this Order and are necessary.

X. **ORDER**

Based on EPA's jurisdiction, Findings of Fact, Conclusions of Law set forth above, the Administrative Record supporting issuance of this Order, and in order to abate or prevent any imminent and substantial endangerment to health, the Respondents are **ORDERED** to perform all Work required under this Order. The Respondents shall comply with the following provisions and perform all actions required by the terms and conditions of this Order.

59. This Order is intended to apply to disposal of UXO and munitions which have been disposed of or buried on the Training Ranges and Impact Area, where such disposal or burial is not a result

of product use (hereinafter jointly referred to as "solid waste munitions"). It is not intended to establish conditions on the disposal of UXO and munitions which are excluded from the definition of solid wastes and are not subject to RCRA regulation pursuant to 40 C.F.R. 266.202(a).

60. When a decision is made to dispose of a solid waste munition, as defined above, and the appropriate EOD officer has determined that the solid waste munition is safe to move, such solid waste munition shall be stored in a manner, and disposed of in a controlled detonation chamber with air pollution control equipment, which meets the requirements of RCRA, this Order and the SOW attached hereto.

61. Respondents shall conduct such storage and disposal of solid waste munitions as required by the Statements of Work attached to this Order, and any modifications thereto made in accordance with this Order.

62. All response actions proposed by Respondents under this Order shall meet or exceed the substantive cleanup standards of M.G.L. c. 21 E and the Massachusetts Contingency Plan, 310 CMR 40.000 et seq. Nothing herein shall limit the Respondents' obligations to provide any notifications to DEP as required by M.G.L. c. 21E and the Massachusetts Contingency Plan.

XI. DESIGNATION OF SUPERVISING CONTRACTOR AND PROJECT COORDINATOR

63. Within **seven (7) days** after the effective date of this Order, Respondent National Guard Bureau shall retain the services of a qualified and experienced Supervising Contractor for the purpose of performing the work required by this Order in accordance with the terms and conditions of the Scope of Work. Within the same **seven (7) day** period, Respondent National Guard Bureau shall notify EPA in writing of the name, address, and qualifications of the proposed supervising contractor and the name and telephone number of the supervising contractor's primary contact person. The Respondent(s) shall also notify EPA of the identity and qualifications of any other contractor(s) or subcontractor(s) to be used at the Site at least **seven (7) days** in advance of their performing any work under this Order.

64. The supervising contractor shall be a qualified professional with substantial expertise and experience in the investigation and cleanup of hazardous waste sites, munitions and contaminated groundwater, as well as clearance and remediation of UXO. EPA reserves the right to disapprove, based on professional qualifications, conflicts of interest, and/or deficiencies in previous similar work, any contractor or subcontractor or other person engaged directly or indirectly by the Respondent(s)s to conduct work activities under this Order. If EPA disapproves the selection of any proposed contractor, the Respondent(s)s shall notify EPA in writing of the name, address, and qualifications of another contractor within **seven (7) days** after receipt of the notice of disapproval.

65. Respondents shall provide a copy of this Order to all contractors, subcontractors, laboratories, and consultants retained in connection with this Order within **seven (7) days** after the Order's effective date or of such retention, whichever is later. The Respondents shall ensure that all such contractors, subcontractors, laboratories and consultants will perform all work in conformity with the RCRA, the Safe Drinking Water Act, 42 U.S.C. § 300f, and the terms and conditions of this Order and Scope of Work. Respondents shall nonetheless be responsible for ensuring that their contractors and subcontractors perform the Work in accordance with this Order.

66. Within **seven (7) days** after the effective date of this Order, the Respondents shall designate a Project Coordinator who shall be responsible for administration of all of the Respondents' actions called for by this Order, and shall submit the designated coordinator's name, address, and telephone number to EPA. EPA will deem the project coordinator's receipt of any notice or communication from EPA relating to this Order as receipt by the Respondents.

XII. NOTICE OF INTENT TO COMPLY

67. Each Respondent shall provide, within **seven (7) days** after the effective date of this Order, written notice to EPA stating whether it will comply with the terms of this Order. If either Respondent does not unequivocally commit to perform the work required by this Order, such Respondent shall be deemed to have violated this Order and to have failed or refused to comply with this Order. The absence of a response by EPA to the notice required by this paragraph shall not be deemed to be acceptance of Respondent(s)' assertions.

XIII. EPA TECHNICAL PROJECT COORDINATOR

68. The EPA Technical Project Coordinator (TPC) will administer EPA's responsibilities and receive all written notices, reports, plans and other documents required by this Order. EPA's TPC under this Order will be Todd Borci or other EPA designee. All submissions required by this Order shall be sent to EPA's TPC at the following address:

Attention: MMR Impact Area Technical Project Coordinator
Mr. Todd Borci
U.S. Environmental Protection Agency
J.F.K. Federal Building
Boston, MA 02203-2211

69. EPA's TPC shall have the authority to modify the Scope of Work in writing. Absence of the TPC from the Site shall not be cause for stoppage of work by the Respondents unless specifically directed by the TPC.

XIV. WORK TO BE PERFORMED; COMPLETION OF WORK

70. Immediately after the effective date of this Order, unless modified pursuant to Section XXXVII of this Order, Modification of the SOW, the Respondents shall commence the work detailed in the Scope of Work. All work performed by the Respondents shall be conducted in accordance with RCRA, applicable guidance documents provided by EPA, and the provisions of this Order including any standards, specifications, and time schedules contained in the Scope of Work or specified by the TPC.

XV. SUBMISSIONS REQUIRING AGENCY APPROVAL; RESPONDENTS' OBLIGATION TO PROCEED

71. After review of any deliverable, plan, report or other item (submission) that the Respondent(s) are required to submit for review and approval pursuant to this Order and Statements of Work, EPA may: (i) approve the submission; (ii) conditionally approve the submission with required modifications; (iii) disapprove the submission and notify the Respondent(s) of deficiencies; or (iv) disapprove the submission and modify the deliverable, plan, report, or other item itself to cure any deficiencies. In the event EPA approves or conditionally approves the submission, or disapproves and modifies the submission itself, the Respondent(s) shall perform all actions required by the submission, as approved, conditionally approved, or modified by EPA.

72. Upon receipt of a notice of disapproval with deficiencies ((iii) above), the Respondent(s) shall correct the deficiencies and resubmit the submission within **seven (7) days** or such other time period specified in the notice of disapproval. Notwithstanding a notice of disapproval, the Respondent(s) shall proceed to take any action required by any non-deficient portion of the submission. If EPA does not approve the submission as resubmitted, Respondent(s) shall be in violation of the Order.

73. For each submission provided to EPA, the Respondent(s) shall submit such copies as specified by the TPC. Any deliverable, plan, or report submitted to EPA pursuant to this Order shall be dated and shall include, in a prominent location in the document, the following disclaimer: "Disclaimer: This document has been prepared pursuant to a government administrative order (U.S. EPA Region I RCRA Docket No. 1-2001-0014) and is subject to approval by the U.S. Environmental Protection Agency. The opinions, findings, and conclusions expressed are those of the authors and not those of the U.S. Environmental Protection Agency." In addition, any such deliverable, plan, or report which has not received final approval from EPA shall be marked "Draft" on each page. The Respondent(s) shall provide copies of all deliverables to the Massachusetts Department of Environmental Protection (DEP). EPA will consult with the DEP in its review of each major deliverable; however, EPA retains the authority to approve or disapprove any of the deliverables.

XVI. INCORPORATION AND ENFORCEABILITY OF DOCUMENTS

74. The Statements of Work and all other appendices or attachments to this Order shall be deemed incorporated into, and made an enforceable part of, this Order. Upon approval by EPA,

all contracts, deliverables, plans, reports, specifications, schedules, or other items required by or developed under this Order shall be deemed incorporated into, and made an enforceable part of, this Order. In the event of conflict between this Order and any document attached to, incorporated into, or enforceable hereunder, the provisions of this Order shall control.

XVII. SITE ACCESS

75. To the extent that Respondents own, occupy, lease or control property at the MMR, or property other than the MMR to which access is required in order to properly carry out the terms of this Order, they shall grant access to EPA, the Commonwealth of Massachusetts (the "State") and their officers, employees, agents, contractors, consultants, and other authorized representatives for purposes of implementing and monitoring work to be performed under this Order. EPA, the State and their authorized representatives shall be considered essential personnel in overseeing work relating to UXO and the detonation chamber.

76. To the extent access to, use or ownership of, or easements over property other than the MMR is required for the proper and complete implementation of this Order, the Respondents shall use best efforts to obtain site access agreements or other interests in the property, in writing, sufficient to allow implementation of this Order within **thirty (30) days** after the Order's effective date. For purposes of this paragraph, "best efforts" include but are not limited to the payment of money, consistent with the Anti-Deficiency Act, in consideration of access to property.

77. Such written access agreements or other interests obtained pursuant to the preceding paragraph shall provide EPA, the State, and their officers, employees, agents, contractors, consultants, and other authorized representatives access to the MMR or other such property at all times for purposes of implementing and monitoring work under this Order. Such written access agreements or other interests shall specify that the Respondents are not EPA's representatives or agents with respect to liability associated with the Site.

78. In the event that site access agreements or other interests sufficient for implementation and monitoring of work under this Order are not obtained within the time period specified above, the Respondents shall notify EPA in writing within **three (3) days** thereafter regarding the lack of such agreements and the efforts made by the Respondents to obtain them. Lack of access shall not excuse or justify failure to perform any activity or to meet any deadline not requiring or directly dependent upon such access.

XVIII. QUALITY ASSURANCE/SAMPLING

79. The Respondent(s) shall submit immediately to EPA and the State, upon receipt, the results of all sampling or tests and all other data generated by the Respondent(s), its contractor(s), or on the Respondent(s)' behalf in the course of implementing this Order. The Respondent(s) shall also provide the quality assurance/quality control procedures followed by all sampling teams and laboratories performing data collection and/or analysis.

80. Upon request, the Respondent(s) shall allow EPA, the State, or their authorized representatives to take split and/or duplicate samples of any samples collected by the Respondent(s) while performing work under this Order. The Respondent(s) shall notify EPA and the State not less than four (4) days in advance of any sample collection activity. In addition, EPA shall have the right to take any additional samples that it deems necessary.

81. The Respondent(s) shall assure that EPA and its authorized representatives are allowed access to any laboratory utilized by the Respondent(s) in implementing this Order. Upon request, the Respondent(s) shall have a designated laboratory analyze samples submitted by EPA for quality assurance monitoring.

XIX. ACCESS TO INFORMATION; RECORD PRESERVATION; CONFIDENTIALITY CLAIMS

82. Upon request, the Respondents shall provide EPA and DEP with copies of all records, documents, and other information generated by the Respondents and their contractor(s) which relates in any way to the facility or to the implementation of this Order, including but not limited to, sampling and analysis records, field sheets and field notes, engineering logs, chain of custody records, contracts, bills of lading, trucking logs, manifests, receipts, reports, and correspondence. In addition, the Respondents' employees, agents, or representatives with knowledge of facts concerning the conditions at the facility or performance of work under this Order shall be made available to EPA and DEP to provide such information.

83. For a period of at least five (5) years following completion of all work conducted by the Respondent(s) pursuant to this Order, the Respondent(s) shall preserve all documents, records, and information of whatever kind, nature or description in their possession and/or control or that of their officers, employees, agents, licensees, accountants, contractors, attorneys, successors and assigns, that relate in any way to the performance of work under this Order, or relate in any way to releases or threatened releases of contaminants which are the subject of the actions addressed by this Order. After this five (5) year period has expired, the Respondent(s) shall provide EPA and DEP with thirty (30) days advance written notice prior to the destruction of any such records, documents, or information. The Respondent(s) shall send such notice, accompanied by a copy of this Order, to:

Attention: MMR Impact Area Counsel
Office of Environmental Stewardship
U.S. Environmental Protection Agency
J.F.K. Federal Building
Boston, Massachusetts 02203-2211

EPA Docket No. RCRA-1-2001-0014

Upon request, the Respondent(s) shall provide to EPA copies of all such records, documents, or information.

84. Respondent(s) may assert a confidentiality claim, if appropriate, covering part or all of the information required by or requested under this Order, pursuant to Section 3007(b) of RCRA and 40 C.F.R. § 2.203(b) (1989). Respondent(s) shall adequately substantiate all such assertions. Information determined to be confidential by EPA will be afforded the protection required by 40 C.F.R. Part 2, Subpart B. If no confidentiality claim accompanies the information when submitted to EPA, EPA may make it available to the public without further notice to the Respondent(s).

XX. CREATION OF DANGER; EMERGENCY RESPONSE

85. Upon the occurrence of any incident or change of conditions during the activities conducted pursuant to this Order that causes or threatens a release of contaminants from the facility or an endangerment to the public health or welfare or the environment, the Respondents shall immediately take all appropriate action to prevent, abate or minimize such release or endangerment. The Respondents shall also immediately notify the TPC or, in the event of his/her unavailability, shall notify the Regional Duty Officer of the Emergency Planning and Response Branch, EPA Region I, telephone (800) 424-8802 and DEP emergency response personnel at (888) 304-1133. In taking any actions under this paragraph, the Respondents shall act in accordance with all applicable provisions of the Health and Safety Plan prepared pursuant to the Statements of Work.

86. The Respondents shall submit a written report to EPA within **seven (7) days** after each incident specified above, setting forth the events that occurred and the measures taken and to be taken to mitigate any release or endangerment caused or threatened by the incident and to prevent the reoccurrence of such an incident.

87. Nothing herein shall limit the power and authority of EPA or the United States to take, direct, or order all actions necessary to protect public health, welfare, or the environment or to prevent, abate, or minimize an actual or threatened release of hazardous or solid wastes, hazardous substances, pollutants or contaminants on, at, or from the facility.

XXI. AMENDMENTS

88. This Order, other than the Statements of Work, may only be amended in writing by signature of the Regional Administrator of EPA Region I. Amendments or modifications to the Statements of Work may only be made in writing by the TPC.

89. No informal advice, guidance, suggestion, or comment by EPA regarding reports, plans, specifications, schedules, and any other writing submitted by the Respondent(s) shall be construed as relieving the Respondent(s) of its obligation to obtain such formal approval as may be required by this Order.

XXII. PUBLIC INVOLVEMENT

90. Respondents shall ensure adequate public involvement in all Work undertaken pursuant to the Order and SOW. Within fifteen days of the effective date of the Order, Respondent National Guard Bureau shall submit to EPA an amendment to the existing Public Information Plan for the Impact Area Study, which shall ensure adequate public involvement concerning the detonation of UXO at MMR in a controlled detonation chamber, including but not limited to the following:

A. Making immediately available to the public all non-privileged information obtained or compiled pursuant to this Order;

B. Coordinating the Work under this Order and SOW with the Impact Area Review Team established pursuant to Administrative Orders SDWA I-97-1019 and SDWA I-2000-0014 ;

C. Providing periodic oral and written updates to the public on the progress of the Work;

D. Sharing immediately with the public all conclusions reached by the Respondent(s) or their representatives with respect to the Work;

E. Coordinating the Work under this Order and SOW with the ongoing groundwater investigations being undertaken by Respondents and with response actions being undertaken at MMR by the Installation Restoration Program.

XXIII. OTHER APPLICABLE LAWS

91. All actions required pursuant to this Order shall be undertaken in accordance with the requirements of all applicable local, state, and federal laws and regulations, including but not limited to, the laws relating to occupational health and safety and worker's compensation.

XXIV. ENFORCEMENT; PENALTIES FOR NONCOMPLIANCE

92. Violation of this Order, or failure or refusal to comply with this Order, may subject the Respondents to an enforcement action, as provided in Section 7002(b) of RCRA, 42 U.S.C. § 6972(b), and may subject the Respondent Massachusetts National Guard Bureau to an enforcement action by EPA for civil penalties for each day in which such violation or failure to comply occurs, as provided in Section 7003(b) of RCRA, 42 U.S.C. §6973(b).

XXV. DISCLAIMER OF LIABILITY BY EPA

93. By issuance of this Order, EPA assumes no liability for injuries or damages to persons or property resulting from acts or omissions by the Respondent(s), its officers, employees, agents, representatives, successors, assigns, contractors, or consultants in carrying out activities pursuant

to this Order. EPA shall not be held as a party to any contract entered into by the Respondent(s) or their employees, agents, representatives, successors, assigns, contractors, or consultants in carrying out activities pursuant to this Order.

XXVI. NO RELEASE FROM LIABILITY

94. Nothing in this Order shall constitute or be construed as a satisfaction or release from any claim, cause of action, or demand in law or equity against the Respondents or any other person, whether or not a party to this Order, for any liability such person may have for any conditions or claims arising out of or relating in any way to the generation, storage, treatment, handling, transportation, release, or disposal of any hazardous substances, hazardous or solid wastes, pollutants, or contaminants found at, taken to, or taken from the facility, including but not limited to any and all claims of the United States for money damages and interest under Section 107(a) of CERCLA, 42 U.S.C. § 9607(a), or under any other applicable statute or the common law.

XXVII. RESERVATION OF RIGHTS BY EPA

95. EPA reserves all rights against the Respondents and all other persons to take any further civil, criminal, or administrative enforcement action pursuant to any available legal authority, including the right to seek injunctive relief; the recovery of money expended or to be expended (plus interest); monetary penalties; criminal sanctions; and/or punitive damages regarding: (i) any violation of this Order; or (ii) any actual or potential threat to human health or welfare or the environment, or any release or threat of release of hazardous substances on, at, in, or near the facility. Nothing in this Order shall preclude EPA from taking any additional enforcement actions, including modification of this Order or issuance of additional Orders, and/or additional actions as EPA may deem necessary, or from requiring Respondents in the future to perform additional activities pursuant to RCRA, SDWA, or any other applicable law.

96. EPA further expressly reserves the right both to disapprove work performed by the Respondent(s) and to request or order the Respondent(s) to perform tasks in addition to those detailed in the Order. In addition, EPA reserves all rights it may have to undertake response actions at any time and to perform any and all portions of the work activities which the Respondent(s) has failed or refused to perform properly or promptly, and to seek reimbursement from Respondent(s) for its costs, or seek any other appropriate relief.

97. Notwithstanding any other provision of this Order, EPA shall retain all of its information gathering, entry, inspection, and enforcement authorities and rights under any applicable law, regulation, or permit.

XXVIII. OPPORTUNITY TO CONFER

98. Within **three (3) days** after signature of the EPA Regional Administrator on this Order, the Respondent(s) may request a conference with the Regional Administrator of EPA Region I or his

designee to be held no later than **six (6) days** after issuance of this Order. Requests for a conference should be submitted to:

Margery Adams, Esq. (SEL)
Office of Environmental Stewardship
U.S. Environmental Protection Agency
1 Congress Street, Suite 1100
Boston, Massachusetts 02203-2211
(617) 918-1733
FAX (617) 918-1809

99. The purpose and scope of the conference shall be to discuss the issue(s) which Respondent(s) would like the Regional Administrator to consider in connection with this Order. Respondent National Guard Bureau should submit copies of all necessary information regarding the issue(s) to be discussed. The conference is not an evidentiary or adversarial hearing and is not part of any proceeding to enforce or challenge the Order. The conference does not give the Respondent(s) a right to seek review of this Order, or to seek resolution of potential liability, and no official stenographic record of the conference will be made. At any conference held pursuant to this section, the Respondent(s) may appear in person or by attorney or other representative.

Pursuant to Section 6001(b)(2) of RCRA, 42 U.S.C. 6961(b)(2), the Respondent National Guard Bureau also has the opportunity to confer also with the EPA Administrator. If, after the conference referred to immediately above in this Section, Respondent National Guard Bureau desires to confer pursuant to RCRA 6001(b)(2) with the EPA Administrator, it shall use the following procedures:

a. Within 10 days after the conference with the Regional Administrator, if the head of Respondent National Guard Bureau desires to confer with the EPA Administrator, either through an exchange of correspondence or through a direct meeting, the National Guard Bureau must file a written request addressed to the Administrator seeking such an opportunity to confer. Respondent National Guard Bureau shall file this request with the Administrator, and provide a copy to the Director of the Federal Facilities Enforcement Office, in EPA's Office of Enforcement and Compliance Assurance, as well as to the Regional officials listed above. If Respondent National Guard Bureau desires to confer through an exchange of correspondence, its letter requesting the conference should specifically identify the issue(s) which Respondent National Guard Bureau would like the Administrator to consider. If National Guard Bureau instead desires to confer thorough a direct meeting, its request for a conference should also specifically identify the issue(s) that it proposes to discuss with the Administrator, as well as the person(s) who will represent it. National Guard Bureau should also attach copies of all necessary information regarding the issue(s). Failure to request a conference within the five-day period will be considered a waiver of the right to confer with the

Administrator. In the event of such waiver, the Order shall become effective on the fifth day following the conference with the Regional Administrator.

b. If the conference with the Administrator is to be conducted through a direct meeting, the parties of record for the agencies may request to be present during the conference. This request is to be in writing, and served on the Director of the Federal Facilities Enforcement Office and the EPA attorneys of record in this action. After a determination that a direct conference will occur, the Administrator will notify the head of the federal entity who requested the conference, and the parties of record for the agencies.

c. Following conclusion of the conference, a person designated by the Administrator will provide a written summary of the issues discussed and addressed. Copies of the written summary will be provided to the parties of record for the agencies.

d. Within twenty-one (21) days of the conference, the Administrator will issue a written decision with appropriate instruction regarding the finality of the order.

XXIX. PUBLIC COMMENT

100. In accordance with public participation requirements of RCRA, EPA shall publish notice of this Order, provide an opportunity for a public meeting, and provide a reasonable opportunity for the public to comment on the Order. After consideration of any comments filed during the public comment period, EPA may modify all or part of this Order if comments received disclose facts or considerations which indicate that this Order is inappropriate, improper or inadequate.

XXX. EXCUSED DELAY - FORCE MAJEURE

101. Respondent(s)' activities under this Order shall be performed within the time limits set forth herein, or otherwise established or approved by EPA, unless performance is delayed or prevented by events which constitute "force majeure". For purposes of this Order, "force majeure" is defined as any event arising from causes beyond Respondent(s)' control. "Force majeure" shall not include any inability of Respondent(s) to pay the costs or expenses associated with complying with this Order, or increases in such costs or expenses, except as provided below in XXXII, Anti-Deficiency Act. When an event constituting "force majeure" occurs, Respondent(s) shall perform the affected activities within a time period not to exceed the time provided in this Order and the period of delay attributable to "force majeure". Respondent(s) shall use best efforts to avoid or minimize any delay or prevention of performance of their obligations under this Order, and to discover and keep apprized of any and all circumstances which may result in a delay or prevention of the work required under this Order. A delay caused by EPA, and otherwise conforming with the terms of this Section, shall be treated as beyond the Respondent(s)' control.

102. Respondent(s) shall verbally notify the EPA Project Coordinator as soon as possible, and not later than forty-eight (48) hours, after the discovering that circumstances have occurred or are likely to occur which may delay or prevent the performance of any activity required by this Order, regardless of whether or not those circumstances constitute a "force majeure". If the Project Coordinator cannot be reached, Respondent(s) shall leave a telephone message at the Project Coordinator's office. Respondent(s) shall also notify EPA in writing within seven (7) days after the date Respondent(s) first became aware of the circumstances which may delay or prevent any performance of any activity required by this Order. Such written notice shall be accompanied by all available pertinent documentation including, but not limited to, third-party correspondence, and shall contain: 1) a description of the circumstances and the Respondent(s)' rationale for interpreting such circumstances as being beyond its control; 2) the actions (including pertinent dates) Respondent(s) has taken and/or intends to take to minimize any delay; and, 3) the date or time period Respondent(s) propose to complete the delayed activities. Such notification shall not in and of itself relieve Respondent(s) of any of their obligations under this Order. Respondent(s)' failure to timely and properly notify EPA as required by this paragraph shall nullify any claim of "force majeure" and resulting entitlement to any extension of time therefor. Respondent(s) shall have the burden of proving to EPA's satisfaction that an event constituting "force majeure" has occurred.

XXXI. EFFECTIVE DATE; COMPUTATION OF TIME

103. The obligations required by this Order shall become effective forty-five (45) days after the Order is signed by the EPA Regional Administrator. All times for Performance of Work under this Order shall be calculated from the effective date. When computing any period of time under this Order, if the last day would fall on a Saturday, Sunday or federal holiday, the period shall run until the next working day.

XXXII. ANTI-DEFICIENCY ACT

104. Nothing in this Order shall require the Respondent National Guard Bureau or other federal agency to violate the Anti-Deficiency Act.

XXXIII. SEVERABILITY

105. If any provision of this Order is determined to be invalid, or it is determined that the Respondents have sufficient cause not to comply with one or more provisions of this Order, Respondents shall remain bound to comply with all provisions of this Order not so invalidated.

XXXIV. TERMINATION

106. The provisions of this Order shall remain in full force and effect until all actions required by this Order have been completed and EPA has notified the Respondents, in writing, that the actions required by this Order have been completed. Respondent(s) shall notify EPA in writing at such time as it believes that all such actions have been completed. EPA shall have sole discretion in

determining whether all such actions have in fact been completed. Failure to complete all actions required hereunder as directed by EPA shall be deemed a violation of this Order. EPA's provision of written notice to Respondents pursuant to this paragraph shall not be construed as a waiver of any of EPA's rights to take further enforcement action under any environmental laws.

XXXV. EXISTING CONSENT DECREE

107. The provisions of this Order are not intended to require any action inconsistent with applicable law or with the consent decree in Conservation Law Foundation of New England, Inc. v. Lt. Gen. Herbert R. Temple, Jr. as he is Chief of the National Guard Bureau, et al., No. 86-1044-S (D. Mass). To the extent that Respondent(s) believes in good faith that any action required by this Order would be inconsistent with that Consent Decree, Respondent(s) is to notify EPA immediately.

XXXVI. MODIFICATION OF THE SOW

108. If EPA determines that modification of the Work specified in the attached SOW or in work plans developed pursuant to the SOW is necessary and appropriate, EPA may require that such modification be included in the SOW and/or in such work plans.

IT IS SO ORDERED

_____
Mindy S. Lubber
Administrator, EPA-New England
U.S. Environmental Protection Agency

_____
Date

APPENDIX A
STATEMENT OF WORK
Use of Controlled Detonation Chamber for RCRA-Regulated Wastes

I. Objectives

This Scope of Work identifies the requirements for testing and use of the controlled detonation chamber at the Training Range and Impact Area at Massachusetts Military Reservation to dispose of UXO and other munitions which are regulated as solid waste under 40 C.F.R. § 266.202.

The primary components of the work are:

1. Respondent National Guard Bureau shall prepare and submit to EPA a Test Plan for the Donovan T-10 Controlled Detonation Chamber (CDC) currently located at the Training Ranges and Impact Area at MMR.

2. Respondent National Guard Bureau will provide a CDC Test Results Report to EPA and DEP within 60 days of completing the test.

3. Following EPA review of the CDC Test Results Report, Respondent National Guard Bureau shall install additional pollution control equipment to the CDC or undertake additional waste management practices, as directed by EPA to protect human health and the environment.

4. Respondent National Guard Bureau shall use the CDC, together with any required pollution control equipment or waste management practices, for the detonation and/or disposal of UXO and other munitions which are of appropriate size to be detonated in the Donovan T-10 CDC, safe to move and subject to regulation as solid waste under 40 C.F.R. § 266.202.

5. If EPA determines that the Donovan T-10 CDC is not appropriate (based on size limitations, use limitations, or other considerations) for the detonation of munitions and UXO that are found at MMR and are determined safe to move, EPA may in its discretion require the Respondent National Guard Bureau to obtain additional equipment, or to implement additional waste management practices, to allow for the safe disposal of munitions which are subject to regulation as solid waste under 40 C.F.R. § 266.20, in a manner that complies with RCRA.

II. Deliverables and Schedule

1. Respondent National Guard Bureau shall prepare a CDC Test Plan which will describe a test to evaluate potential emissions from the detonation of munitions found at MMR in the Donovan T-10 CDC. The NGB has already submitted drafts of the Test Plan to EPA for review, and EPA

has commented on such drafts. The NGB submitted a revised Draft Test Plan on December 11, 2000.

2. Respondent National Guard Bureau shall implement the CDC Test Plan within 45 days of EPA's approval of the Test Plan.

3. Within 60 days of completion of the CDC Test, Respondent National Guard Bureau shall submit to EPA and DEP a CDC Test Results Report, providing a comprehensive analysis of the results of the test of the CDC. Upon review of the test results, EPA may require additional pollution control equipment and/or additional waste management practices in order to attain emission levels that are protective of human health and the environment. EPA may either approve the use of the Donovan T-10 CDC without additional modification, or EPA may require modifications before the CDC can be used for the detonation of munitions and UXO which meet the definition of solid waste under 40 C.F.R. § 266.202.

4. Following receipt of EPA's approval, and after implementing any modifications that may be required, Respondent National Guard Bureau shall use the CDC as approved for the detonation of munitions and UXO that are found at MMR, are determined safe to move, and which meet the definition of solid waste under 40 C.F.R. § 266.202.

Lieutenant General Russell Davis
Chief, National Guard Bureau
1411 Jefferson Davis Highway
Arlington, VA 22202-3231

Mr. Raymond Fatz
Deputy Assistant Secretary of the Army
Environment, Safety and Occupational Health
Office of the Assistant Secretary, Installations and Environment
United States Department of the Army
110 Army Pentagon
Washington, DC 20310-0110

Re: EPA Administrative Order No. RCRA 1-2001-0014 to the National Guard Bureau
Regarding Waste Munitions at the Massachusetts Military Reservation

Dear General Davis and Mr. Fatz:

This letter transmits the final decision of the Environmental Protection Agency (EPA) regarding the above-referenced imminent hazard order issued by EPA Region I pursuant to Section 7003 of the Resource Conservation and Recovery Act (RCRA). Subject only to the revisions set forth below to accommodate the National Guard Bureau (NGB), the modified Order is now final for purposes of Section 6001(b)(2) of RCRA, and is effective immediately.

On January 4, 2001, Region I issued an order under Section 7003 of RCRA, which required the NGB to use a controlled detonation chamber at Massachusetts Military Reservation to dispose of certain waste munitions. On January 8, 2001 the NGB requested, and on January 12, 2001 received, an opportunity to confer with EPA Region I. On January 22, 2001, the NGB requested a conference with the EPA Administrator regarding the Region I order pursuant to Section 6001(b)(2) of RCRA. Administrator Whitman delegated the task of conducting the conference to me on February 15, 2001, and the conference was held on March 16, 2001 with General Squier, Raymond Fatz and other representatives from the National Guard Bureau and Department of the Army.

During that conference, the NGB and the Department of Defense raised certain issues and questions regarding the Order, and also provided written materials. The principal issues

discussed included: (1) whether an imminent hazard may be presented by the storage and disposal of waste munitions at MMR; (2) the types of waste munitions to which the Order applied (*i.e.,* the Order's scope); (3) the applicability of the permit exemption provided in Section 121(e) of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) to the activities covered by the Order; and (4) a request for flexibility in the use of alternatives to the Controlled Demolition Chamber (CDC) for disposal of waste munitions. Each of these are summarized below, and are discussed in more detail in the attachment to this letter.

I have carefully considered the points and requests made by the NGB in connection with this Order, and subject to the revisions noted below, have determined that the order is an appropriate use of Section 7003 of RCRA in this instance.

First, the Order and the information presented establish that the improper storage and open detonation of waste munitions which are safe to move and be disposed of in a controlled manner may present an imminent and substantial endangerment to human health and the environment, including the sole source aquifer which underlies the Massachusetts Military Reservation. Between September, 2000 and March, 2001, several hundred waste munitions, including mutually incompatible groupings, were stored in close proximity for an extended period of time in open air on the ranges at MMR. This storage was conducted in an unsafe manner and in violation of regulations promulgated by the Department of Defense Explosives Safety Board. In addition, data presented in the Order establish that open detonation of munitions at MMR causes the release of explosives in soils at high levels, and that past practices of open detonation have caused significant contamination of soils and groundwater at Demolition Area 1.

Second, the revised Order clarifies that it does not apply to wholly inert munitions, except to prohibit their open detonation at MMR.

Third, on the facts of this case, the permit exemption provided in Section 121(e) of CERCLA is not relevant because whether the permit exemption applies in no way bears upon the determination of an imminent hazard at MMR, or upon EPA's determination regarding the safe and proper management and disposal of munitions subject to this Order. I would like to emphasize that EPA agrees that, under Section 121(e) of CERCLA, no permits are required when a remedial or removal action taken pursuant to CERCLA occurs entirely on-site. However, the fact that an action could have been taken[1] by the NGB as a CERCLA response action does not preclude EPA from issuing an order pursuant to RCRA § 7003 to abate an imminent and substantial endangerment. In a case such as this, in which improper storage and disposal, including open detonation, may contaminate soils and threaten a sole source aquifer, it is properly within EPA's discretion to act to establish enforceable conditions under which waste munitions will be stored and disposed of.

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[1]I note that in the March 16, 2001 conference the NGB conceded it has not satisfied the procedural requirements for a CERCLA removal action with respect to the use of the controlled detonation chamber.

Fourth, to accommodate the NGB's request for flexibility and cooperation between the NGB and EPA, the Order is modified to clarify that the National Guard Bureau may propose alternative, equally protective, disposal or treatment technologies for waste munitions for EPA review and approval. Lastly, the Order has also been modified as appropriate to address other technical revisions that were included in the written materials (but not specifically discussed) during the March 16, 2001 meeting.

In closing, we appreciate DoD and NGB's commitment to address the hazardous conditions at MMR, and urge your full cooperation in carrying out cleanup in a safe and responsible manner and to share promptly information regarding actions taken under this and prior orders with EPA. Please direct this information to Todd Borci, MMR Project Coordinator in EPA Region I, at (617) 918-1358. If you have any questions about this correspondence, please contact Craig Hooks at (202) 564-2510.

Sincerely,

Sylvia Lowrance
Acting Assistant Administrator

Attachments

cc: Brigadier General George Keefe, Massachusetts National Guard

Attachment 1

Issues:

A. The finding of imminent and substantial endangerment

As part of the environmental investigations undertaken by the NGB pursuant to EPA's prior administrative orders under the Safe Drinking Water Act, the National Guard Bureau has unearthed, and is expected to continue to unearth, munitions and UXO which had previously been buried or disposed of on the range at MMR. Once unearthed and removed from their locations, such items must be stored and treated or disposed of.

The Order, along with information regarding storage at MMR of the formerly buried munitions, provides a reasonable basis for the conclusion that unsafe storage and open detonation (the preferred practice for disposal under military guidance, such as render-safe procedures) may present an imminent and substantial risk to human health and the environment at MMR. The use of a controlled detonation chamber, or an alternative environmentally protective treatment/disposal method, for disposal of buried munitions which are safe to move is an appropriate measure to prevent the release or threat of release of contaminants to the environment as a result of open detonation.

1. Threat from Open Detonation

The data summarized in Section VI of the Order establishes that in-place open detonations of UXO and other munitions at MMR may present an imminent and substantial endangerment to health and the environment through the release or threat of release of contaminants, including solid wastes, to soil and groundwater. Numerous munitions-related contaminants have been found in soils at MMR, including RDX, HMX, 2,4-DNT, 2A-4,6-DNT, 4A,2,6-DNT, 2,4-DNT, N-nitrosodiphenylamine, di-n-butylphthalate, dioxin, lead, magnesium, barium, copper, cadmium, pentachorophenol, deildrin, and nitroglycerin. Many of these contaminants have been detected at levels which present a risk of leaching to groundwater. Similar soil and groundwater contamination has been found at other open burn/open detonation sites across the United States.

At MMR, one contaminant of significant concern in both soil and groundwater is RDX, which has been classified by EPA as a possible human carcinogen (Group C carcinogen). The Lifetime Health Advisory for RDX in drinking water is 2 ppb. Consumption of large amounts of RDX by humans has caused seizures, indicating that the nervous system is a primary target organ. Exposure to other contaminants associated with open detonation, including TNT, HMX, and PETN causes significant adverse health effects, as detailed in Section VII of the Order.

1. Sampling at MMR indicates that individual open detonation events may present a risk to health and the environment. In soil sampling conducted at MMR after open detonations of munitions considered unsafe to move, the explosives RDX, HMX, 2,4,6-TNT, 4A-2,6-DNT, 2A-4,6-DNT, PETN, picric acid, and other compounds were detected in soils at levels which may present a risk of leaching to groundwater. For example, in April 2000, RDX was detected in soil at 1,700,000 parts per billion (ppb) following the detonation of a 105 mm high-explosive anti-tank projectile.[1] EPA's preliminary fate and transport analysis indicates that, at MMR, RDX soil contamination at 2,000 ppb will cause contamination of underlying groundwater at levels at or above EPA's Health Advisory of 2 ppb.

2. The evidence from MMR establishes that, over time, open detonations have caused the release of explosives and other contaminants to soil and groundwater at MMR. At Demolition Area 1, an area used to train soldiers in open detonation and demolition of explosives, RDX has been detected in groundwater at 370 ppb, which is 185 times greater than EPA's Health Advisory.

3. Buried munitions, buried UXO, and the RDX, HMX, 2,4,6-TNT, 4A-2,6-DNT, 2A-4,6-DNT, PETN, picric acid and other contaminants found in soil are RCRA solid wastes. Based on the sampling data from individual open detonation events, the contaminants found in soil and groundwater at Demolition Area 1, and the literature review cited in Paragraph 39 of the Order, a release or threat of release of solid wastes exists from open detonation of munitions.

Thus, open detonation of buried munitions at MMR may result in RDX and other contamination in groundwater at levels higher than health-based levels. Open detonation of the buried munitions therefore may present an imminent and substantial threat to the sole source aquifer underlying MMR and to people who use the aquifer as a drinking water source.

2. Threat from Storage

Approximately 1626 buried rounds (i.e., disposed-of rounds) at MMR which are potentially covered by the order are now awaiting disposal. Of these rounds, the NGB has submitted documents to EPA characterizing 1124 as "potentially explosive," an additional 34 as potentially

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[1]Explosives and other contaminants have been detected in post-detonation soil sampling even when the round was ultimately determined to be inert, due to the supplemental charge of C-4 which is attached to a round to conduct open detonation.

containing white phosphorous, and the remainder as inert. Under RCRA, the potentially explosive munitions and those containing white phosphorous are considered RCRA hazardous wastes.

Starting in September 2000, and continuing through about March 9, 2001, the unearthed munitions awaiting disposal were stored in a manner that presented a threat, and did not appear to be stored in a facility approved by the Department of Defense Explosives Safety Board (DDESB). Most of the rounds were stored in open air piles on bare ground on the J-2 Range at MMR.[2] The white phosphorous rounds were stored in open buckets of wet sand adjacent to the other suspected high explosive rounds, in violation of distance and compatibility standards established by DDESB. The munitions piles were located approximately 1800 feet from Greenway Road, which is used by the public, and no fence barred access to the munitions from Greenway Road. There was no effective barrier between the shells and trespassers, who are known to visit the site, and no barrier underlying the corroding shells to prevent RDX and other contaminants from leaching into the ground and the aquifer below.

On about March 9, 2001, apparently in anticipation of the March 16 conference with EPA, the NGB moved the potentially high explosive rounds to bunkers at the ammunition supply point at MMR. The suspected white phosphorous rounds remain in open buckets on the J-2 range. The NGB now states that it has ample storage space to store both the rounds found to date and rounds that may be found in the future. However, many of the 1626 formerly buried rounds now awaiting storage are corroded and deteriorated. Indefinite storage of deteriorating rounds is not feasible, and these rounds will ultimately have to be destroyed in the chamber or otherwise disposed. In addition, storage of the suspected white phosphorous rounds on the J-2 range continues to pose an endangerment because the NGB has not effectively limited access to the open buckets.

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[2]A handful of munitions which are not in open-air piles were contained in a small metal shed. As of February, 2001, the shed held five shells and some chunks of C-4 explosive.

B. Whether Use of the Controlled Demolition Chamber is Exempt from RCRA Permitting Requirements by CERCLA § 121(e)

The NGB asserts that detonation of the buried munitions in the controlled detonation chamber (CDC) is exempt from RCRA permitting under the exemption set out in CERCLA Section 121(e). The NGB contends that because MMR is an NPL site, the use of the CDC is an action conducted pursuant to its removal authority under Section 104 of CERCLA. Attachment 6 to the NGB's letter of January 22, 2001 states that "a time critical removal action occurs when munitions not safe to move are blown in place and when munitions deemed safe to move are moved to the DDESB-approved storage facility. Destruction of the stored munitions in the CDC is a continuation of the removal action."

On its face, the CERCLA §121(e) permitting exemption only applies to response actions selected and carried out in compliance with CERCLA. EPA agrees with the NGB that, under Section 121(e) of CERCLA, no permits are required when a removal and remedial action taken pursuant to CERCLA is conducted entirely on-site.[3] However, as noted below, whether or not a RCRA permit is needed in these circumstances is not relevant to whether an imminent hazard may be posed by improper storage and disposal of waste munitions at MMR, or whether a RCRA § 7003 Order is appropriate.

In this case, it is undisputed that the environmental investigations and response actions conducted to date at the Camp Edwards portion of MMR have been undertaken by the NGB in response to EPA's Safe Drinking Water Act orders. The NGB contends that it is also acting under the authority of CERCLA. However, the NGB has not complied with either the procedural or substantive requirements of CERCLA §121 for the use of the controlled detonation chamber. The NGB has not conducted the analysis required under CERCLA for a removal action: at the March 16, 2001 conference, it was conceded that the NGB had not issued an action memorandum needed for a time-critical removal under the NCP, and had not done an EE/CA analysis, which is needed for a non-time critical removal action.

Nonetheless, even if the NGB had complied with CERCLA, the availability of the CERCLA 121(e) permit exemption is not dispositive here. The fact that the NGB could have acted pursuant to CERCLA does not in any way limit EPA's authority to act under the imminent and substantial authority of RCRA. EPA may invoke RCRA § 7003 authority to address an imminent and substantial endangerment even if CERCLA actions are underway. Based on the facts and in light of all relevant considerations, the use of a RCRA § 7003 Order in this instance

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[3]Of course, the NGB must in any event comply with the substantive requirements of RCRA (in the case of a removal action, the NGB must comply to the extent practicable) or obtain a waiver pursuant to CERCLA § 121(d)(4).

is appropriate.

C. <u>Whether EPA's determination that the CERCLA 121(e) permitting exemption does not preclude issuance of the RCRA 7003 order will have serious nationwide impacts for DoD.</u>

The NGB states that the "failure to recognize the CERCLA exemption could have DoD-wide impacts, and if the rationale is applied equally to other agencies, then serious nationwide impacts."

EPA disagrees with the NGB as to the scope of the impact of this order. As is well documented in the order, the order is premised on the particular facts at MMR: a sole source aquifer which has already been significantly compromised by contamination from MMR; a projected drinking water shortage in 20 years; highly permeable sandy soils; and evidence that contamination associated with open detonation has already contaminated groundwater above health-based levels. Under these circumstances, EPA clearly has the discretion to use appropriate authority, such as Section 7003 of RCRA, to abate the release or threat of release of solid wastes that may present an endangerment to health and the environment.

The issuance of the Section 7003 order with respect to the controlled detonation chamber at MMR should not affect the ability of the NGB or other lead federal agencies to take CERCLA response actions as authorized under Section 120 of CERCLA. As stated above, EPA agrees that when the NGB or other authorized federal agency undertakes a remedial or removal action under CERCLA, a permit is not required for the portion of the action conducted on-site. In addition, if a federal agency carries out a response action under CERCLA, the benefits of CERCLA 113(h) would be available to it and would limit the timing of review of challenges to such a response action.

Attachment 2

Summary of Public Comments/State Concurrence on EPA's Order

On January 25, 2001, after notice to the public through local newspapers on January 22, 2000, EPA held a public hearing on the Order. Approximately 75 people attended the hearing. Oral comment on the Order was accepted at the meeting and written comments were invited by EPA. The comment period was extended once, and closed on February 18, 2001.

In all, 14 commenters[1] supported the order and 5 commenters opposed or questioned it. A copy of the transcript of the hearing and the written comments is attached. The supporters stated that open detonation is environmentally harmful, that the controlled detonation chamber is a good technology, and that the National Guard Bureau should be cleaning the environment and not spending its energies fighting EPA. Commenters who opposed the order generally believed that the Order is an inappropriate intrusion into the military's activities, that it could be risky to move munitions, that the chamber is too expensive, and that the time for comment was too short. (In response to this last comment, EPA extended the public comment period.)

The Massachusetts Department of Environmental Protection and the Attorney General of the Commonwealth of Massachusetts submitted letters in support of the approach being taken by EPA. Specifically, the Commonwealth agreed that the past, present and future handling of UXO and buried munitions may present an imminent and substantial endangerment, and that the use of the chamber is an appropriate technology.

[1] Four of these comments were received after the close of the public comment period.

Attachment 3

1. The following clarifications and modifications are hereby made to Administrative Order No. RCRA 1-2001-0014 (the "Order"):

(i) the Order does not apply to the storage and disposal of wholly inert military munitions, other than to prohibit open detonation of such munitions; and

(ii) the National Guard Bureau may propose alternative, equally protective, disposal or treatment technologies for RCRA-regulated munitions for EPA review and approval.

2. Certain technical modifications proposed by the National Guard Bureau during the conference on March 16, 2001 are hereby made, as detailed in the attached modified Order, specifically to paragraphs 29, 30, 32, 35 (subparagraph vi), 36 and 75.