

*file: Chemicals
Conventional
munitions*

HUMAN HEALTH EFFECTS of SPECIFIC CHEMICALS
Present at Stresau Laboratories, Spooner, Wisconsin

Antimony Sulfide (S_3Sb_2): Antimony is a chemical element that is normally used as an alloy with lead and other metals to increase their hardness, mechanical strength, corrosion resistance, and electrochemical stability. As an alloy, antimony is used in ammunition and cable sheathing. Antimony compounds are also used as fire retardants, vulcanizing agents, ammunition primers and fireworks. Antimony sulfide is a stable complex of antimony formed in the presence of sulfur. The OSHA TWA (time weighted average) standard for antimony sulfide is $0.5 (Sb) \text{ mg/m}^3$. Oral or inhalation exposure to antimony can cause anemia, intestinal disorders (stomach pain, vomiting or diarrhea) and heart problems (altered electrocardiograms).

Barium Chromate: Barium chromate is an insoluble chromate compound used as an activator and dipolarizer in fused salt batteries. Excessive exposure to chromate compounds can cause kidney damage and possibly birth defects. Inhalation of chromate dusts can cause ulceration and eventually perforation of the nasal septum, respiratory disorders such as asthma and lung cancer.

Barium Nitrate: Barium nitrate is an oxidizing compound. A lethal oral dose of barium nitrate in rats is 355 mg/kg. Poisoning from ingestion can result in gastroenteritis, muscular paralysis, decreased pulse rate, and ventricular fibrillation. The OSHA TWA (time weighted average) standard for barium nitrate is 0.5 mg (Ba)/m^3 .

Boron: Boron is one of a group of elements, such as lead and arsenic that affect the Central Nervous System.

Charcoal: Flammable solid. Health effects have not been well studied.

Cyclotetramethylenetetranitramine (HMX): Humans may be exposed in HMX by inhalation and dermal absorption when it is manufactured or incorporated into munitions at load, assembly, and pack facilities. There are no carcinogenicity studies found in the literature, therefore HMX is classified as an EPA group D (not classifiable as to human carcinogenicity). HMX is an explosive polynitramine that has been used to implode fissionable material nuclear devices to achieve critical mass, and as a components in plastic-bonded explosives, solid-fuel rocket propellants and in military munitions.

Cyclotrimethylenetrinitramine (RDX): Convulsions, fever dizziness, vomiting, neuromuscular irritability, and gastrointestinal symptoms. Classified as an EPA Group C (possible human carcinogen) contaminant. Used as high-impact explosives and rat poison. Non-carcinogenic (non-cancerous) effects in humans are convulsion, unconsciousness, amnesia. Animal studies demonstrated weight loss, testicular atrophy, vomiting, prostrate inflammation and kidney toxicity.

Ethyl Centralite: Persons affected by ethyl acetate had been exposed to vapors. The commonest change in the blood picture was the finding of immature neutrophils (shift to the left); in other cases there was a reduction in number of blood platelets and a macrocytic anemia.

No. 1 Fuel Oil: No. 1 fuel oil, the most widely used class of fuel oils, includes kerosene and JP-5 jet fuel. Exposure can occur by drinking contaminated water, by breathing vapors, or by skin contact. Breathing kerosene or JP-5 vapors can cause nausea, elevations in blood pressure, eye irritations, and nervous system effects that include headaches, light-headedness, anorexia, poor coordination, and difficulty concentrating. Long-term exposure can also cause kidney damage and blood clotting disorders.

Graphite: The OSHA TWA (time weighted average) standard for graphite is 15 mppcf (millions of particles per cubic foot). Toxicity information is limited.

Hexafluoropropylene: Hexafluoropropylene is a non-flammable gas. The 4 hour LC_{50} for hexafluoropropylene by inhalation exposure in the mouse is 750 ppm.

Hexanitrostilbene: No information available.

Lead: Lead enters the body through inhalation of the dusts, fumes, mists or vapors; by ingestion; or through the skin in the case of organic compounds of lead, as lead tetraethyl. When heated, lead compounds emit highly toxic fumes. Lead is a cumulative poison. Critical effects included neurotoxicity and kidney damage; lead is highly toxic to infants and pregnant women.

Lead Azide: Lead azide is classified as an "explosive A" and is also known as "initiating explosive lead styphinate". Health effects of this compound are not well known.

Lead Thiocyanate: No available information.

Lead Trinitroresorcinate: Lead trinitroresorcinate is classified as an "explosive A". Health effects of this compound are not well known.

Nitrocellulose: Human toxicity from drinking water and any other exposure has not been reported. Principle ingredient of propellants, smokeless powders, rocket fuel, mortar increments and some explosives. There is a lack of data on the terrestrial bioaccumulation data of nitrocellulose in the literature.

Nitroglycerin: Individuals exposed to nitroglycerin frequently suffer from: headache, dizziness, and postural weakness; acute poisoning, occurring especially in industrial workers: nausea, vomiting, abdominal cramps, headache, mental confusion, delirium, paralysis, convulsions, circulatory collapse, and even death. Most serious effect of chronic exposure is form of organic nitrate dependence; individuals without demonstrable vascular disease have died suddenly or developed myocardial infarctions after few days' break.

Polyisobutylene: Polyisobutylene is used for making microcapsules and plastic films and for the impregnation of paper-insulated power cables. Laboratory studies indicate that this compound is moderately carcinogenic.

Potassium Chlorate: Potassium chlorate is the potassium salt of chloric acid and is used as an oxidizing agent. The lowest concentration that causes death after oral exposure in rats is 7000 mg/kg. The threshold limit (TL_m) value for the aquatic toxicity of potassium chlorate ranges from 100 to 1000 ppm (parts per million).

Potassium Nitrate: Potassium nitrate is an oxidizing compound. Health effects are not well known.

Potassium Perchlorate: Potassium perchlorate, the potassium salt of perchloric acid, is used as an oxidizing agent. Health effects are not well known.

Sodium Stearate: Sodium stearate is the sodium salt of steric acid. The lowest dose causing causing death in mice is 400 mg/kg.

Sulfur: The threshold limit (TL₃ 96 hr) value for the aquatic toxicity of sulfur is greater than 1000 ppm.

Tetracene: No available information.

Tungsten: Recent studies have failed to indicate any serious toxic effect following the inhalation or ingestion of various tungsten compounds, although heavy exposure to the dust or the ingestion of large amounts of soluble compounds produces a certain rate of mortality in experimental animals.

1,3,5 - Triamino -2,4,6-Trinitrobenzene: No available information.

Vinylidene Fluoride: Vinylidene fluoride is a flammable gas. Health effects are not well known.

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DESCRIPTIONS OF TOXINS IN THE GROUND WATER AT MOFFETT FIELD

ACETONE Acetone potentiates responses to 1,1-dichloroethylene and enhances the liver toxicity of halogenated hydrocarbons. (pg. 303)(1)

CHLOROFORM It has been demonstrated that exposure to lower, subnarcotic levels can cause liver or kidney toxicity. (pg. 645)(1) As a liver carcinogen chloroform is listed among PCB's, carbon tetrachloride and vinyl chloride. (pg. 299)(1) Chloroform is found in water supplies at low levels in a number of cases due to the chlorination process associated with drinking water. Chloroform is biotransformed to reactive metabolites that covalently bind to hepatic (liver) proteins, depleting them of glutathione (an essential enzyme necessary for proper liver function). Chloroform is reported to affect female reproductive capacity. (pg.455) (1)

1,2-DICHLOROBENZENE A halogenated benzene.

1,1-DICHLOROETHANE This chemical is shown to be toxic to liver and kidneys in various species of animals. (125)(1) 1,1 Dichloroethane has a specific effect on a number of key enzymes in the liver and kidneys, particularly cytochrome P450, monooxygenases, epoxide hydrolase, and glutathione transferase. These enzymes are part of a complex interactive balance of components essential for maintaining the health of an organism. It is believed that the drug's carcinogenic effect noted in the kidney and liver is due to the production of a reactive intermediate epoxide. (pg.125)(1)

1,1-DICHLOROETHYLENE This chemical is more toxic when administered during a period when low levels of the enzyme glutathione exist in the liver, more animals die. (pg.291)(1) In comparison 1,1 dichloroethylene exhibits characteristics similar in liver toxicity to carbon tetrachloride. The existence of acetone as a precursor increases the hepatotoxicity (liver toxicity) of chloroform, trichloroethylene, 1,1,2-trichloroethane, and 1,1,1-trichloroethane. Acetone potentiates the response to 1,1-dichloroethylene.

1,2-DICHLOROETHYLENE This chemical has cis and trans isomers (two possible locations in which the chlorine atoms can exist in relation to one another). 1,2-dichloroethylene exhibits an epoxide intermediate, yet appears to be less toxic than the single bonded alkanes which are saturated.

FREON 113 Freon is used as a solvent. This particular freon is a trichlorotrifluoroethane. In other words two carbons linked by a single bond are each binding three halogens (either chloride, fluoride, bromide or iodide), in this case three fluoride ions and three chloride ions. Freon is a compound known to contribute to the environmental problem of ozone depletion.

PHENOL Phenol is listed along with sulfur, sulfur compounds, aldehydes, and dodecanes as examples of carcinogen enhancers for the carcinogenic effects of aromatic hydrocarbons. (pg.143)(1) It is not clear in some instances if agents are promoters or cocarcinogens. Phenols have also been implicated in the formation of a condition known as heinz body hemolytic anemia. Essentially a breakdown of the hemoglobin in red blood cells. Hemoglobin is essential in transporting oxygen via circulation, throughout the bodies tissues and organs. This condition also involves shape distortion of red blood cells.

POLYCHLORINATED BIPHENYLS (PCB's) PCB's have been used as insulating material in electric capacitors and transformers, plasticizer in waxes, and in paper manufacturing among other uses. PCB's are a very stable material and nonflammable. These qualities make them especially persistent in the environment. PCB's are not miscible in water therefore their adsorption in the soil depends on the presence of organic matter present. (840)(1) PCB's accumulate in fish and waterfowl. Investigations show the PCB's interfere with reproduction in phytoplankters. Other observed effects occur in mammals and birds, including microsomal enzyme induction, tumor promotion, estrogenic activity and immunosuppression.

PCB's are lipophilic, a property along with their stability, that leads to bioaccumulation and the possibility of long term effects. Toxicity occurs through epoxidation. PCB's contain a number of isomers after the technical process which may include tetrachlorodibenzo-p-dioxin(TCDD), one of the most toxic chemicals known. TCDD has adverse effects at amounts as small as parts per trillion. (pg132)(1) Carcinogenicity may stem from such contaminants, together with the promoting affects by PCB.

Human exposure to PCB's has been reported in Japan and China where PCB contaminated rice oil was consumed. PCB exposed individuals exhibited chloracne, were susceptible to respiratory infection and suppressed immune response was observed. PCB suppressed immune response alters defense mechanisms and decreases specific antibody response following immunization with antigens. (pg. 269)(1)

POLYCHLORINATED BIPHENYLS CONT. Most induction is reversible, however the highly lipophilic and poorly biotransformed (PCB's) will be retained by the body and lead to prolonged induction because of their continued presence. PCB's have been shown to have a stimulatory effect on drug metabolism in the liver and change liver size and liver weight. PCB's are also responsible for altering kidney metabolism. (pg. 325)(1) PCB's have been shown to affect female and male reproductivity. (pgs. 454,455) (1) PCB's have also been found in mother's milk.(pg.436)(1)

TRICHLOROETHYLENE This chemical is used as a degreasing agent in industry. This chemical as been shown to produce fatty liver and cell death. The hepatotoxicity(liver toxicity) has been associated with the ease with which a halogen(chloride in this case) can be removed to produce a reactive metabolite. Factors associated with an increase in toxicity are increasing numbers of halogens, and a molecule of increasing size. (pg.645)(1) Trichloroethylene is also reported to affect female reproduction (pg.455)(1) (Target Organ Toxicity Center Reproductive Toxicity Information File)

1,1,1-TRICHLOROETHANE This chemical is hepatotoxic(liver toxin) and enhanced by the pretreatment of acetone and isopropanol. (pg.303)(1)

TETRACHLOROETHYLENE This chemical causes fatty liver and necrosis(cell death). Bioactivation leads to epoxide formation. The resulting molecules are highly reactive and can therefore covalently bond to nucleic acids with the eventual end result of mutations and cancer. (pg. 647)(1) This chemical is highly toxic to the liver and the kidneys and have been shown to cause liver cancer in mice. (pg.135)(1)

VINYL CHLORIDE Vinyl Chloride is one of the better known carcinogenic chemicals. Vinyl chloride was identified as a human carcinogen when individuals responsible for cleaning reactor vessels in the polymerization plants developed angiosarcomas of the liver. (124)(1) Vinyl chloride involves microsomal oxidation leading to epoxide formation across the double bond. The resulting products can covalently bind to nucleic acids (DNA,RNA) with the end result of mutations and cancer. Early tests show younger animals are more susceptible to the effects of vinyl chloride. (pg.124)(1) This chemical forms a reactive epoxide which is mutagenic and is associated with prolific liver tumors. (pgs. 124,299,399)(1) Vinyl chloride is also reported to affect female reproductive capacity.(pg. 455)(1)

GLOSSARY WITH DEFINED TERMINOLOGY AVAILABLE UPON REQUEST

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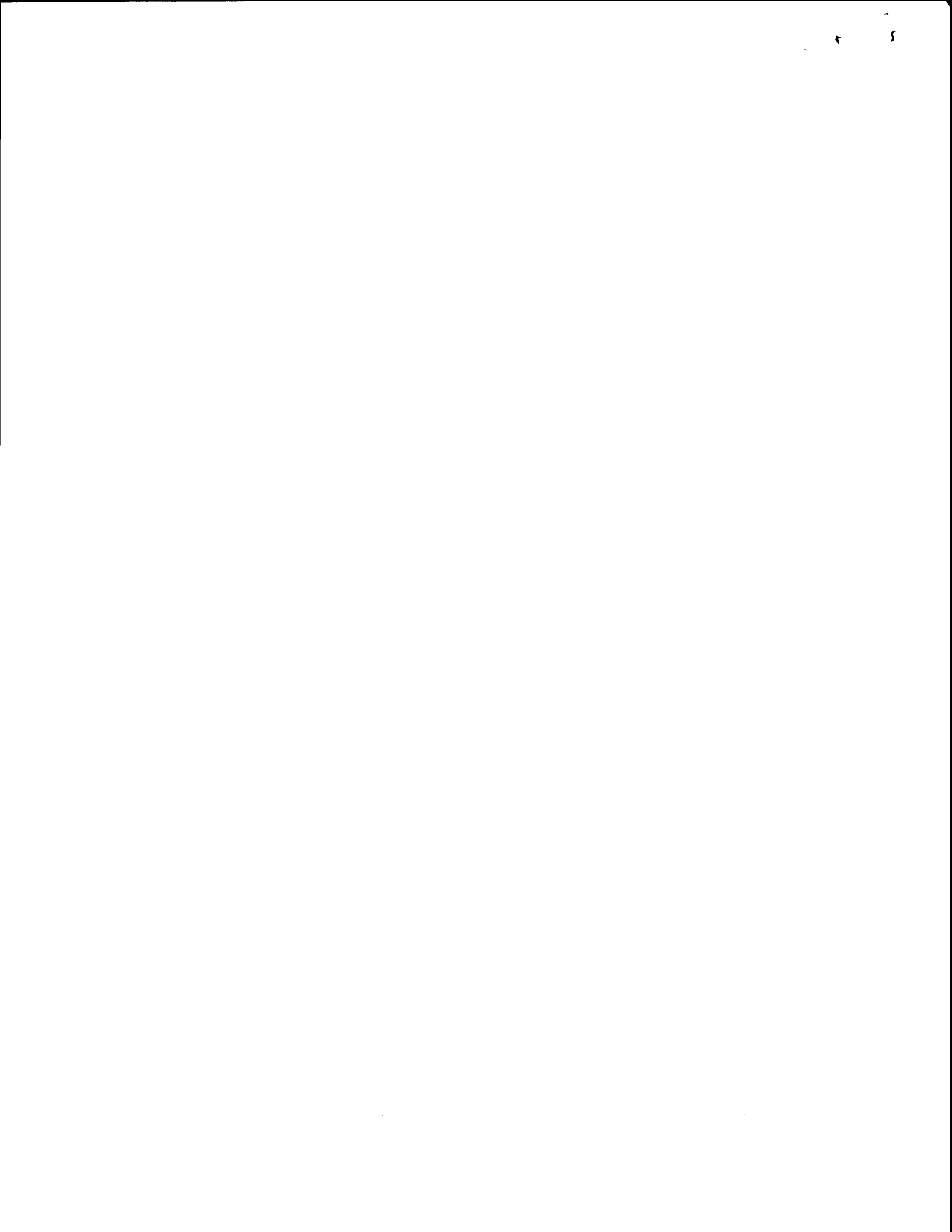
TIME TO STOP THE MADNESS

Just days before EPA was to release a rule regulating waste munitions and bombing and artillery ranges, Department of Defense officials confronted the EPA and bullied the Agency into waiving their authority. As a result of this eleventh-hour meeting, the Department of Defense undermined our right to a safe and healthy environment.

The proposed rule, required by the Federal Facilities Compliance Act of 1992, affects the storage, transportation, treatment and disposal of conventional and chemical munitions as well as the management of bombing artillery ranges. The military is the nation's largest polluter – in geographic terms – because until now, it has held itself above outside oversight. The environmental legacy of the federal government's mission-oriented activities is felt in communities throughout the country. Environmental cleanup of the 24,000 sites on federal facilities in the United States may ultimately cost as much as \$400 billion and will extend well into the next century.

By passing the Federal Facilities Compliance Act, Congress sent a clear message that external oversight was essential to protect human health and the environment from further damage. It was further intended to force facilities like Wisconsin's Badger Army Ammunition Plant to comply with existing waste disposal laws. Improper handling of hazardous waste has contaminated our natural resources beyond repair. Without regulatory oversight, the environmental catastrophe that plagues our community will happen over and over again, costing the taxpayers billions more dollars. This document is one community's response to the EPA's proposed Military Munitions Rule pursuant to the Federal Facilities Compliance Act.

January 1, 1996



Ken Schuster
EPA RCRA Docket #F-95-MMP-FFFFF
Mail Code 5305W
401 M Street SW
Washington, DC 20460

RE: Military Munitions Rule: Hazardous Waste Identification and Management; Explosives Emergencies; Redefinition of On-site

January 1, 1996

Dear Mr. Schuster,

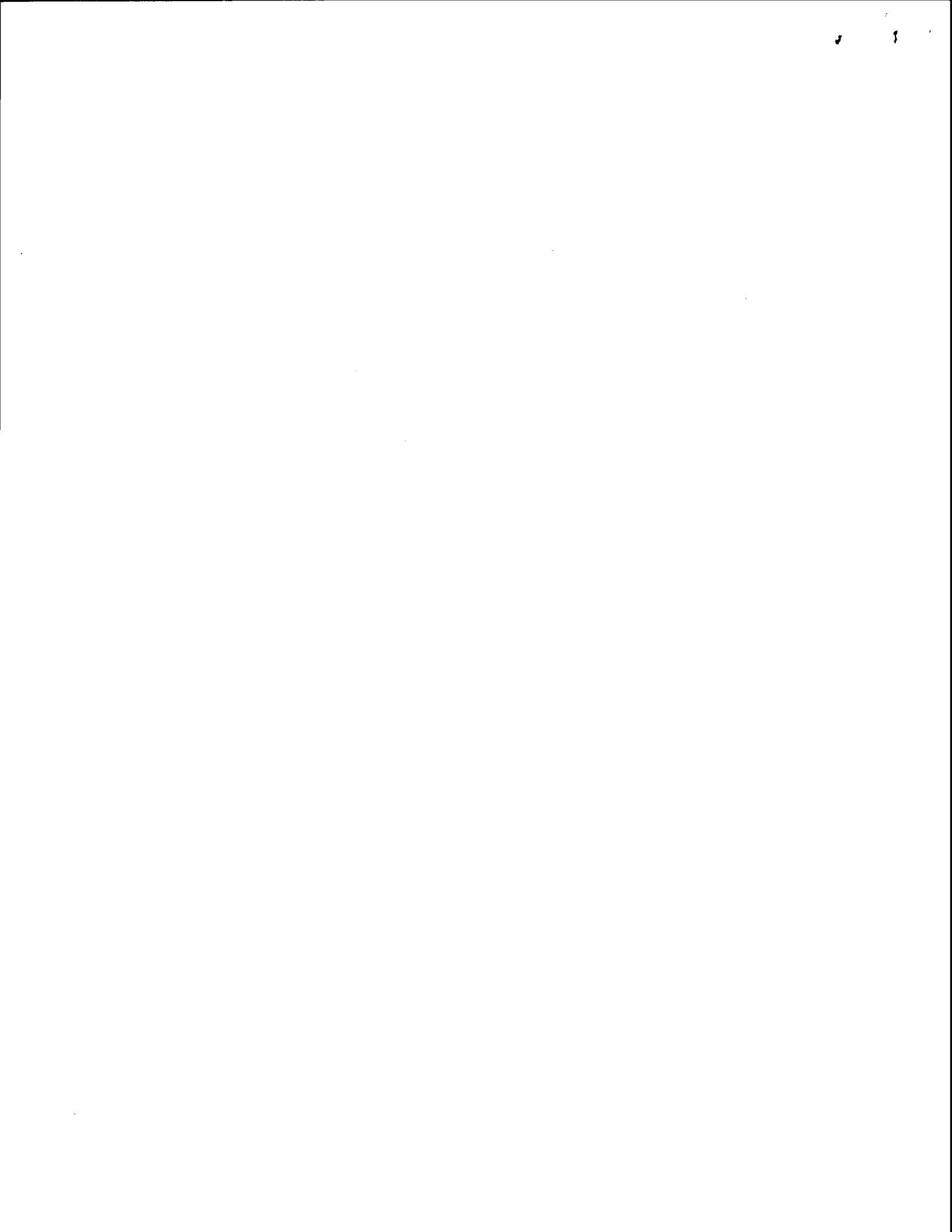
Enclosed are one original and two copies of written comments on the USEPA's Military Munitions Rule: Hazardous Waste Identification and Management; Explosives Emergencies; Redefinition of On-site from Citizens for Safe Water Around Badger.

Citizens for Safe Water Around Badger (CSWAB) is a community effort to secure public participation in decisions regarding the cleanup and operation of Badger Army Ammunition Plant. Historically, the plant workers and community have been excluded from this process and as a result, public health and the environment have been damaged.

Of the 40 contaminated military sites in Wisconsin, the Defense Environmental Restoration Agency has cited Badger as the most contaminated; 32 areas within the 7,000 acre plant are polluted with high levels of solvents, toxic metals and explosive wastes. Contaminants have migrated through the soil column and have destroyed all three aquifers.

Private drinking water wells have been polluted with high levels of carbon tetrachloride and trichloroethylene, placing these families at increased risk for liver and kidney cancers. Levels of carbon tetrachloride were found in drinking water at 80 parts per billion; the safe standard is 5. The Army withheld critical information from the community and as a result three families living near the plant unknowingly drank poisoned water for over 15 years. A 1990 study by the Wisconsin Division of Health confirmed that communities near the Badger plant have a significantly higher incidence of cancer deaths. The incidence of non-Hodgkin's lymphoma and kidney/ureter cancer deaths are 50% higher than the balance of the State.

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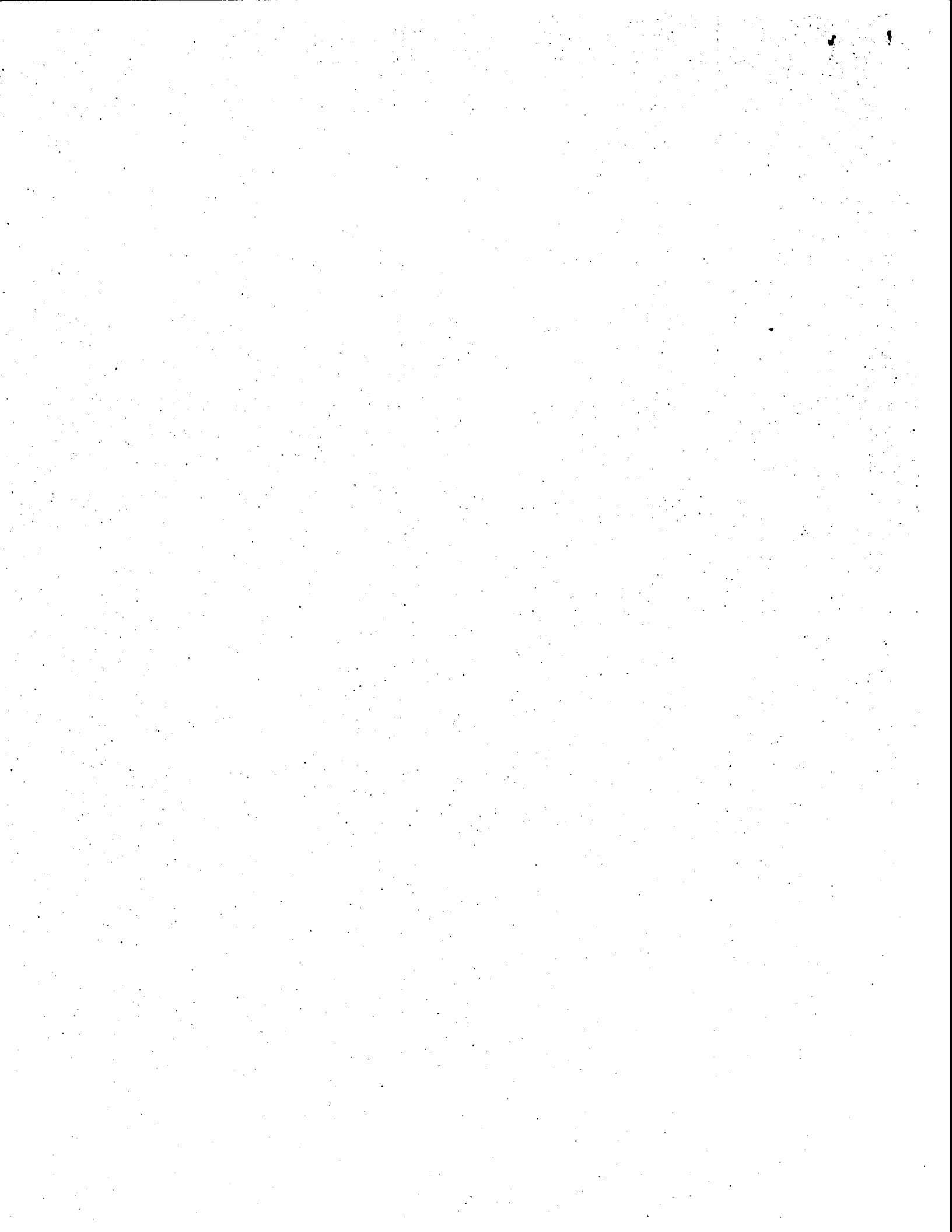
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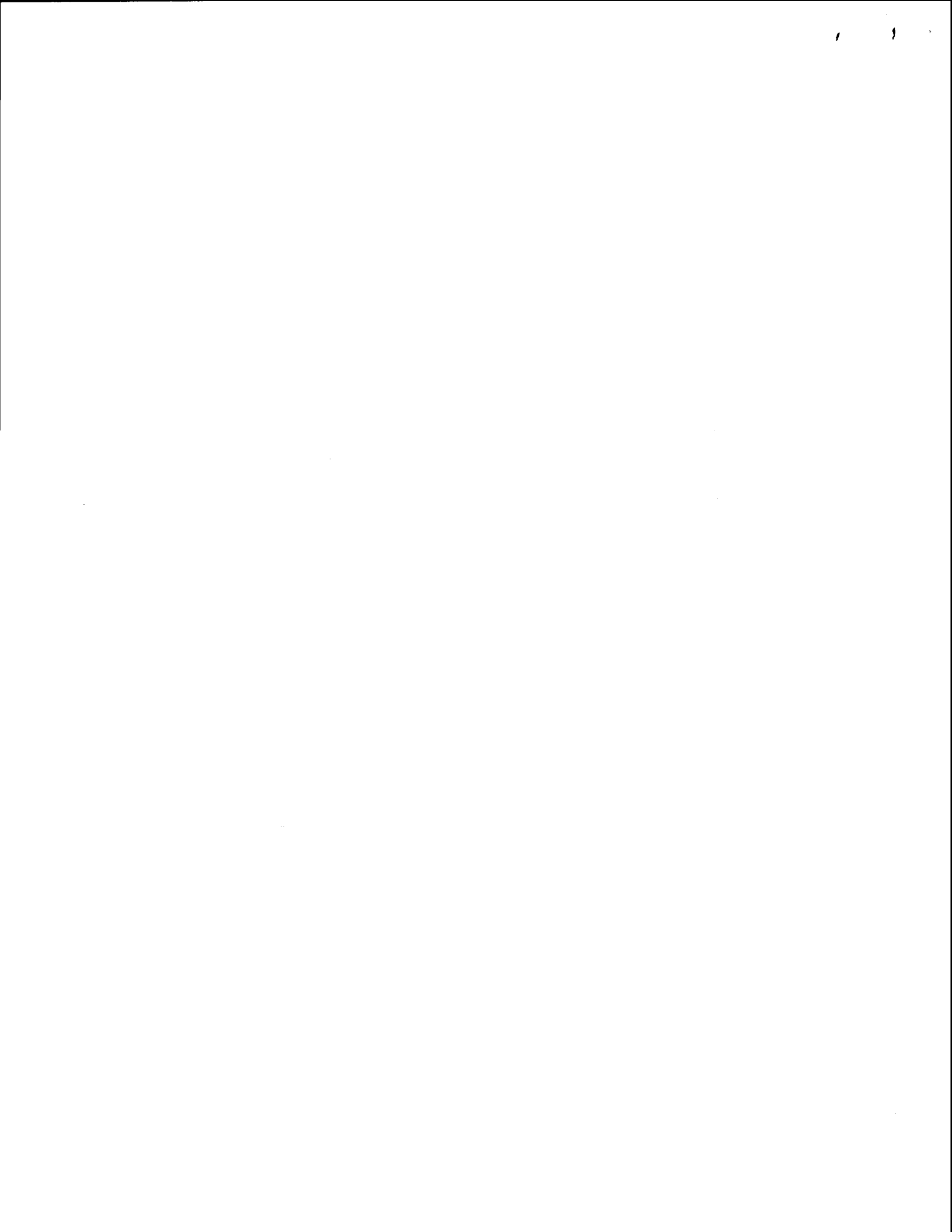
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Page 36-37. "The most important of these authorities are (1) RCRA section 7003, which authorizes EPA to require remedial action in cases in which solid wastes may present an imminent and substantial endangerment; (2) RCRA sections 3004 (u) and (v), which require corrective action for release of hazardous waste or constitutes from any solid waste management unit at treatment, storage, or disposal facilities seeking a RCRA hazardous waste permit, and (3) RCRA section 3008 (h), which allows EPA to require corrective action at interim status facilities."

Page 1. "This amendment would apply to responses by non-military or private personnel, as well as by the military."

CSWAB Comment: This amendment to the Resource Conservation and Recovery Act would, according to the summary, apply to responses by "non-military or private personnel". It follows, therefore, that the EPA proposes to afford exemptions [that have been subsequently qualified by the "uniqueness" of the mission of the DOD] to non-military and/or private personnel; the EPA further proposes the theorized protection provided by internal DOD procedures and guidance will be sustained in the same manner by non-military or private personnel, and that the EPA further has considered delegating its authority to the DOD and non-military or private personnel. The inclusion of non-military and private personnel in this proposed rule, therefore, invalidates the rationale for virtually every substantive exemption the military seeks from RCRA regulation.

Page 8. "The term 'hazardous waste' is defined in the statute as those solid wastes that "(A) cause, or significantly contribute to an increase in mortality or an increase in serious irreversible, or incapacitating reversible, illness: or (B) pose substantial present or potential hazard to human health or the environmental when improperly treated, stored, transported, or disposed of, or otherwise managed."

Page 10. On the issue of when a munition becomes a regulatory solid waste, today's proposal provides that unused military munitions in the military stockpile when...DOD or authorized Military Service personnel declare them to be a solid waste..."

CSWAB Comment: As there is no description of the internal DOD protocol for this determination, it is impossible for the community to comment on this proposal. Additionally, the EPA has deferred to DOD guidance and has not indicated any external, independent review has been conducted or what the results of this review were. As the proposed amendment will apply to non-military personnel that presumably do not adhere to DOD guidance, it is impossible to know what the additional implications of this proposal are.

Page 10. "Under today's proposal, DOD's standards, once issued, would take precedence over RCRA."

The intent of the Federal Facilities' Compliance Act was to ensure oversight of activities at federal facilities comparable to the regulatory oversight of private industry; there is no language or even inference in the FFCA that federal entities such as the DOD should be self-regulating and further, enabled to dictate federal environmental and human health



policy. We question the legality of delegation of authority and further submit is contradictory to the FFCA; Congress charged **EPA** with developing a 'fair and coherent approach to identifying when military munitions become a hazardous waste. (pages 26-27 of the proposed rule)

The community has already suffered the devastating consequences of military self-regulation. Badger Army Ammunition Plant, located at the base of the Baraboo Hills and adjacent to Devil's Lake State Park, was built in 1942 to produce single- and double-based propellant for cannon, rocket and small arms ammunition.

The contamination at Badger is a result of past production practices, including open burning of propellant-contaminated wastes and solvents, the discharge of process water into open ditches and ponds, landfilling waste and spills of solvents, acids, oils and production chemicals. Some volatile contaminants in the soil, such as the solvent carbon tetrachloride, have been carried by infiltrating precipitation down through the soil to the groundwater.

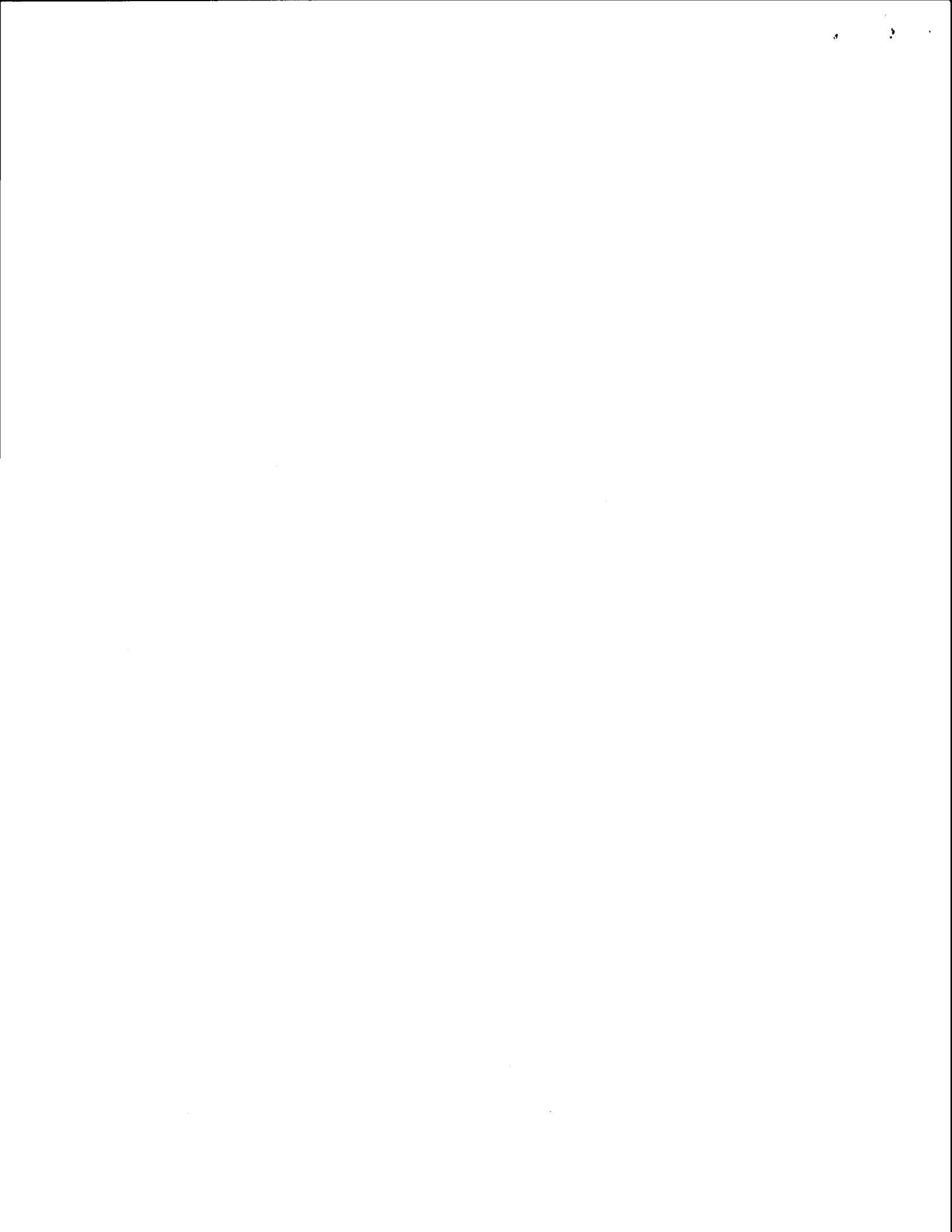
Off-site contamination was confirmed in 1990, when the Army announced groundwater contamination had traveled three miles offsite and was within a quarter mile of Prairie du Sac's municipal well. Shortly afterward, drinking water supplies of three private homes were found to be contaminated with high levels of carbon tetrachloride, a cancer-causing chemical. It is now known these families consumed poisoned water for at least 15 years. See Attachment A. *Badger Army plant fires silent gun; Toxic plume seeps toward wells of nearby residents.*

The mission and priority of DOD activities is not protection of human health and the environment; the proposed rule is permeated with illustrative statements such as page 5: "The Department of Defense has expressed concern that differing regulations or interpretation from State to State substantially undermine its ability to carry out its mission."

"The environmental legacy of the federal government's mission oriented activities is felt in communities throughout the country. Environmental clean-up of the 24,000 sites on federal facilities in the United States may ultimately cost as much as \$400 billion and extend well into the next century."

*USEPA's Interim Report of the Federal Facilities Environmental Restoration Dialogue Committee
February 1993*

The proposed rule further negates the Agency's ability to take enforcement actions, placing the health and well-being of the community in unnecessary jeopardy. In November of 1990, community members researched test results for private drinking water wells and discovered Olin Corporation, the operating contractor for the Badger plant, withheld every test result above the state standard for at least two years. Hundreds of tests conducted during this two year period were edited by Olin; dozens of test results above the safe standard were purposefully withheld from these families living



near the Plant. Nitrate levels as high as 50 ppm were found but not reported in drinking water supplies; the safe standard, by comparison, is only 10 ppm. See Attachment B. *BAAP official acknowledges mistake made.*

Other military contractors, including metaTrace, have compromised human health and the environment. In 1990, this contractor was retained by Badger Army Ammunition Plant to perform analyses of soil and groundwater samples associated with contamination at the Badger plant. This company was suspended from performing any work at or for BAAP following EPA and US Justice Department investigations into alleged alterations of dates on samples and improper instrument calibrations, which called data into question.

Olin's laboratory failed regulatory scrutiny again in 1993, when a State audit was conducted; several years of water testing results were subsequently invalidated. See Attachment C. *State of Wisconsin Department Justice, November 10, 1994.*

Page 11. Expansion of the definition of 'on-site'... "will eliminate redundant paperwork requirements (e.g., by eliminating the manifest requirement)."

The community is concerned eliminating the manifest requirement will compromise and even obliterate the community's right-to-know.

As recently as June 1992, an operation which the base commander ironically described as intended to "make sure operations remain safe", resulted in the release of toxic cloud of red gas over the Badger plant. The plume of nitric oxide drifted northward over adjacent Devil's Lake State Park. See Attachment D. *Red cloud over BAAP from acid spill.*

Page 12. "The proposed definition also clarifies that such military munitions may be under the control of ...a private company producing the munitions under contract to or as an agent for the DOD, as well as the Department of Defense."

Page 13. "In today's proposal, EPA has focused on the first point -- when munitions become a solid waste -- and has not proposed to amend the definition of "hazardous waste" as it applies to munitions."

Page 15. "However, once DOD promulgated range cleanup regulations under its own standards, this section would be superseded."

Again, we question whether this delegation of authority by the USEPA to DOD and/or non-military personnel is lawful. This proposal further denies the community any participation in the decision-making process including opportunities for valid public comment, public hearings and scoping meetings. This is again inconsistent with the intent of the FFCA.

Page 15. "...under DOD procedures, these materials first undergo evaluation to determine whether they can be returned to service, repaired, sold or recycled."



As there is no description of the internal DOD protocol for this determination, it is impossible for the community to comment on this proposal. Additionally, the EPA has deferred to DOD guidance and has not indicated any external, independent review has been conducted or what the results of this review were. As the proposed amendment will apply to non-military personnel that presumably do not adhere to DOD guidance, it is impossible to know what the implications of this proposal are. Again, we question the legality of the proposed delegation of authority to the DOD.

Page 19. "Similarly, a munition may be removed from storage for the purpose of recycling or materials recovery without triggering RCRA."

The community *may* support this proposal but the criteria for determining that a munition will be recycled, for instance, has not been included in the rule; the parameters are apparently contingent on internal DOD procedures and guidance. Furthermore, there is no indication that any external, independent review has been conducted or what the results of this review were. Applications to non-military personnel are of additional concern.

Page 23. One type of recycling identified by DOD is "the processing of an unused explosive to allow its use as a fertilizer".

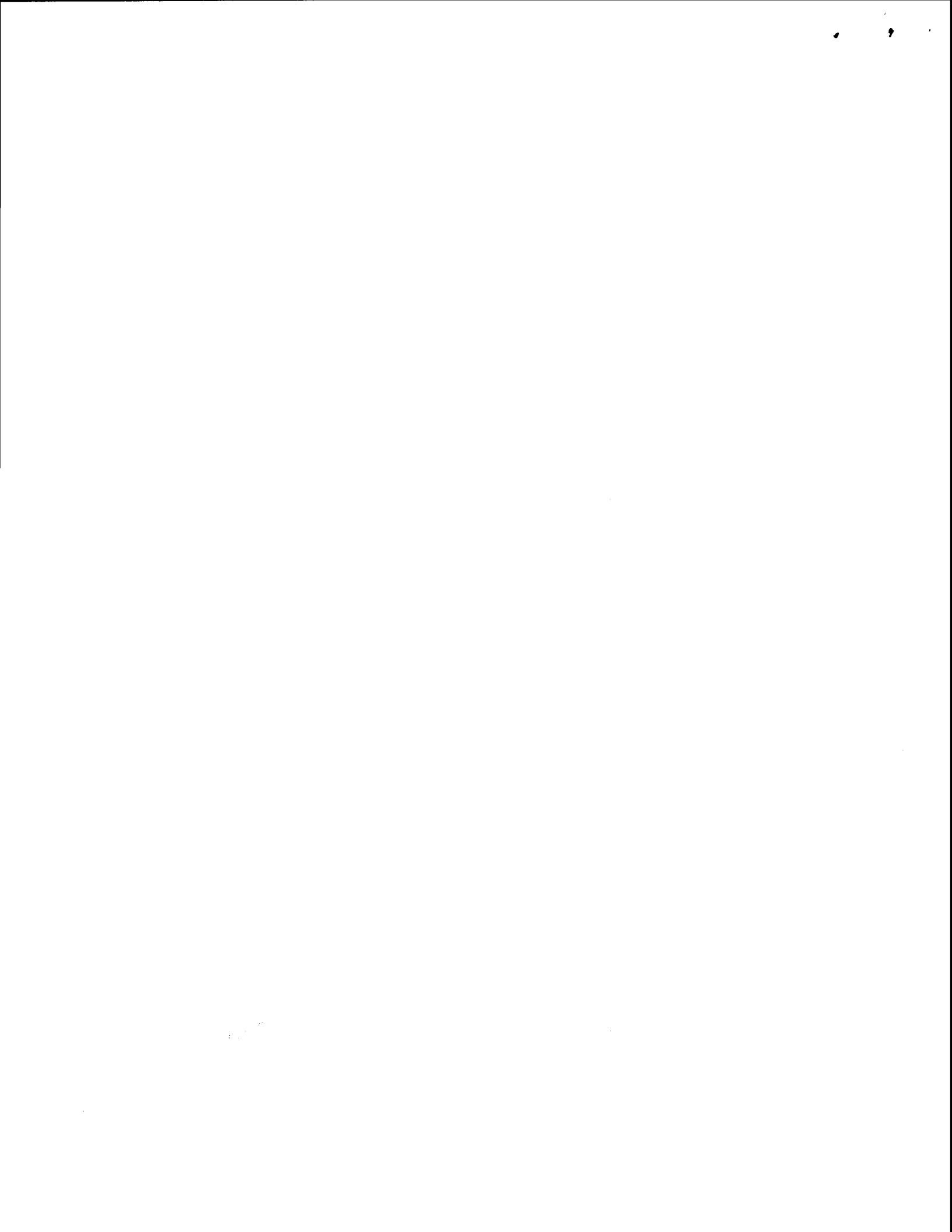
Recycling activities involving hazardous materials should not be exempted from regulatory oversight and community right-to-know. In the State of Wisconsin, safe disposal of animal waste, a natural and plentiful fertilizer here and in other agriculturally-based states, is already an environmental concern. The community is not convinced increased production of artificial fertilizers is in the best interest of the environment, particularly as it affects surface and groundwater quality.

Page 25. "Furthermore, EPA shares commenters' concerns that, when a munition presents a threat because of leakage or physical deterioration and when there is no reasonable possibility of productive use of the material, it should be treated or destroyed as soon as feasible."

In some cases, immediate treatment may not be in the best interest of human health and the environment. In the case of chemical weapons, for instance, the community is vehemently opposed to incineration for the "treatment" of these weapons; temporary storage, if feasible, may allow the implementation and development of safer, alternative treatment technologies. Given the EPA's recent report on dioxins and the high potential for multiple and additive risks associated with exposure to incineration emissions, the community could, in some cases, support the postponement of treatment in favor of alternative, safer technologies.

Page 25. "Today's proposal would not affect the waste status of these materials, or of materials DOD in the future classifies as solid waste."

As there is no description of the proposed internal DOD protocol for this determination, it is impossible for the community to comment on this proposal. Additionally, the EPA has deferred to the DOD guidance and has not indicated any external, independent review has been conducted or what the results of this review were. As the proposed amendment will apply to non-military personnel that



presumably do not adhere to DOD guidance, it is impossible to know what the implications of this proposal are. Again, we question the legality of the proposed delegation of authority to the DOD. "In the future" infers there is no time limit, which is unacceptable to the community.

Page 26. "...that DOD has in place extensive storage standards that, in providing for safety..."

As there is no description of the internal DOD standards for this determination, it is impossible for the community to comment on this proposal. Additionally, the EPA has deferred to the DOD guidance and has not indicated any external, independent review has been conducted or what the results of this review were. As the proposed amendment will apply to non-military personnel that presumably do not adhere to DOD guidance, it is impossible to know what the implications of this proposal are. Again, we question the legality of the proposed delegation of authority to the DOD.

Page 27. "EPA's goal has been to define a consistent national standard, which would eliminate the need for complicated site-specific judgments that may have little if any relevance to protection of human health and the environment."

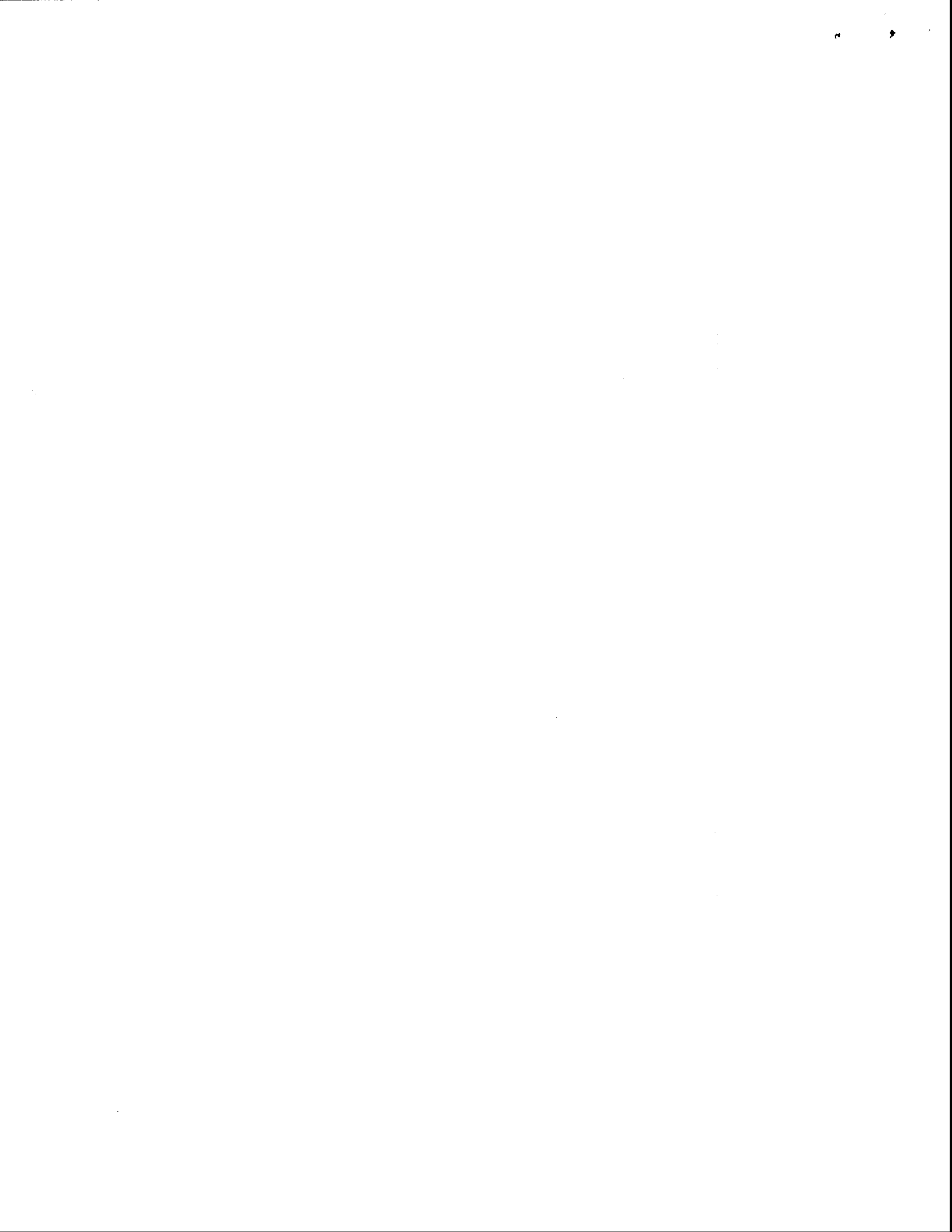
We believe site-specific judgments (as to when military munitions become a hazardous waste) may have profound relevance to protection of human health and the environment. For instance, at the Badger Army Ammunition Plant in Wisconsin, USEPA Region V required a proposal to burn 2,500 pounds per day of propellants consider the proximity to potential populations at risk such as schools and retirement communities, the preexisting contamination of soils, subsurface soils and groundwater, prevailing wind direction, water run-off, potential impact to protected and endangered species and other pertinent and **site-specific** information.

Page 29. "The military's storage standards and practices for munitions general provide protection that is comparable to or better than RCRA regulation could provide."

As there is no description of the internal DOD standards for this determination, it is impossible for the community to comment on this proposal. Additionally, the EPA has deferred to the DOD guidance and has not indicated any external, independent review has been conducted or what the results of this review were. As the proposed amendment will apply to non-military personnel that presumably do not adhere to DOD guidance, it is impossible to know what the implications of this proposal are. Again, we question the legality of the proposed delegation of authority to the DOD and/or non-military or private personnel.

Page 30. Footnote. "Finally EPA sees no reason why Service inspection procedures for the active stockpile are not adequate for munitions slated for disposal."

As there is no description of the internal DOD procedures for this determination, it is impossible for the community to comment on this proposal. Additionally, the EPA has deferred to DOD guidance and has not indicated any external, independent review has been conducted or what the results of this review were. As the proposed amendment will apply to non-military personnel that presumably do not adhere to



DOD guidance, it is impossible to know what the implications of this proposal are. Again, we question the legality of the proposed delegation of authority to the DOD.

Page 31. "Used or fired munitions removed from their landing spot and transported off-site would have to be handled under RCRA subtitle C (assuming they are "hazardous")."

Page 32. "Under RCRA, the use of products for their intended purpose does not constitute waste management and is not subject to regulation. For example, RCRA does not regulate the use of pesticides by farmers, even though pesticides are discharged to the environment during use."

This analogy is invalid. Agricultural chemical use in the State of Wisconsin has and is being regulated and in some areas prohibited. Just as waste munitions buried and lying on surface soils pollute soils, subsurface soils, surface water and groundwater, herbicides such as Atrazine while used "*for its intended purpose*" are highly regulated.

Page 33. "In wartime, procedures specify that the excess propellant be burned at the closest safe point." "Indeed such training exercises typically follow detailed protocols..."

These procedures and protocols are not detailed in the proposed rule. It is impossible for the community to comment on this supposition as there are no detailed descriptions of the internal DOD procedures. Moreover, we are told propellant is **not** burned during active wartime as the resultant flash and smoke will reveal a soldier's location which is predictably less than desirable in a battle situation.

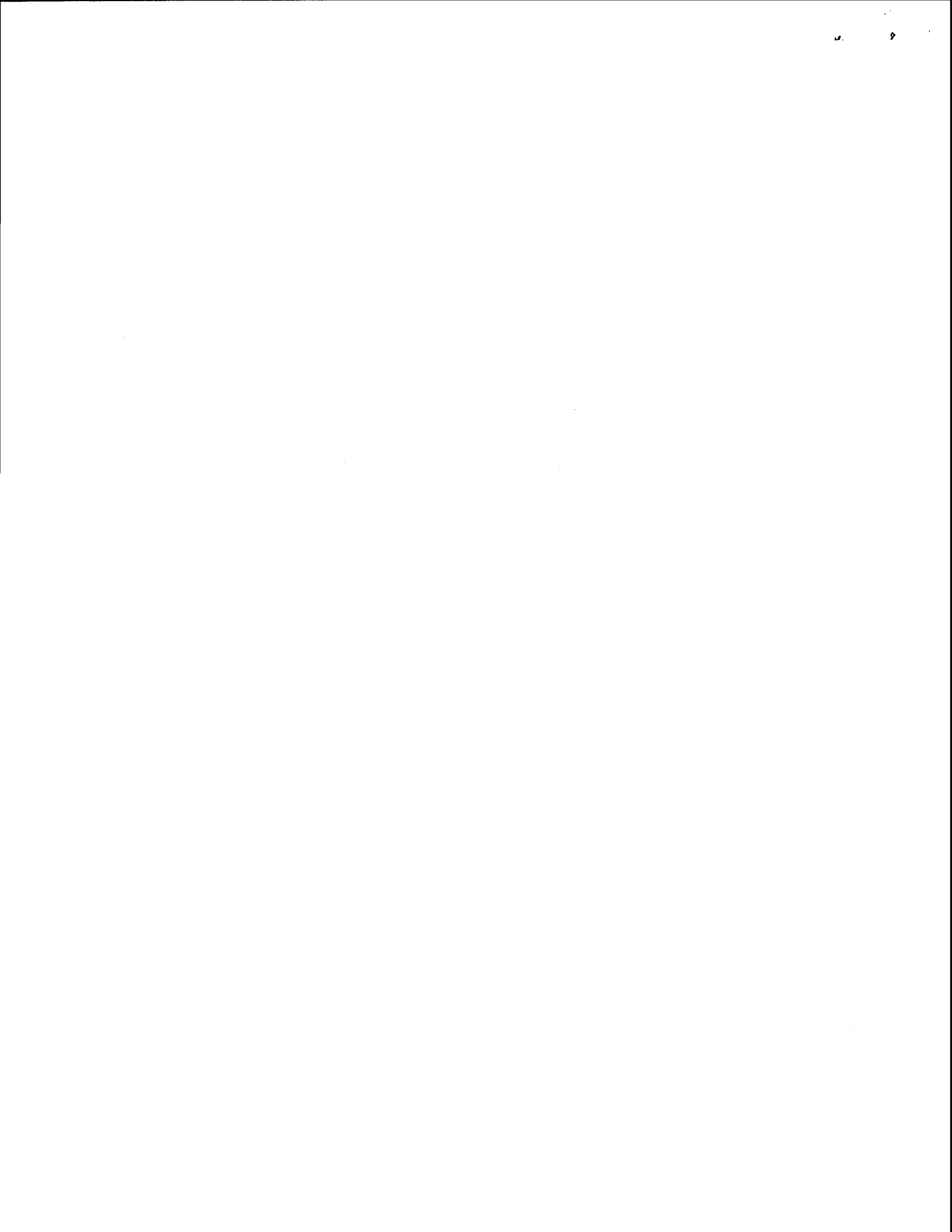
Additionally, the EPA has deferred to the DOD guidance and has not indicated any external, independent review has been conducted or what the results of this review were. As the proposed amendment will apply to non-military personnel that presumably do not adhere to DOD guidance, it is impossible to know what the implications of this proposal are. Again, we question the legality of the proposed delegation of authority to the DOD.

Page 34-35. "In response to the concerns over sham training, DOD has suggested the existence and use of training manuals, and appropriate documentation of training activities should be accepted as evidence of training."

As there is no description of the internal DOD standards for this determination, it is impossible for the community to comment on this proposal. Additionally, the EPA has deferred to the DOD guidance and has not indicated any external, independent review has been conducted or what the results of this review were. As the proposed amendment will apply to non-military personnel that presumably do not adhere to DOD guidance, it is impossible to know what the implications of this proposal are.

Page 35. "...EPA solicits comments on (propellant burning as field exercise), in particular whether it is appropriate or necessary, under RCRA, to impose specific restrictions on burning of excess propellant, and if so what those restrictions should be.

- Of the 40 contaminated military sites in Wisconsin, the Defense Environmental Restoration Agency has cited Badger as the most contaminated; 32 areas within the

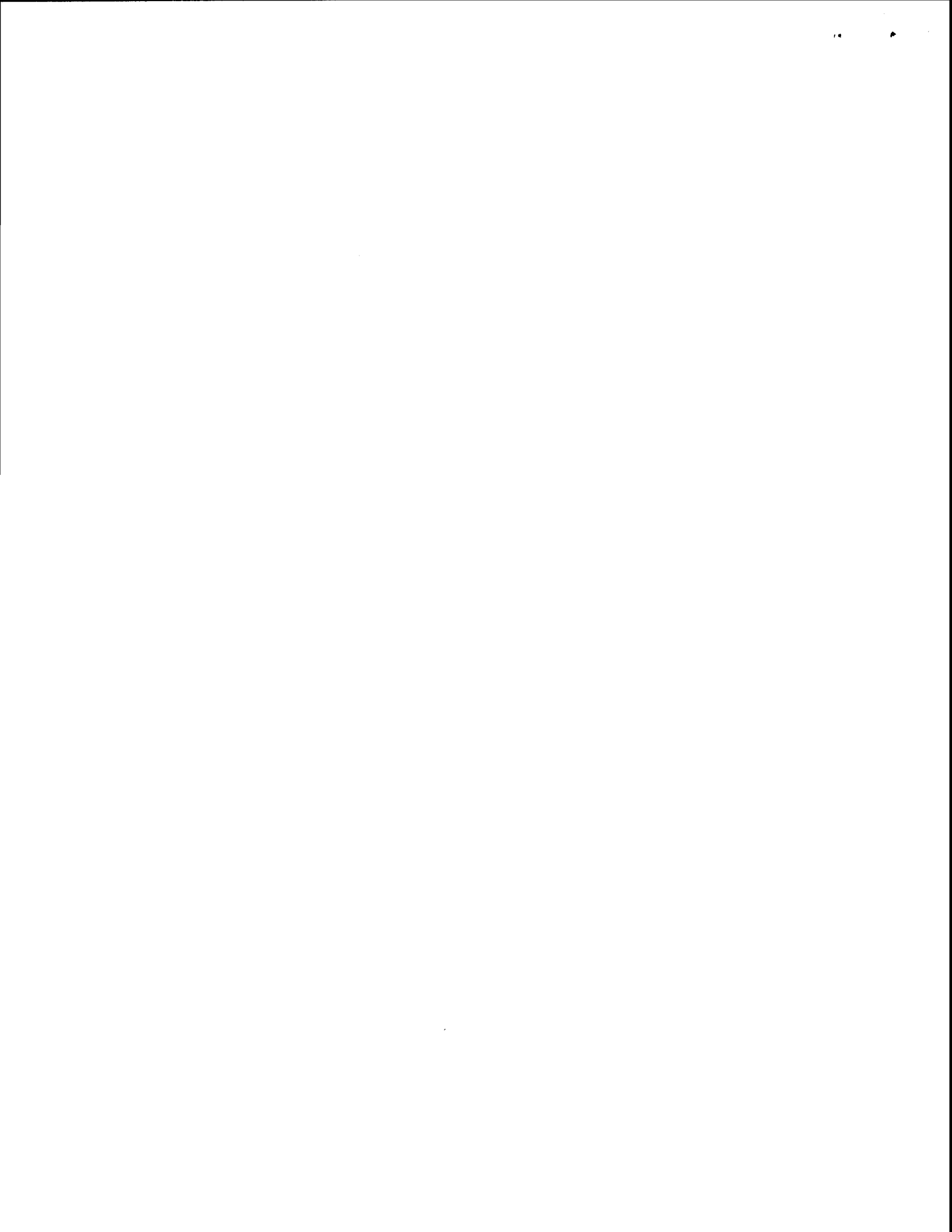


plant are polluted with high levels of solvents, toxic metals and explosive wastes. Environmental cleanup costs are expected to exceed \$250 million.

The Propellant Burning Ground, located at the south end of the Badger Army Ammunition Plant, was used between 1942 and 1983 for open burning of waste explosives, propellants and waste process chemicals. During production, these burnings took place almost daily, producing a "ball of fire" visible from several miles away.

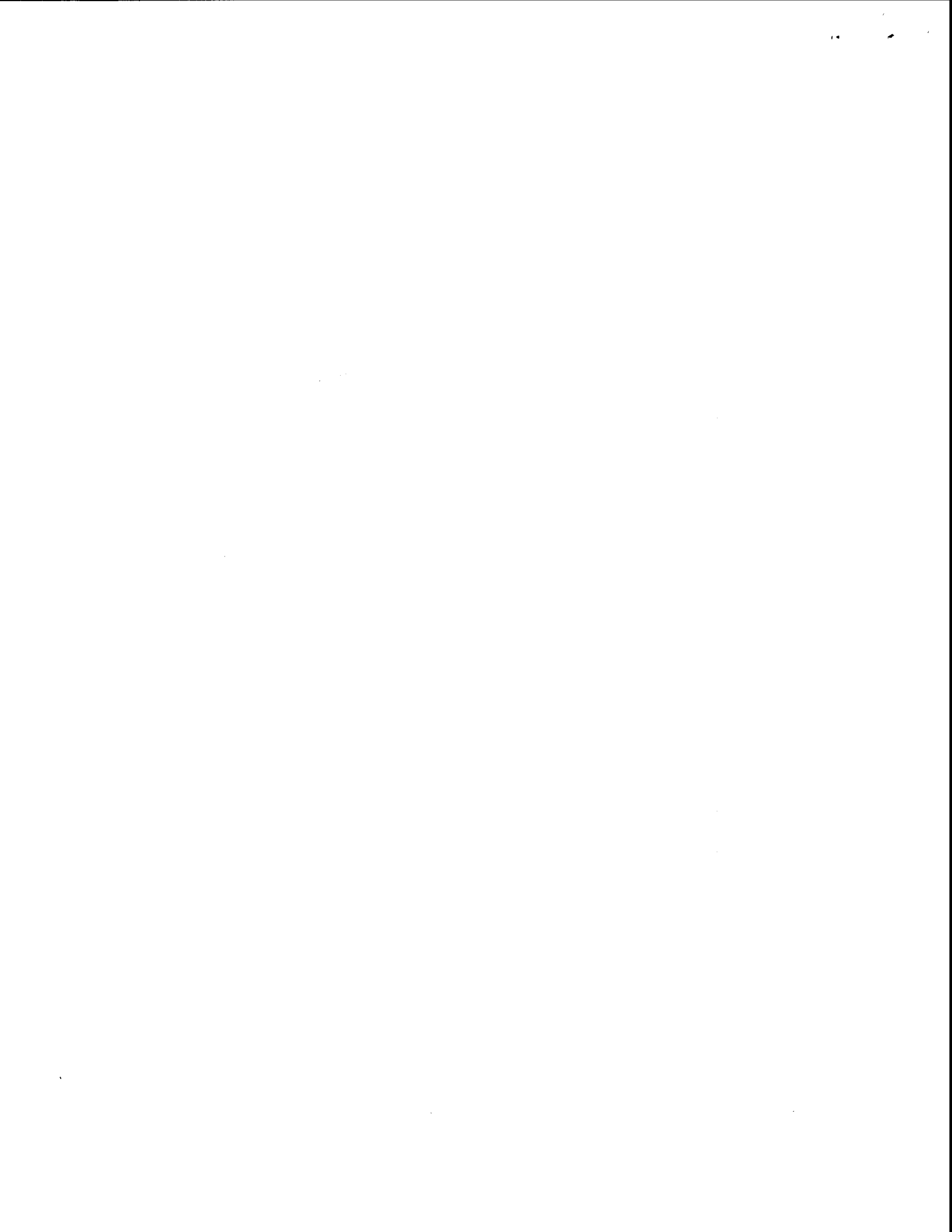
In 1990, in response to community concerns about exposure to pollution from Badger, the Wisconsin Division of Health conducted a health survey. The study confirmed that communities near the Badger plant have a significantly higher incidence of cancer deaths. **The incidence of female non-Hodgkin's lymphoma and male kidney/ureter cancer deaths are 50% higher than the balance of the State.** See Attachment E. Wisconsin Division of Health July 1990 Health Assessment of Communities near the Badger Army Ammunition Plant.

- Studies have demonstrated a correlation between elevated blood lead levels and exposure to lead-contaminated dust in indoor firing ranges. See Attachment F, Gunning for Lead, Lead Distribution Surface Soils at the Propellant Burning Grounds at Badger Army Ammunition Plant.
- The Commonwealth of Massachusetts commissioned Boston University Professor David Ozonoff to perform an epidemiological study to determine whether local environmental contamination was a factor in the elevated cancer rates found in the community. A significant finding of this report was a dose response relationship between residence proximity to the nearby artillery training area, where propellant bags were burned, and the risk of **lung and breast cancer**. The identified contaminant of concern was 2,4-DNT. See Attachment G. The Open Burning Issue: Cancer.
- Over the years, open detonation and burning has been used for the disposal of military propellants, explosives and pyrotechnics at Tooele Army Depot in Utah. Although the Utah Cancer Report, a publication of the Utah Cancer Registry, reports the state of Utah has some of the lowest cancer rates in the U.S., a comparison of cancer rates shows the incidence of **lung cancers** in Tooele County, home of the Tooele Army Depot, is well above the State average from 1966 to 1990. See Attachment H. Tooele County Incidence of Lung Cancers.
- An extensive study, conducted by scientists from the Weizmann Institute of Science in Israel, and the University of Florida found that burning common explosives produces toxic gases such as nitric oxide and carbon monoxide. According to the report, open-air detonation causes serious contamination of the surrounding environment. See Attachment I. Incineration of explosives poses threat to atmosphere.
- In an attempt to measure and identify emissions from the burning of propellants, Sandia National Lab conducted the so-called "Bang Box" tests. Emission factors from these tests included toxic and carcinogenic substances such as carbon



monoxide, methane, benzene, 2,4 dinitrotoluene, 2,6 dinitrotoluene, and nitrogen oxides. See Attachment J. Table from 'Bang Box' tests.

- Of all the areas at Badger, the propellant burning ground is the most contaminated. Surface soils contain hazardous amounts of lead as high as 3,300 mg/kg; contamination of DNT's, phthalates and diphenylamine is widespread (up to 47,000 ppm 2,4-DNT and 86,000 ppm di-n-butyl phthalate) at or near the surface and at depth (920 ppm 2,4-DNT and 97 ppm 2,6-DNT). The impact of years of open burning and disposal of military waste is evidenced by the tremendous devastation to the surrounding environment.
- There is little doubt residents living near the Badger Army Ammunition Plant have been exposed to emissions and particulates from years of open burning of propellants. The Propellant Burning Ground, located at the south end of the Badger Army Ammunition Plant, was used between 1942 and 1983 for open burning of waste explosives, propellants and waste process chemicals. During production, these burnings took place almost daily, producing a "ball of fire" visible from several miles away. Recent air dispersion modeling in Badger's RCRA permit application, confirms pollutants from open burning readily migrate beyond the plant boundary. See Attachment K. *Badger Army Ammunition Plant: 50 Years.*
- "DNT is classified B2 (probable human carcinogen) and thus a Lifetime HA is not recommended. The cancer potency is associated with hepatocellular and mammary gland carcinogenic activity in rats after 2,4-DNT treatment. 2,4-DNT also may be a promoter." "There is some evidence which suggests that 2,6-DNT has both initiation and promotion activity and, therefore, may be a complete carcinogen." See Attachment L. *Overview of the Health Effects of Selected Munitions Chemicals published by the USEPA and the Department of the Army.*
- Attachment M summarizes the incremental carcinogenic risk for exposure to DNT's from open burning of propellants. Of considerable concern are the multiple potential exposure pathways including inhalation, soil ingestion, dermal contact, and food ingestion and the increased **and additive** risks associated with each of these exposure pathways. Non-carcinogenic health risk are increased as well; toxic metals-contaminated ash, disbursed by open burning, exposes soldiers and nearby residents through inhalation, soil ingestion, dermal contact, and food ingestion. Other pollutants including NO_x, CO, VOC's and TSP increase and compound risks to human health. See Attachment M. Table 7.1, 7.2 and 7.3. *Health Risk Assessment for the Open Burn Facility at Badger Army Ammunition Plant.*
- **Elevated cancers, including lung cancers, and an increased prevalence of respiratory disease** were documented by the federal Agency for Toxic Substances and Disease Registry in communities near the Caldwell County incinerator. The Caldwell incinerator burned, in addition to waste material from manufacturing industry, waste torpedo fuel (Otto Fuel II) from the U.S. Navy. **One of the constituents of Otto Fuel II is 2-nitrosodiphenylamine, a component of many propellants,** and a pervasive contaminant of concern at propellant manufacturing facilities including Badger Army Ammunition Plant. Residents of the target area were almost nine times more likely to report symptoms of recurrent wheezing or



cough following a respiratory insult. ATSDR personnel report the Caldwell incinerator had “so little pollution controls that it closely resembled open burning. It illustrates that open burning done near a neighborhood does harm a community’s health.” Moreover, ATSDR personnel report accessibility to specific health information was blocked by the military. The military claimed this information was classified and obstructed the Agency’s access to pertinent health studies. Requests from the Agency were either not satisfied or in some cases, delayed for over a year. **It follows, therefore, that the USEPA should be equally concerned human health studies relevant to the munitions rule have not been disclosed by the U.S. military.** (See Attachment N. Final Report, Study of Symptom and Disease Prevalence Caldwell Systems, Inc. Hazardous Waste Incinerator Caldwell County, North Carolina, ATSDR’s Toxicological Profile for Otto Fuels II, and various newsreports.)

Page 34. State authorities share this concern, “In some cases, this precaution (burning in lined trenches) has been required by state regulators.”

Page 35. “Today’s proposal also clarifies that munitions used in weapons research, development, testing and evaluation programs are not regulated under RCRA.”

Why not? The activities are identical, the emissions and contaminated-particulates are identical, and the risks to human health and the environment are identical. This is illustrated by the EPA’s own language on page 36 which says, “Furthermore, from an environmental perspective, it makes not difference whether ordnance explodes on impact or is subsequently detonated by an EOD specialist.”

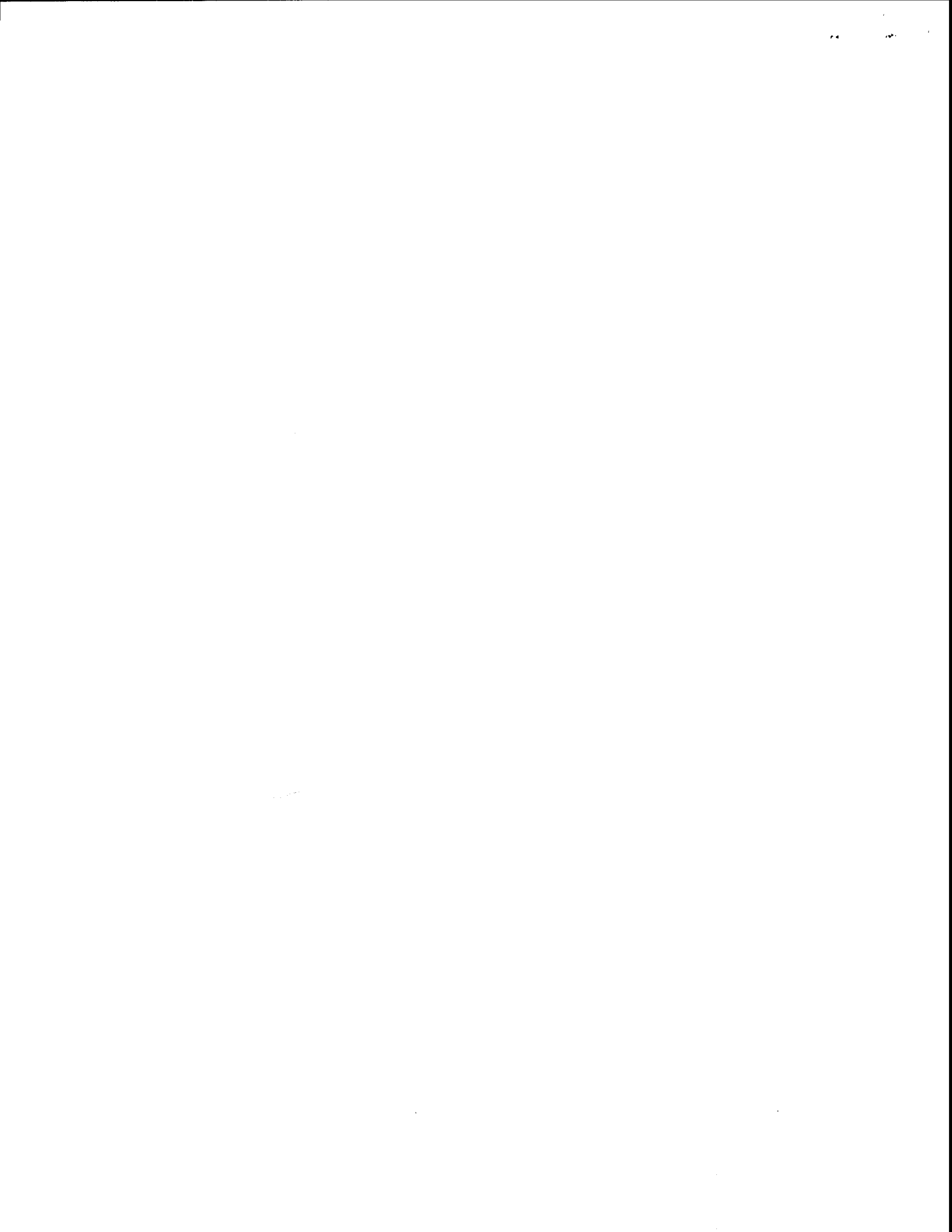
Further, the EPA has not defined any of these terms, such as ‘development’, ‘testing’, and ‘research’ and to use the EPA’s own rationale, these subjective terms may “lead to jurisdiction by the courts.” (page 27).

Page 37. “However, an “inactive range--i.e., a range that is not currently being used, but that is still considered by the *military* to be a potential range area...”

As there is no description of the internal DOD standards for this determination, it is impossible for the community to comment on this proposal. The EPA has deferred to internal DOD procedures and has not indicated any external, independent review has been conducted or what the results of this review were. As the proposed amendment will apply to non-military personnel that presumably do not adhere to DOD guidance, it is impossible to know what the implications of this proposal are. Again, we question the legality of the proposed deferral to the DOD.

Page 38. “...property transfer would simply affirm that the remaining materials on the range *could* be considered to have been discarded.”

The act of transferring property from the DOD to another party necessitates abandonment of munitions and debris on this same property and should therefore trigger RCRA cleanup requirements.



Pages 38-39. "Today's proposal, however, contemplates that RCRA regulation of cleanups at closed and transferred ranges would be **temporary**. The proposal would further provide that, if DOD promulgates, pursuant to DOD's own statutory authorities, rules that allow for public involvement in cleanups of these ranges and that are fully protective of human health and the environment, then these DOD regulations would supersede RCRA regulations. The DOD regulations, rather RCRA, would then govern range cleanups. EPA would issue a notice at the time DOD's regulations were issued, announcing that DOD cleanup regulations took precedence and that munitions at closed or transferred ranges are not to be considered RCRA statutory solid waste."

The DOD invariably resists valid public participation in the decision-making process; this is documented throughout EPA's Federal Facilities Environmental Restoration Dialogue Committee Interim Report. "Reinvigorating the process (by which federal facility cleanup decisions are made) will require a **fundamental change** in the way the cleanup process is managed. The cornerstone of this change must involve a shift from the decide, announce and defend mode of public involvement to a new partnership between all of the affected stakeholders". As EPA is aware, the DOD's subsequent guidance document for public involvement was **contrary** to virtually every recommendation from this committee of representatives of federal agencies, tribal and state governments and associations, and local and national environmental, community and labor organizations.

As we have previously commented, we question the legality of delegating EPA's authority to the DOD and recognize the role DOD's conflicting mission will play in promulgating it's own rules; we have also voiced our opposition to proposals to limit State's authority.

Page 39. Department of Army regulations state RCRA does not apply to military ranges, however, "several EPA regions and States have asserted that these authorities (RCRA) apply to military ranges."

Department of Army regulations are here inconsistent with existing RCRA authorities.

Page 40. "The level of assessment needed would be consistent with the potential risk of exposure."

Cleanup based on future use is simply not acceptable. States and the EPA should establish and enforce cleanup goals and standards based on optimal protection of human health and the environment and should not be politicized as often happens when so-called "fast track" cleanup is implemented. In many cases, unrestricted use is essential to safe-guard the cultural value of these properties. We urge the EPA to actively solicit and consider input from indigenous peoples and Native American nations in this regard.

Containment, for example, may be an appropriate interim action to provide immediate and short-term protection of human health and the environment, but should never be considered a long-term solution. Lands should be restored to conditions found prior to DOD abuse, and not subjective and politicized cleanup levels based on short-term future

use scenarios. Such terms of cleanup are again subjective and consequently prone to costly court battles.

Page 40. "Also, environmental released from range activities that migrate off-range in groundwater or runoff, including from active ranges, would be statutory "solid waste", and could be addressed under RCRA section 7003."

Addressing contamination after it has been allowed to migrate off-site sanctions **permanent destruction of the environment**. Past disposal practices have heavily contaminated surface and subsurface soils at Wisconsin's Badger Army Ammunition Plant. Over the years contaminants migrated to the water table, creating a plume of toxic groundwater.

On May 9, 1990 the Army reported that drinking water wells serving three homes south the Badger plant had been polluted with unsafe levels of carbon tetrachloride and chloroform. Concentrations of carbon tetrachloride were measured at 80 parts per billion -- more than 13 times the State's recommended safe standard of 6 parts per billion.

The plume of contaminated groundwater continues south to within a quarter mile of Prairie du Sac's municipal well which services the village's 3,000 residents. Subsequent testing revealed eight of over 100 private wells in this area were contaminated with these compounds and, of these, four are above state groundwater standards. According to the Agency for Toxic Substances and Disease Registry, exposure to these chemicals is known to induce liver, kidney and lung cancers.

A \$35 million "pump and treat" system is currently being installed at the southern boundary of the Badger plant in attempt to stop further contamination from migrating offsite. Despite these colossal effort the Army estimates the groundwater offsite however, will be contaminated for at least another 100 years!

Moreover, addressing contamination only when it has migrated through the soil column, reached groundwater and drinking water supplies off-site, is totally contrary to the mission of the EPA which is to **protect**; this approach endorses activities for which there is no practicable cleanup and accordingly creates dead zones, robbing future generations of their right to a clean, safe environment.

Page 42. "The Agency recognizes that inactive ranges may frequently be reused, and questions the value of a formal corrective action process when the area will likely be subject to ranges use gain. Furthermore, such an approach might only encourage installations to continue use of ranges, rather than discontinue their active use, for fear of triggering EPA or State oversight."

If corrective action would have the effects EPA supposes and that cleanup of inactive ranges is impracticable, we believe this does not prohibit relatively minor interim actions that could substantially reduce environmental impacts to soils, groundwater and surface water; this may be a sound financial investment as well, as an investment in preventing future, escalated cleanup, which later may be technically and financially impossible to achieve.

Pages 42-43. "Therefore the EPA seeks comment on what sorts of range activities are properly considered uniquely military."

This approach is bogus; as we have said before, the intent of the discharge to the environment is irrelevant. The potential harm a discharge may cause to human health and the environment should gauge the necessity for regulatory intervention, not the polluter's affiliations or intentions.

Page 43. "EPA understands DOD intends to propose clean up standards and a clean up process under these authorities...DOD's proposed rule will address the nature of the role of the States..."

This proposal is shocking! EPA essentially proposes to enable an industry to promulgate its own cleanup standards, to escape external oversight, to rob the public of participation in the decision-making process, to disregard and possibly even annihilate State authority and enforcement capacity. The intent of the Federal Facilities Compliance Act, the act propelling this proposed rule, is to hold federal facilities equally accountable as the rest of industry, **not above and apart.**

The EPA does not propose regulating the military in the same way it regulates other industry; if it did, the EPA's responsibilities would be clear. We know burning of propellants releases toxic and carcinogenic substances to the environment and unexploded and exploded ordnance release poisons to the soils, the waters and the air. Without exception, industrial activity that places human health and the environment at similar risk is regulated and enforced by federal and State regulatory agencies.

Surprisingly, the DOD does not submit their activities are not causing harm, instead they have relied almost exclusively on the EPA's willingness to accept their mission as priorital, siting endless training manuals, internal procedures and protocols that document the necessity of their activities. Millions of acres of DOD contaminated lands and waters in virtually every state in the nation lay testament to this folly.

Regulation of military activities will provide external oversight and accountability to the community, but most certainly will **not** stop military activities anymore than regulatory oversight has stopped similar industrial activities all across the country. EPA has been misguided in its approach and should adhere to addressing the immediate and eminent dangers to the health and well-being of our communities; the military is an industry and should regulated as such.

Page 45. "...the operator of the installation would be required to maintain records of the event *as long as any threat remained.*"

Language is vague and subjective and prone to debate. This needs to be defined.

Page 46. "On the other hand, off-specification ordnance or line rejects are considered products, and not waste subject to regulation under RCRA."

This appears to be inconsistent with previous language that suggests materials no longer able to be used for their intended use are waste, and may also be considered 'hazardous' waste based on their composition and/or RCRA hazardous characteristics.



Page 47. "Proposed sections...would exempt stockpile munitions (that are hazardous wastes...) shipped off-site to DOD-owned or controlled TSDF under DOD tracking procedures from RCRA manifest requirements."

It is unlikely this same exemption is afforded to other industries that transport hazardous wastes and therefore the community cannot support this proposal. If DOD transportation and inventory controls are indeed equivalent and/or duplicative of RCRA standards, compliance with RCRA will place no hardship on DOD.

Page 48. "Features of the DOD transportation system include pre-trip routing plans, safe havens..."

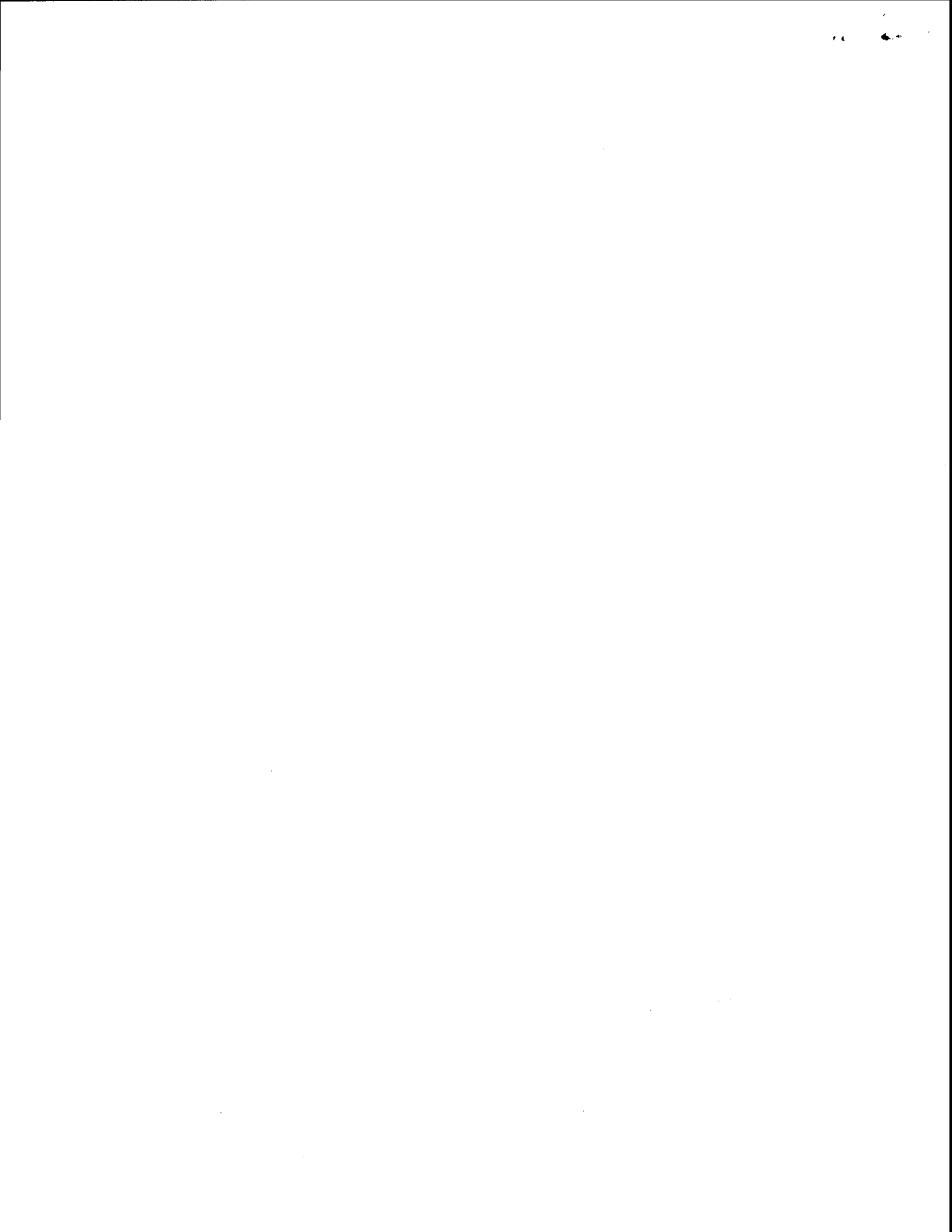
Of particular concern to the community is coordination with local officials and emergency governments. As in the case of the recent range fire at Aberdeen Proving Ground (1995) the military purposefully withheld pertinent information from emergency and medical personnel. The Army reportedly claimed the identity of the probable and specific contaminants was classified and consequently disclosure was inconsistent with "their mission". Civilians were sick for days and in some cases weeks. Initial symptoms including burning eyes, nose and throat, fatigue and shortness of breath. Medical personnel could afford little relief and no substantive follow-up care or testing as the military blocked this information. Public health was compromised for "the mission".

Page 49. "Regarding the RCRA manifest and marking requirements, DOD is concerned about training its personnel in two separate systems, and maintaining both of these systems simultaneously..."

First, we are not aware that mild hardship is a valid argument for non-regulation. Second, the DOD has not demonstrated that modification of the DOD internal reporting structure consistent with RCRA is impracticable. Further, private industry is not afforded this exemption.

Page 53. "For those few military munitions waste that are liquids..."

The proposed rule does not identify munitions which are liquids and consequently it is difficult for the community to comment on this proposal. Nitroglycerine, for instance, is a liquid that, in addition to being highly reactive, can affect humans when breathed and by passing through the skin. High exposure can cause confusion and interfere with the ability of the blood to carry oxygen causing blue skin, trouble breathing, and even death. (*New Jersey Hazardous Substance Fact Sheet on Nitroglycerine, April 29, 1990.*) The need for independent regulation and accountability to the community is evident and essential to protect human health and the environment. The EPA has deferred to internal DOD procedures and has not indicated any external, independent review has been conducted or what the results of this review were. As the proposed amendment will apply to non-military personnel that presumably do not adhere to DOD guidance, it is impossible to know what the implications of this proposal are. Again, we question the legality of this proposed delegation of authority to DOD.



Page 56. "...compliance with standards set by DDESB and Service-specific regulations implementing procedures."

The lack of uniformity between the Services invalidates the DOD's request for across-the-board uniformity of standards; the DOD here acknowledges "**service-specific regulations**". As there is no description of the internal DOD standards for this determination, it is impossible for the community to comment on this proposal. The EPA has deferred to internal DOD procedures and has not indicated any external, independent review has been conducted or what the results of this review were. As the proposed amendment will apply to non-military personnel that presumably do not adhere to DOD guidance, it is impossible to know what the implications of this proposal are. Again, we question the legality of the proposed deferral to the DOD.

Page 56. "There were gaps in certain procedural requirements and in areas unrelated to risks from explosive materials (e.g., in requirements to coordinate with local authorities or in closure requirements)."

The issue of coordination with local authorities is a grave concern to communities near DOD facilities. At Badger Army Ammunition Plant, Army officials defer emergency responses, including evacuations, to the local emergency government; they have only maintained responsibility for emergency response inside the fence. What other deficiencies exist within DOD internal requirements and what risk does this place on soldiers and civilians?

Pages 56-57 reference "Standard Operating Procedures".

As there is no description of the internal DOD standards for this determination, it is impossible for the community to comment on this proposal. The EPA has deferred to internal DOD procedures and has not indicated any external, independent review has been conducted or what the results of this review were. As the proposed amendment will apply to non-military personnel that presumably do not adhere to DOD guidance, it is impossible to know what the implications of this proposal are. Again, we question the legality of this proposed delegation of authority to DOD.

Page 59. "For these reasons, DOD asserts that waste military munitions do not have to be managed in accordance with RCRA standards for the storage of hazardous waste so long as they are stored in accordance with the regulation established by DDESB and the Service-specific implementing procedures and requirements."

As there is no description of the internal DOD standards for this determination, it is impossible for the community to comment on this proposal. The EPA has deferred to internal DOD procedures and has not indicated any external, independent review has been conducted or what the results of this review were. As the proposed amendment will apply to non-military personnel that presumably do not adhere to DOD guidance, it is impossible to know what the implications of this proposal are. Again, we question the legality of this proposed delegation of authority to DOD. Moreover, page 56 references gaps in these same DOD standards.

Page 61. Storage of Military Munitions. "This approach would allow EPA or State regulators directly to enforce DDESB standards, but would eliminate any possible inconsistency or redundancy between military and EPA standards."

It appears the third option provides the greatest protection of human health and the environment as well as opportunity for public participation in the decision-making process, but, again, there is no description of the DDESB standards and accordingly the community is unable to comment on the specifics of this proposal. Further, the EPA has deferred to internal DOD procedures and has not indicated any external, independent review has been conducted or what the results of this review were. As the proposed amendment will apply to non-military personnel that presumably do not adhere to DOD guidance, it is impossible to know what the implications of this proposal are.

Page 68. "...the possibility that treatment permits would be required for areas "routinely" used to handle emergencies."

"Emergency" does not connote "routine". Any disposal activity that has an established pattern or "routine" area should be regulated, and does not fall within the parameters of an emergency disposal.

Page 70. Emergency response. "...with respect to an incident creating a danger to public health or welfare or the environment as a result of any releases of a hazardous substance or threat thereof."

There have been incidences where an 'emergency' disposal action has exposed nearby residents to fumes, volatile chemicals, particulates and other emissions from burning or detonation of munitions and/or weapons. In cases such as the recent incident near Aberdeen Proving Ground where emissions migrated off-site, the DOD withheld pertinent information about suspected and known emissions from this exposure under the guise of 'national security'. The DOD further declined sharing pertinent medical information with local doctors and emergency personnel. We believe that once an exposure has occurred, the DOD is morally and legally obligated to immediately disclose any and all pertinent medical information and **under this proposed rule, the EPA should require this disclosure.**

Page 73. "If a material is not subject to EPA's manifest requirements, it is not considered a 'hazardous waste' by DOT."

Page 74. "EPA expects the benefit of consolidation on balance outweighs the risk of allowing transportation without a manifest along a short stretch of road to which the public has access."

The first question from the community is whether or not private industry is afforded the same exemption and if the net effect is as the EPA presupposes it will be. The proposal provides no prior experience to support the described net benefit. If private industry is required to manifest on public roads, it is our inclination to support the same for the military. Additionally, the proposal has assumed that consolidation equals improved safety, in the case of explosive munitions and/or waste this may not be the case.

Page 75. "One way to implement that result could be to limit the on-site exemption from transporter requirements....so (RCRA) would continue to apply to any discharge of hazardous waste on public right-of-way even if it is considered "on-site".

The community supports this proposal as the most protective of human health and the environment.

Page 75. "Some RCRA permits at military installations have condition prohibiting the receipt of "off-site" waste...DOD maintains that this situation will cause a serious disruption of its munitions management program."

Maintaining the "off-site" prohibition is critical to the community and the States:

- Many controversial on-site treatment technologies such as the open burning of off-spec and unstable munitions, have been justified by the Army because transport on public roads created an "unacceptable risk to the general public." In Badger Army Ammunition Plant's RCRA Part B permit application to the Wisconsin Department of Natural Resources, the risk of transport was a strategic point in the Statement of Need. The same rationale was applied in the Fort McCoy permit application for an Open Detonation permit. The DOD appears to contradict itself.
- Allowing and encouraging transport of hazardous waste to and from DOD facilities all over the country is a direct disincentive to waste reduction and recycling. Conversely, off-site prohibitions will provide strong, direct incentives for facilities to reexamine the way they do business and encourage conservative and innovative practices.
- We are concerned that without off-site prohibitions, poor, disadvantaged or less-organized communities will be targeted as major national or regional disposal sites. This clearly becomes an environmental justice issue.
- In May of 1987, The Wisconsin Department of Natural Resources denied a request to allow Illinois' Savanna Army Depot to open burn 240,702 pounds of waste propellants at Wisconsin's Fort McCoy and further recommended "...the Army coordinate with the Illinois EPA the disposal of the waste propellant at the site the waste is generated. There appears to be no environmentally beneficial reason to bring 240,702 pounds of waste propellants to Wisconsin..." See Attachment O. *WDNR May 14, 1987 letter.*
- A recent request from Wisconsin's Fort McCoy for an emergency waiver was based on the same premise. "Munitions not performing as intended or designed, or those recovered after misfires, are stored in the ASP for future treatment. AMC informed Fort McCoy the accumulated munitions may be unstable due to having already been fired and not detonating as designed. Additionally, many munitions degrade over time increasing their susceptibility to shock and/or temperature changes. As a result, these munitions cannot be safely transported over public roads for treatment." See Attachment P. *WDNR, October 28, 1993. Subject: Emergency Waiver Approval.*

The disruption of business as usual, and we note not the prohibition, is the only argument the DOD has offered.

Page 75. "In the case of interim status, facilities would be allowed to continue receiving off-site wastes, although it might be necessary for the facility to amend its permit application."

Interim status is not a permit, and consequently has not undergone the riggers of the public permitting process. The EPA's proposal circumvents this process and will accelerate disposal activities when no valid permit is in place. This is a stupid idea.

Page 76. "In some cases, however, the facility's part B permit application might include an off-site waste prohibition. In this case, the facility owner should amend the permit application."

This proposal infers the States retain RCRA authority regarding federal facilities, yet the EPA has previously submitted that States will have no authority to impose off-site prohibitions. Are the States' RCRA authorities retained in whole, in part, or not at all?

Page 77. "DOD's preferred option...would be to set the point of generation of the waste at the point when it arrives at the receiving unit. In this case, the waste would have been generated on-site, and its management would not constitute a permit violation."

If the States are allowed to retain off-site prohibitions the DOD proffers to circumvent the intent of the States by distorting the meaning of 'on-site'. We strongly concur with the EPA's conclusion that the public and States' perception will be that "permit conditions are being circumvented." We believe the States should remain empowered in this process and agree the most consistent way to address this issues would be through site-specific permit modifications, rather than a national rulemaking.

Page 79. Stockpiled munitions. "DOD and the individual services have historically taken the position that munitions in the military stockpile only become waste when they are received at a treatment or disposal unit. ...DOD believes... (1) military munitions are fundamentally different from most other types of industrial hazardous waste...and (2) there are extensive (internal) management, oversight, and accountability controls already in place."

Exempting the DOD from compliance with existing RCRA law is completely contrary to Congress' intent in passing the FFCA. Congressman Scott Klug, on May 2, 1991 addressed the U.S. Congress in support of the Federal Facilities Compliance Act as a means to ensure the Federal facilities such as the Badger Army Ammunition Plant "would comply with existing waste disposal laws" and "give the states the right to levy fines and penalties against violators".

Congressman Klug emphasized, "...While U.S. statutes require federal agencies to obey national and state environmental laws, the Wisconsin Department of Natural Resources and the Environmental Protection Agency have limited power to force federal agencies to comply. Meanwhile, the longer we wait for the Army to act on its own to clean up the hazardous waste, the more widespread and dangerous the pollution becomes. ...This bill sends a strong message that the Federal Government's own operations are not above the law."

From the Congressional Record, Congressman Klug testified "...The State of Wisconsin, like States around the rest of this country, cannot do anything to force the Federal Government to clean up this site. It cannot even force the Federal Government to pay the same kind of fines it can force **private industry to do.**" See Attachment Q. *Congressman Scott Klug's Special Update on the Badger Army Ammunition Plant.*

Page 83. "Finally, the general safety of stockpiled chemical munitions is already the subject of considerable internal and external review. EPA, as a result, tentatively concludes that additional oversight under RCRA would not significantly increase protection of human health and the environment, while increasing the paperwork burden on the services and the workload burden of the regulatory agencies."

The community strong disagrees. See Attachment R. *International Citizens Declaration on Chemical Weapons.*

Page 84. Alternative based on the condition of munitions. "First, this approach would be inconsistent with EPA's approach to other "products". Commercial products do not automatically become solid waste when they can no longer be used for their intended purposes..."

One problem with this analogy is when it is applied to management of ranges where munitions are laying on the ground, exposed to the elements, deteriorating and contributing to soil, groundwater and surface water pollution. Other industrial "products" are not routinely "stored" in such a fashion.

Page 86. "Under the recommended approach, EPA would define off-specification, obsolete, or unusable munitions as hazardous waste".

As previously stated, the community is highly supportive of EPA determining these specifications.

Page 87. "EPA also notes that commenters did not provide evidence of human health or environmental damage resulting from non-RCRA storage of "obsolete" munitions, nor did it provide details on military "shell games" delaying proper treatment and disposal."

In the case of stored of chemical munitions, rapid and immediate destruction may not be in the best interest of human health and the environment, and concurrently storage may allow time for the research, development, and implementation of safer, alternative technologies. In the case of 'conventional' munitions, the storage of 1,000,000 pounds of nitrocellulose fines at Badger Army Ammunition Plant has been the community's preference in contrast to a proposal to mix this waste with a petroleum product and burn it. In this case, the community believes the risk to workers and residents from storage is considerably less than incineration.

Page 89. Range management. "...in many cases the extent of damage has been the subject of considerable disagreement." Page 90. "At the same time, however, military ranges have clearly been associated with numerous environmental or safety concerns. Although it recognizes these

concerns, EPA is not proposing in today's rule to regulate military firing ranges activities under RCRA."

Wisconsin's Fort McCoy, a massive 93 square mile training ground for active and reserve military personnel, occupies more than 50 percent of the Upper LaCrosse River watershed. Most streams in this watershed are contained within the fort's boundaries and all are partially or wholly classified as trout streams. Of the stream miles in this watershed, 22 percent are Class I trout waters and thus classified and protected as exceptional water resources under the state's antidegradation policy. Citizens report water quality impacts and associated decline in fish populations or habitat are the result of training activities, bombing or shelling in the North Impact Area of the military reservation, historic solid waste management units, and other military activities. (Source: *July 1993 Bad Axe-LaCrosse Water Quality Management Plan, July 1993 published by the Wisconsin Department of Natural Resources.*)

According to the February 2, 1994 *Wisconsin State Journal*, "Shelling by explosives -- including those containing white phosphorus -- has transformed the wetlands surrounding the LaCrosse River into a cratered moonscape. Aerial photos...show the trout stream and its banks pocked by huge holes left by howitzer shells. Severe erosion of the river's fragile sandy bottom has ruined trout habitat and washed tons of sand downstream off base". See Attachment S. *LaCrosse River at Fort McCoy.*

Spotting charges in so-called 'dummy' bombs contain toxic substances such as red phosphorus, white phosphorus and titanium tetrachloride. In addition to fire hazards, burning red phosphorus emits toxic fumes of oxides of phosphorus and can react with reducing materials. White phosphorus is dangerously reactive in air and if inhaled can cause photophobia with myosis, dilation of pupils, retinal hemorrhage and congestion of the blood vessels. See Attachment T. *Dangerous properties of industrial materials.*

Ironically, the DOD suggests existing internal regulations and protocols are adequate; this environmental catastrophe is the legacy accomplished by military self-regulation. As recently as 1993 U.S. Army Garrison Fort McCoy violated federal regulations by open detonating hazardous waste without a RCRA permit. See Attachment U. *Complaint, Findings of Violation and Compliance Order U.S Army Garrison Fort McCoy.*

Page 91. "A requirement that all fired munitions be tracked would be impracticable. It would also be largely redundant with existing DOD requirements."

The DOD contradicts itself. In previous sections of the proposed rule, EPA has considered adopting existing DOD internal reports, procedures and protocols and enforce these same procedures as their own. Assuming internal DOD requirements are consistent between the Services and that these requirements have been determined to be at least as stringent as RCRA law, why does the EPA hesitate to apply the same reasoning here? Moreover, as the DOD acknowledges it is already tracking fired munitions, it follows, therefore, that concurrent external oversight of these activities will not prohibit these same activities.

As there is no language specifying internal DOD standards for this determination, it is impossible for the community to comment on this proposal. The EPA has deferred to

internal DOD procedures and has not indicated any external, independent review has been conducted or what the results of this review were. As the proposed amendment will apply to non-military personnel that presumably do not adhere to DOD guidance, it is impossible to know what the implications of this proposal are. Again, we question the legality of this proposed delegation of authority to DOD.

Page 91. "According to DOD, the Air Force is able to require routine clearance of bombing ranges, where relatively limited numbers of unexploded munitions will be found."

The Army acknowledges range clearance may have the effect of waste reduction as cleanup of a large number of rounds is prohibitive while restricted bombing is, by their own admission, more conducive to cleanup, accountability and environmental protection.

Page 91. "This is particularly the case since many of the concerns addressed by commenters are already addressed under other independent authorities (e.g., DOD and the services must comply with the Endangered Species Act...)

At facilities like Fort McCoy, Wisconsin the presence of the endangered Karner Blue butterfly has not diminished firing range activities, in fact the past few years have seen a dramatic increase bombing and habitat destruction. Habitat continues to be destroyed on a daily basis; mission-driven activities trample wild lupines and other species that sustain the Karner Blue.

Page 92. "As discussed earlier in this preamble, the proposal also contains a sunset provision; munitions left in place at closed or transferred ranges would no longer be subject to RCRA cleanup authorities once DOD promulgates, pursuant to DOD's own statutory authorities, regulations governing cleanup of ranges."

As there is no description of the internal DOD standards for this determination, it is impossible for the community to comment on this proposal. The EPA has deferred to internal DOD procedures and has not indicated any external, independent review has been conducted or what the results of this review were. As the proposed amendment will apply to non-military personnel that presumably do not adhere to DOD guidance, it is impossible to know what the implications of this proposal are. There is also broad inconsistency between the Services within the DOD itself; it is, therefore, impossible for the community or the Agency to know what the implications of this proposal are. Again, we question the legality of this proposed delegation of authority to DOD.

Page 93. "EPA solicits comments on the need for "post closure" controls under RCRA to address these situations where property remains under Federal ownership. Comments should address the legal basis for such controls under RCRA; their need, given current controls (including current DOD regulations and practices); the level of controls that would be appropriate; and the regulatory burden of such controls, both on DOD and regulatory agencies."

The community cannot comment on current DOD regulations as they are not part of this rule. The community is however, aware of the potential and real contamination that threatens human health and the environment under existing practices, which clearly

demand EPA and State regulatory oversight. The global menace and proliferation of abandoned land mines, for instance, is propelled by both the prohibitive cost of removal (\$300 to \$1,000 a mine) and the low cost of purchase (often less than \$20). With no accountability to the communities or to regulatory oversight, the proliferation of land mines amounts to "a modern, man-made plague upon civilization". See *Attachment V. The global menace of land mines left over from a long list of wars.*

Page 94. "EPA also sees the benefit of a uniform nationwide system for managing waste military munitions given DOD's national defense mission, nationwide presence and logistical and operational needs. ...Indeed, EPA believes Congress' intent in passing RCRA ss3004 (y) was to establish a clearer, uniform national system for regulating military munitions."

The DOD is demanding of the State and the EPA a uniformity that it does not maintain within its own structure; the internal procedures and practices within each of the DOD Services are unique and yet the national mission is still accomplished. To further deduce the intent of the FFCA was to relinquish and crush State authority is a clear distortion of Congressional intent; Wisconsin's Congressman Klug has testified "the Federal Government should be a model for the cleanup of hazardous waste sites around the country, and instead we find it is a model for the that sites should not be cleaned up".

Moreover, multi-state trade/operations are not unique to the military. The intent of the FFCA was to ensure federal facilities were held equally accountable, and that they should, conversely, not be exempted from industry standards. Hazardous waste is hazardous waste; if the community is exposed or placed at risk, the human health and environmental consequences are identical.

George E. Meyer, Secretary of Wisconsin's Department of Natural Resources describes the distinct disadvantages of strict equivalency. "Federal standards provide the absolute minimum or lowest common denominator in environmental standards. For example, federal federal regulations governing municipal solid waste facilities are generic and wide viewed as not protective of groundwater. Federal standards do not allow flexibility to meet specific Wisconsin needs related to topography, climate, socio-economic conditions, citizen expectations, or the need of business and agriculture." See *Attachment W. Conformity of Wisconsin's environmental quality standards with Federal standards.*

Page 95. "Section 3009 of RCRA allows States to impose standards that are more stringent than those in the Federal program."

Proposals to terminate or restrict State authority appear to contradict this existing law.

Page 97. "Many of the requirements in today's rule, in EPA's view, are neither more nor less stringent than current regulatory requirements applicable to other materials."

We sharply disagree. The impact will be non-compliance with all other Wisconsin standards for air, water, soils and groundwater. The proposed rule is completely inconsistent with existing State standards which have been based on recommendations

from the Wisconsin Division of Health, which in turn are based exclusively on human health and are not subject to political agendas.

The community is also concerned other industry could legally challenge EPA, particularly those industries that practice interstate transport of hazardous materials and/or are national in scope, and vie for the same exemptions the military is requesting.

Page 100. "This section provides that Federal agencies "shall be subject to, and comply with, all Federal, State, interstate, and local requirements...respecting control and abatement of solid waste or hazardous waste disposal and management in the same manner, and to the same extent, as any person is subject to under such requirements. (42 USC 6961)"

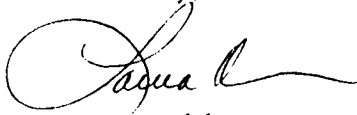
Page 100. "Interested parties, including both DOD and the States, are asked to comment on the approaches and to address such issues as the potential for discrimination against the Federal government; the extent to which the military munitions rule would or could apply to non-Federal entities or to entities whose costs of compliance would not ultimately be borne by the Federal government; the policy consideration raised by the dangers of military munitions and the operational need of the Military Services; and the practical implementation issues that both approaches would raise."

The Army's logic appears to run in circles. The DOD previously argued it should be exempted from external oversight because its mission is unique; this proposal suggests exemption is discriminatory. This rationale is invalid and contrary to the intent of the rulemaking and the FFCA which is to hold the military accountable to the same regulatory standards as private industry, in order to afford soldiers and communities optimal protection from military toxics.

"All communities and persons across this Nation should live in a safe and healthful environment." With these words, President Clinton issued Executive Order 12898 on February 11, 1994 to establish environmental justice as a national priority. There is no evidence the USPEA has initiated outreach to people of color and low-income populations during this rule-making process and consistent with the 1994 Executive Order. *See Attachment X.*

The environmental legacy of the federal government's mission-oriented activities is felt in communities throughout the country. We join these communities, including the Military Toxics Project Conventional Munitions Network, in charging the USEPA with providing a munitions rule which will prevent the unnecessary tragedies we have suffered.

Sincerely,



Laura Olah
Executive Director

COPY

Merrill, WI
E13148 Lower
Eleanor Gilm

News Republic

50¢ South Central Wisconsin News: News-Republic edition

Serving Sauk County's needs© Vol. 1

BAAP official acknowledges mistake made

By Mike Marquardt
News-Republic Writer

BADGER—Allegations of mishandling information arose in a Badger Environmental Work Group meeting at Badger Army Ammunition Plant Thursday.

Laura Olah of Citizens for Safe Water Around Badger (SWAB) said groundwater sampling results were mishandled by Badger officials, allowing the wrong information to be sent to a homeowner northeast of BAAP while the correct information was sent to a library repository.

A chart containing several mistakes was sent to a homeowner, who asked not to be named, according to Olah. One of those mistakes included test results stating there were low or undetectable levels of nitrates in their groundwater. While a Jan. 25, 1989 nitrate test the homeowner received gave no nitrate level, the information sent to the library read 29 milligrams per liter.

A May 18, 1989 test on the library copy read 50 milligrams per

liter, with other nitrate tests reading below 10 milligrams per liter. The monitoring wells in that northeast area have been tested quarterly since February 1988.

Olah said the failure of BAAP to contact this homeowner immediately after seeing these test results was negligent. Nitrates are health dangers to pregnant women and young children, she said.

David Fordham, commander's representative at BAAP, said the mistake indicated a lack of diligence in making this information available to homeowners. He said the correct information for this homeowner's well has been available, although in a different form, in the library since January.

"I should have been more diligent in calling when we received an unusual result," he said.

Fordham said the four homes northeast of the plant that have been tested since 1988 are not being tested in conjunction with the contamination plume that has been

BADGER

turn to page 2



Back to the Future

Sauk Prairie Middle School teachers John Slaney and Jean Yanke did when they were in school for grandparents/par

Merrill, WI
E13148 Lower
Eleanor Gilm

high-tech life-prolonging procedures. The law also allows for a change of physician if the healthcare agent objects to the physician's opinion regarding medical treatment, Lyons said.

"(The law) should've been tied more to terminal illness and that it made some distinction between simpler procedures and some of the high-tech, pro-long life procedures everyone's concerned about," Lyons said.

Wisconsin Right to Life thinks education is the key to alert people to the potential dangers of Durable Power of Attorney.

"We're concerned about the individual that signs one that does not recognize the broad, sweeping powers this third party is given," Lyons said.

She advised, "If they are inclined to sign it, they should be much more specific about what kinds of treatment they may or may not want rather than just granting this broad, sweeping power."

The Russian parliament, headed by Yeltsin, vowed to push ahead with a more radical plan to switch to a free market in 500 days, starting Nov. 1.

Since then, Gorbachev's national

consolidation of society and the country's exit from the crisis."

He told the lawmakers he would replace some military and government officials who were blocking his economic reforms.

Badger

from page one

identified south of the plant. He said it has been determined that groundwater problems northeast of the plant are not coming from Badger.

Dave Egan of the Environmental Protection Agency (EPA) said he is taking steps to see this type of mistake will not happen again. He said he will now receive copies of the raw data Badger receives from its contracted laboratories at the same time Badger does. This will allow him to check results and make them more readily available to homeowners.

Egan also explained that the high nitrate figures for the two quarterly tests are misleading. He said the figures should have been divided by

4.04 in order to reflect the nitrate level in correlation with the public health standard.

Fordham said he has a personal commitment to protecting public health and has made all that is done in the program open to the public. He said there has been no attempt to cover up information.

"If there was an attempt to cover up (by Olin Corp. or Badger), sending it to the library is not the way to do it," he said.

Egan said in examining this situation, he saw no reason for suspicion of covering up information.

"I have no reason to think it was anymore than an oversight," he said.

Olah said she was not accusing Badger or Olin of a cover up. Changes need to be made in the system of relaying data to homeowners so it occurs more quickly and eliminates mistakes like this.

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from page

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STATE OF WISCONSIN
DEPARTMENT OF JUSTICE

Attachment C.

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Wisconsin Public Intervenor
Phone 608/266-8985
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November 10, 1994

Mr. Mike Netzer
Solid and Hazardous Waste Bureau
Department of Natural Resources
Post Office Box 7921
Madison, Wisconsin 53707-7921

Re: Badger Army Ammunition Plant--Olin Corporation Lab

Dear Mr. Netzer:

I am in receipt of a copy of an April 6, 1993, memorandum marked, "Personal File Memo" from you on the subject, "Events Involving Olin Laboratory Audit Concerns and Subsequent Meetings." In the memorandum you recount that you got "a call from Donalea Dinsmore, Audit Chemist, Office of Technical Services about a laboratory audit she had performed at the Olin Lab - primary laboratory contractor for Badger Army Ammunition Plant. Ms. Dinsmore indicated she had several concerns about the quality of analytical data Olin was producing based on a laboratory audit she had performed on November 19, 1991." You "indicated that I considered this a very serious situation" (emphasis in original) for several reasons:

I also noted that it was a serious situation because one recently submitted (March 31, 1993) groundwater monitoring summary report had used Olin's data and another major report being prepared by ABB - Final RI/FS report - that was also going to be using the Olin data - at my direction I added. I indicated that the Department needed this issue cleared up quickly. . . . (emphasis in original)

You also recount a meeting with the auditor, Ms. Dinsmore, in which

She said "analyses performed before February, 1992, is indefensible" but that analyses performed after that date could probably be validated with a sizable effort on Olin's part because at that time Olin changed their analytical techniques.

Mr. Mike Netzer
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You repeatedly recount the seriousness and importance of this problem, "since so many people, agencies and consulting firms were potentially affected by Olin's [sic] potential problems, including myself and the agency I worked for. . . ." Olin is and has been the Army's contractor for running the BAAP plant, and is a current PRP operator at the plant. Olin is not a disinterested party with respect to the contamination and potential liability at the plant. To your credit, you took actions recounted in the memo to correct the situation indicating "that the Department needed this issue cleared up quickly."

We compliment you for your action on the particular matter recounted in your memorandum. However, there are remaining serious questions and concerns that need to be addressed.

First, we would appreciate knowing whether the analyses performed after February, 1992, were indeed "validated with a sizable effort on Olin's part" as suggested in the memorandum. If so, precisely what constituted the "sizable effort" that was needed and performed in order to validate the data in question? Please briefly accompany this explanation with a description of the analyses in question. We are interested in knowing the importance and significance of the information sought by the analyses described with regard to the environmental contamination situation at BAAP.

Second, we would appreciate a brief explanation of what was done to correct the "very serious situation" described in the memorandum. We would also appreciate a brief explanation of the limitations that might hamper efforts to assure that past data submitted by potentially responsible parties is reliable.

Third, we wish to raise the most serious point of our letter. That is, the need not only to assure that proper testing and analyses are performed to create reliable data, but also to assure the credibility of that data in the eyes of all concerned, including the public.

In your memorandum you recount that you and Ms. Dinsmore "had another discussion with her about the possibility of not allowing BAAP to use the Olin lab until all of the past data could be verified and all of the concerns contained in Donalea's letter to Olin were satisfied." The question we raise here is whether the DNR should continue to allow BAAP to use the Olin Lab given the serious questions raised about both its capability to do quality work as well as its credibility even if it is claimed they are now capable of doing quality work.

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Apparently, this is not the first time the Department has questioned Olin's or BAAP's contractor's testing results. In 1990 was the so-called MetaTrace scandal. According to a September 1990 report, MetaTrace was the contractor retained by BAAP to perform analyses of soil and groundwater samples associated with contamination at BAAP. MetaTrace reportedly was suspended from performing any work at or for BAAP because of EPA and US Justice Department investigations into alleged alteration of dates on samples and improper instrument calibration, which called data into question. As a result, the remedial investigation at BAAP reportedly was delayed. BAAP officials were reported as concluding in an August 1991 news account, "apparently MetaTRACE doctored the books on everything they did on quality control." In September 1990, BAAP reportedly hired a new firm to conduct the remedial investigation "to reinforce the decisions being made to ensure public health and safety."

We are informed that a February 18, 1991, DNR correspondence confirmed problems with Badger's (including Olin's) handling of groundwater monitoring and reporting, stating, ". . . we are not satisfied with BAAP's performance on groundwater monitoring. We will be working with the USEPA and the Army to address these issues so that groundwater is properly sampled, tested and reported in a more timely fashion" Olin conducted groundwater monitoring for BAAP at that time.

As you know, the citizen watchdog group CSWAB has questioned both the reliability and credibility of BAAP and Olin. In light of the above, there appears to be good reason for skepticism. CSWAB alleges further that drinking water test results in the past were mishandled allowing the wrong information to be sent to a homeowner, while the correct information was sent to a library repository, and that both BAAP and Olin failed to contact homeowners or conduct immediate testing after elevated levels of contaminants were found in groundwater. A February 7, 1994, Department of Health and Social Services correspondence iterates, "The Health Assessment states, 'current contaminant levels indicate that a small number of families living within the boundaries of the current plume may have slightly increased cancer risks.'"

Given the events recounted in your memorandum, as well as the continuing controversy that swirls around the validity, reliability and credibility of the analyses and data produced by BAAP and Olin, it is our view that it would be in the best interests of all concerned, including BAAP, Olin Corporation, DNR, CSWAB and the public for you to implement your consideration of "not allowing BAAP to use the Olin Lab."

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The issue is no longer a matter of Olin's technical capability to do the work. Given the history and the legitimate questions that have been raised about the analyses conducted by Olin, we question whether the public can reasonably be expected to believe data submitted by Olin even after more claims and assurances are made that the numerous uncovered problems have been corrected. In our view, reasonable doubt will persist concerning the credibility of data submitted by those whose credibility has been legitimately called into question by past actions.

Please consider also that neither BAAP, Olin nor the Department can afford another incident like the above. Another incident following this history and following requests for permanent corrective measures will only turn skepticism into cynicism about the process and the Department's capability to regulate the cleanup at the site. The Department's and BAAP's credibility following such an incident could be rendered irreparable. The continuing situation does not benefit anyone, and a further incident will only seriously set back the parties' efforts to clean up the environmental contamination at BAAP.

On the other hand, the appointment of a new and credible consultant to do the work can do much to help restore the credibility that is necessary to gain public support for the Department's and the PRP's efforts. The public, the DNR, BAAP, and EPA are reliant on not only the technical capability of BAAP's contractors to conduct proper analysis and produce reliable data, but to do it believably. All of the parties deserve someone they can believe, who is beyond reproach, and who has a proven record and reputation of producing high quality work.

Given the on-going, recurrent questions regarding the credibility of Olin's data, the community appears to have little reason for believing that currently exposed problems will not persist. Again, whether or not claims and assurances are made that the technical analytical questions have been adequately addressed, the credibility of environmental work conducted at BAAP appears to have been irreversibly marred and will always operate under a shadow of reasonable doubt and suspicion.

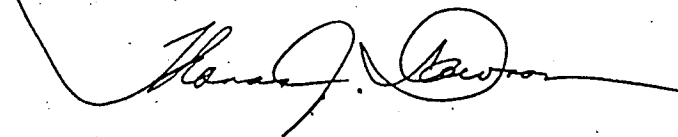
We urge you, BAAP, and Olin Corporation to remove the pall over the analytical work that needs to be done, restore public confidence in the process, and to work with all concerned in identifying and retaining an independent top-notch firm to conduct and submit the necessary data that will be crucial to restoring the environment and assuring the protection of the resource and public water supplies, as well as the health of the public.

Mr. Mike Netzer
November 10, 1994
Page 5

Once again, we appreciate the level of concern you demonstrated in this matter. We hope you will accept our recommendation in the spirit of our sharing that concern.

Thank you very much for your consideration.

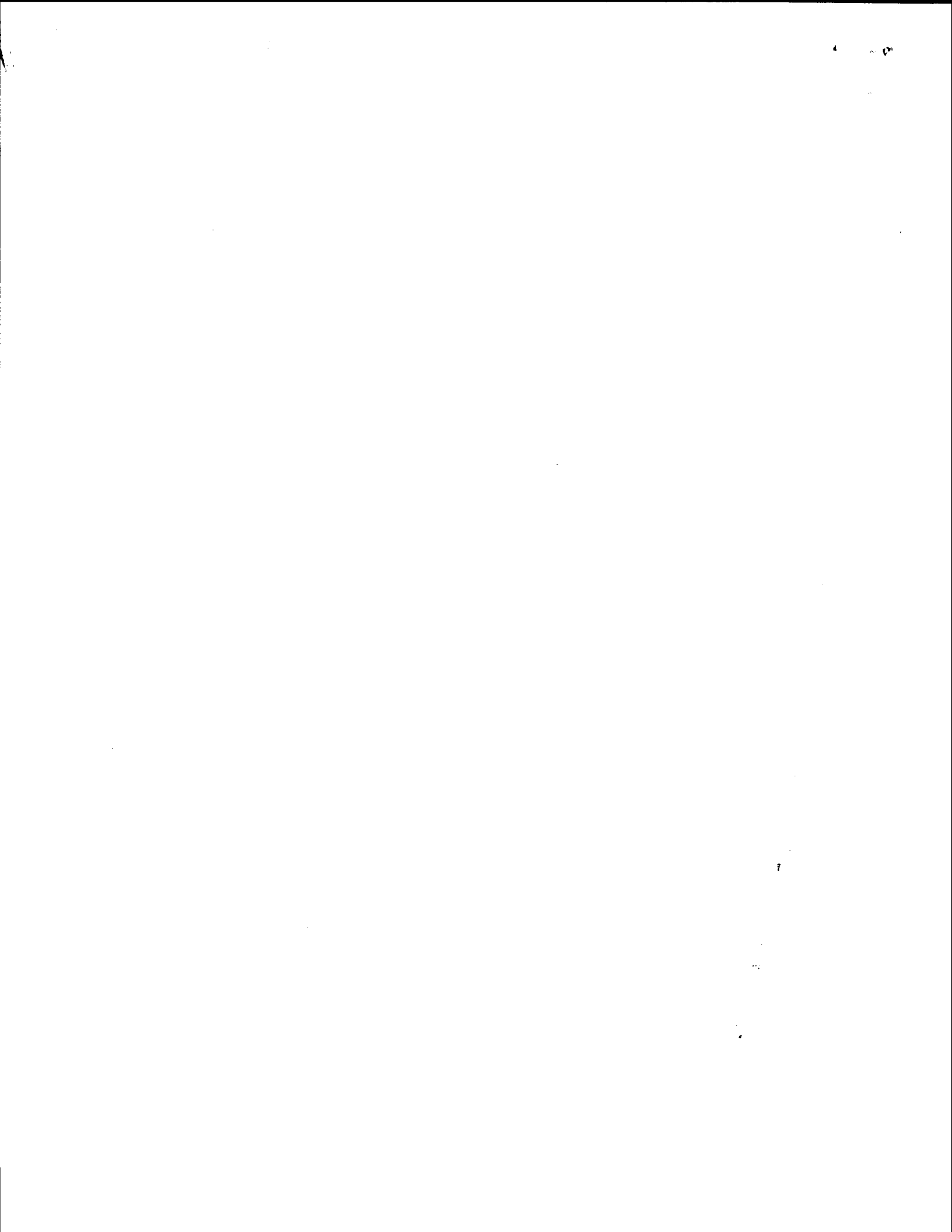
Sincerely,

A handwritten signature in cursive script, appearing to read "Thomas J. Dawson", written in black ink. The signature is fluid and includes a large circular flourish at the end.

Thomas J. Dawson
Wisconsin Public Intervenor

cc: DNR Secretary George Meyer
David Fordham
Jim Mattei

TJD:lsc



NewsRepublic

Local athletes going to state track

Sports, Page 10

Baraboo, Wisconsin

VOL. 136, NO. 133

Red cloud over BAAP from acid spill

By Lee Klestinski
NewsRepublic Writer
BARABOO — A farmer said he saw a red cloud or plume high above the Badger Army Ammunition Plant Wednesday afternoon following the spill of 20 gallons of nitric acid at the plant around 4:45 p.m.

According to Jack Coyle, who is filling in for commander's representative of the plant Dave Fordham in his absence, the cloud was the result of a chemical reaction between the nitric acid and the coating on the floor of the building in which the acid was released.

The acid was spilled on the floor of the building and was released by the build-

ing's fans when the fumes were let out of the tank which held the acid. The acid was spilled in the acid concentrator building, constructed to contain liquid acids, while testing the new facility.

Nitric oxide fumes from the spilled acid were then released into the air. Ron Lins of the town of Prairie du Sac was working on his farm south of BAAP when the cloud caught his attention.

"It wasn't gigantic but it was a fair amount," Lins said. "The color was different than smoke."

Lins lives one mile from the plant's fence. He estimated that he was about three miles away from the cloud.

According to a press release from officials at the plant, "there were no injuries

to the workforce and there was no danger to public health."

Deputy Director of the Sauk County Emergency Government, Corene Ederer-Sklar, observed clean up efforts at the plant Thursday morning.

"I am very satisfied with action taken. The situation is well in hand," she said. "They notified all the proper authorities. They have a good safety system in place."

The press release also stated that "hazardous material response personnel quickly controlled the situations and initiated clean-up operations. The cause of the failure is being investigated."

According to Coyle, no further problems are expected as a result of the inci-

dent. Damage to equipment was minimal and operations are expected to resume shortly.

Plant Commander Lt. Col. Rick Jackson, who is based at the Sunflower Army Ammunition Plant in DeSoto, Kansas, is also pleased with the response of the staff at the plant.

Jackson explained that the plant is attempting to modernize acid facilities at the plant. They have been working at upgrading sulfuric and nitric acid concentrators.

"The objective is to prove the facility and make sure operations remain safe."

SPILL

please turn to page 2

Spill

from page 1

Jackson said. The acids are used in the production of explosives, he said, and are necessary chemicals in the production of propellants.

SWAB (Safe Water Around Badger) president Laura Olah is con-

cerned about the spill and the cloud which drifted northwest of the plant and dissipated.

"The plant is currently inactive. Is this an indication of what to expect when they become active?" Olah said. "This incident just supports our call for the closure of the plant."

"How many more spills is it going to take before people say enough is enough?" Olah added.

Jackson called the incident a "setback" in relations with the area residents.

"I understand the concerns of the residents around Badger. We are trying to fix things and make things better," Jackson said.

U.S. Congressman Scott Klug's office was notified of the spill and the reaction. Klug has been active in the clean up efforts at the plant.

Attachment D.

Wisconsin Division of Health
Investigation of Cancer Mortality
for Communities near the
Badger Army Ammunition Plant

To respond to public concern about cancer in the area surrounding the Badger Army Ammunition Plant, the Division of Health conducted a cancer cluster investigation. The investigation included identifying the area, years, and cancers appropriate for study. Once these were identified, the Division of Health conducted a cancer mortality analysis for the Badger area for the years 1960-88. From this investigation and our analyses we conclude:

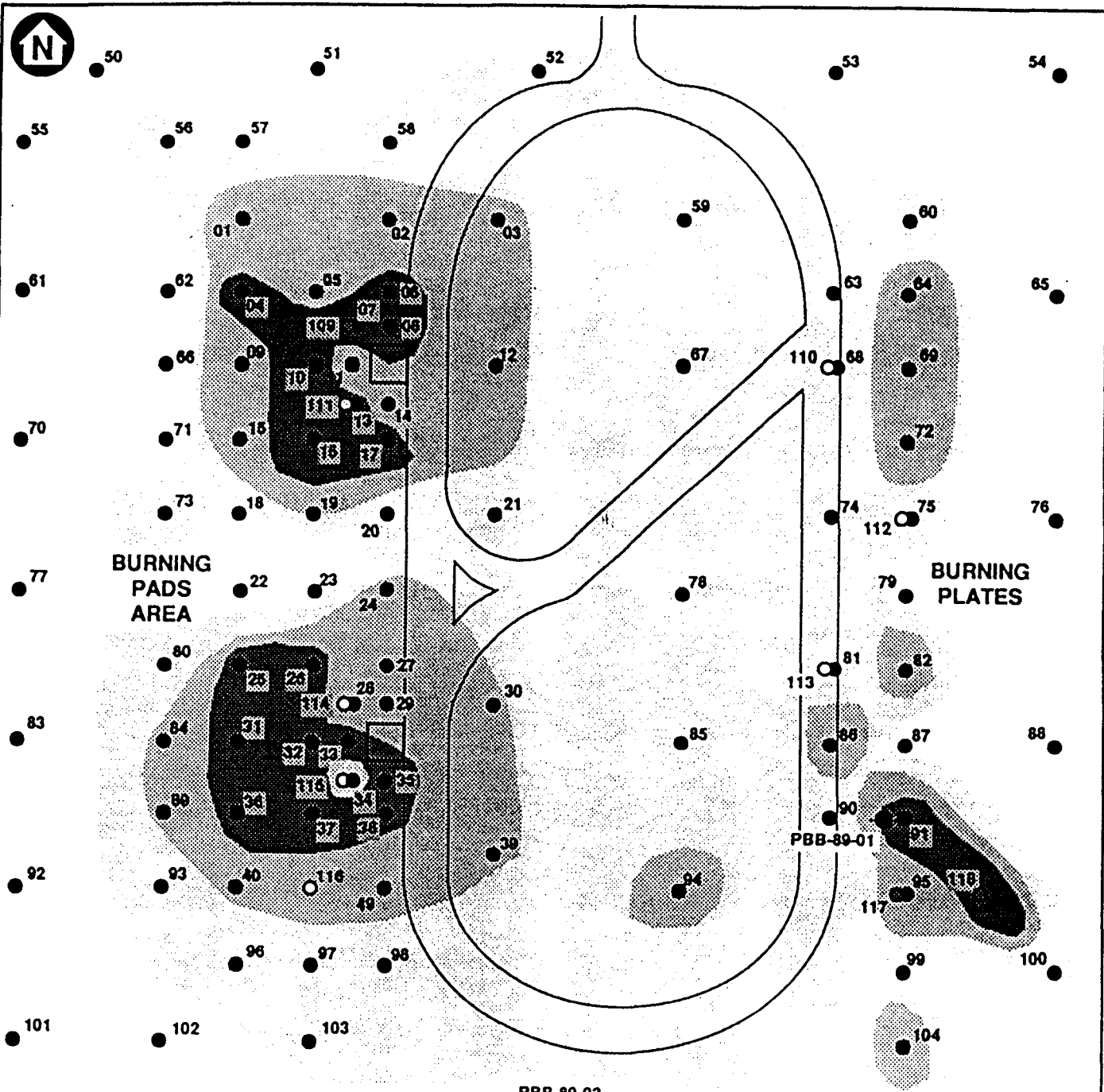
- 1. The townships in which current groundwater contamination has been detected (Sumpter and Prairie du Sac) have not experienced a significantly higher than expected number of liver or kidney cancer deaths during 1980-88. These are the cancer sites that are most biologically plausible given possible exposure to carbon tetrachloride and chloroform.*
- 2. Overall, the Badger area did not experience a significantly higher than expected number of cancer deaths for select cancer sites for the years 1960-88. This area included the Townships of Sumpter, Prairie du Sac, and Merrimac, and the Villages of Prairie du Sac, Merrimac, and Sauk City. The cancers included in this analysis were: brain and other central nervous system cancers, leukemias, non-Hodgkin's lymphomas, kidney (and ureter), liver, lung (including trachea and bronchus), colon, rectum, bladder, thyroid, and breast.*
- 3. The female breast cancer mortality rate for the Badger area was significantly lower than expected during the years 1960-88.*
- 4. The Badger area has not experienced a significantly higher than expected number of deaths for any of the selected cancer sites during 1960-69 and 1970-79. During 1980-88 there was a significantly higher than expected number of male kidney/ureter cancer and female non-Hodgkin's lymphoma deaths. Of the 13 kidney cancer and non-Hodgkin's lymphoma cases, only 4 resided in the townships where current private well contamination has been identified. Three of these 4 cases were non-Hodgkin's lymphoma. There is no evidence in the toxicological literature that associates non-Hodgkin's lymphomas with carbon tetrachloride or chloroform.*

The Division of Health will continue to monitor the cancer rate for those communities near the Badger Army Ammunition Plant where exposure to groundwater contamination has been identified or is identified in the future. This cancer monitoring will focus on those cancer sites most likely to be associated with ingestion exposure to the chemicals identified as well as non-Hodgkin's lymphoma. Cancer rate analysis will be conducted approximately every five years to allow sufficient information for meaningful interpretation. If health care providers in the area note a significant increase in cancer rates between these five year periods, an investigation will then be initiated.

Poison, Yb

Poison

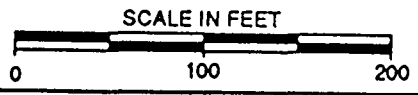
"Gunning for Lead" (Continuum, *Omni* 12/3:44, December 1989). Police trainees, competitive shooters and others who spend an hour or more a week at an indoor firing range are at high risk for lead poisoning, a recent study indicates. Lead from bullets pollutes dust in the air, which shooters inhale. Blood lead levels were measured in 17 police recruits who had spent up to an hour every four days firing pistols at an indoor range. Fifteen had lead levels well beyond what is considered safe. Though none complained of serious problems, the recruits were at high risk for lead poisoning's symptoms: slowing of reaction time, loss of coordination and damage to the central nervous system. Firing range operators could get the lead out by improving ventilation and by requiring the use of bullets "jacketed" with copper. ■



CONCENTRATIONS (µg/g)	
	>1,000
	100 to 999
	30 to 99.9
	BACKGROUND

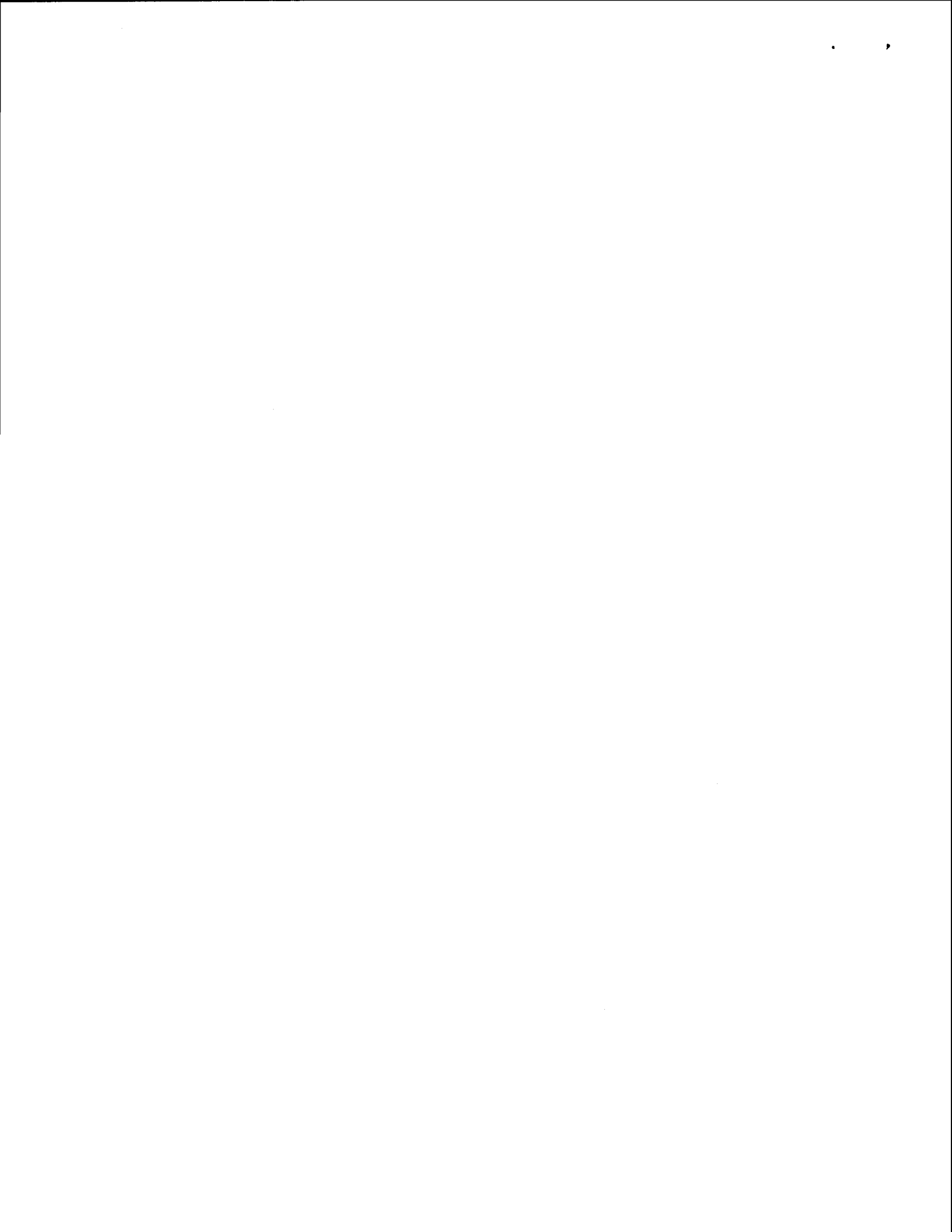
LEGEND

- SURFACE SOIL SAMPLE LOCATION (PBS-91-01)
- SUBSURFACE SOIL SAMPLE LOCATION (PBS-91-109)
- ⊙ SOIL BORING LOCATION (PBB-89-01)
- APPROXIMATE SIZE OF CONCRETE BURNING PADS



NOTES:
 1. SEE REMEDIAL INVESTIGATION REPORT FOR CHEMICAL DATA SUMMARY (ABB-ES, 1993a).
 2. SAMPLE LOCATIONS 41-48 ARE LOCATED OFF THE GRID IN THE CONTAMINATED WASTE AREA.
 SOURCE: MODIFIED FROM FIGURE 4-12 OF TSAI ET AL., 1988.

**FIGURE 3-9
 INTERPRETIVE PB DISTRIBUTION
 IN SURFACE SOILS
 AT THE RACETRACK AREA
 PROPELLANT BURNING GROUND
 FEASIBILITY STUDY
 BADGER ARMY AMMUNITION PLANT
 ABB Environmental Services, Inc.**



THE OPEN BURNING ISSUE: **CANCELLED**

A few years ago residents of north-west Cape Cod, Massachusetts (the Upper Cape), discovered that their area had elevated rates of some types of cancer, and they convinced the Commonwealth of Massachusetts to conduct a study. The state commissioned Boston University Professor David Ozonoff to perform an epidemiological study to determine whether local environmental contamination was a factor in the cancer rate.

The area hosts the 21,000-acre Massachusetts Military Reservation, including the Camp Edwards Army National Guard Base and the former Otis Air Force Base. The area is also a fragile ecosystem, located over a sole-source aquifer.

Over the years groundwater in the area has been contaminated with carcinogens such as trichloroethylene (TCE), perchloroethylene (PCE), and other volatile organic compounds. The full extent has not yet been mapped, but the Army has had to provide alternate water supplies in areas where well water is now unsafe. In addition, the Army has routinely burned artillery propellant bags, containing 2,4-dinitrotoluene (DNT), another probable cancer-causing substance, during on-site training.

The Boston University study found an approximate two-fold increase in the risk of brain cancer among Upper Cape residents who consumed public water, compared to similar populations elsewhere. There was a

fairly strong relative risk of brain cancer for people who lived near the Air Force runways or the Barnstable County airport. There also appeared to be a link between leukemia and perchloroethylene (PCE) in the water distribution system.

Most important, Ozonoff found a dose response relationship between residence proximity to the artillery training area, where the propellant bags are torched, and the risk of lung and breast cancer. He concluded that persons who had lived for a long time within two kilometers of the artillery sites had a significantly elevated lung cancer rate.

The Greater Boston chapter of Physicians for Social Responsibility (GBPSR), working with the Association for the Preservation of Cape Cod and the National Toxics Campaign Fund, is attempting to permanently halt the practice. We and our allies have repeatedly forced back the Army's proposed date to resume burning 2,4-DNT.

In response to public pressure, the Army and the Massachusetts Department of Environmental Protection and Public Health designed a study in which large, measured quantities of propellant were to be burned openly to determine the dose received by the local population. However, the study would have exposed large numbers of people to additional contamination while adding little to the understanding of

the risks. The Alliance for Base Cleanup asked the Department of Environmental Protection to hold a public meeting to discuss the open burning and the proposed study.

At the meeting, attended by more than two hundred citizens, GBPSR warned that the public near Camp Edwards would be used as experimental subjects without their informed consent. In reporting the meeting, the *Boston Globe* told of another type of combustion, a "firestorm of public opposition." The Department has since decided to delay further burning while officials reconsider their options.

The regional director of the Federal EPA has stated that his agency considers the burning of excess 2,4-DNT an Army training activity, not hazardous waste disposal subject to RCRA (the Resource Conservation and Recovery Act). It is important, in the implementation of the just passed Federal Facilities Compliance Act, that such wastes be regulated like other hazardous wastes.

GBPSR believes that the Boston University study was limited by the size of the affected population. So it identified another site with a history of propellant burning, the Dugway Proving Ground in Tooele County, Utah. GBPSR has already discovered that Tooele has a significantly higher lung cancer rate than the rest of Utah.

Jefferson Dickey, MD, Greater Boston Physicians for Social Responsibility, 60 Atherton St., Somerville, MA 02143 • 617/625-7624.

National Toxics Campaign Fund
Military Toxics Project
1168 Commonwealth Avenue
Boston, MA 02134-4634



grassroots action
to prevent pollution



a member of Earth Share.

Laura Olah
CSWAB
E12629 Weigands Bay So.
Merrimac, WI 53561

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3-7-92

Cancer fear leads base to stop shelling

By GWENN FRISS
STAFF WRITER

CAMP EDWARDS — Although battlefield practice resumes at the Upper Cape military base this weekend, the artillery shells suspected of causing cancer will remain idle for the time being.

In artillery training, soldiers use a specified number of bags of propellant — the explosive charge that hurls the shell — then burn the rest as they would on the battlefield to keep it out of enemy hands.

Protested by the Upper Cape Concerned Citizens activist group for several years, the practice drew wide attention in January when Boston University's cancer study showed an increased risk of lung and breast cancer for people living near gun positions. The BU researchers recommended that propellant bags containing the cancer-causing chemical 2,4-dinitrotoluene not be burned near populated areas.

Earlier this month, the Association for the Preservation of Cape Cod and the Barnstable Assembly of Delegates called for a ban pend-

ing further study of the health risks.

National Guard and state officials said yesterday artillery use will be halted until later this spring when an air quality test will determine what goes into the air when propellant bags are burned.

Richard Hugus, a member of the Falmouth Alliance for Base Cleanup, said, "We don't need more studies. They should just put a stop to it."

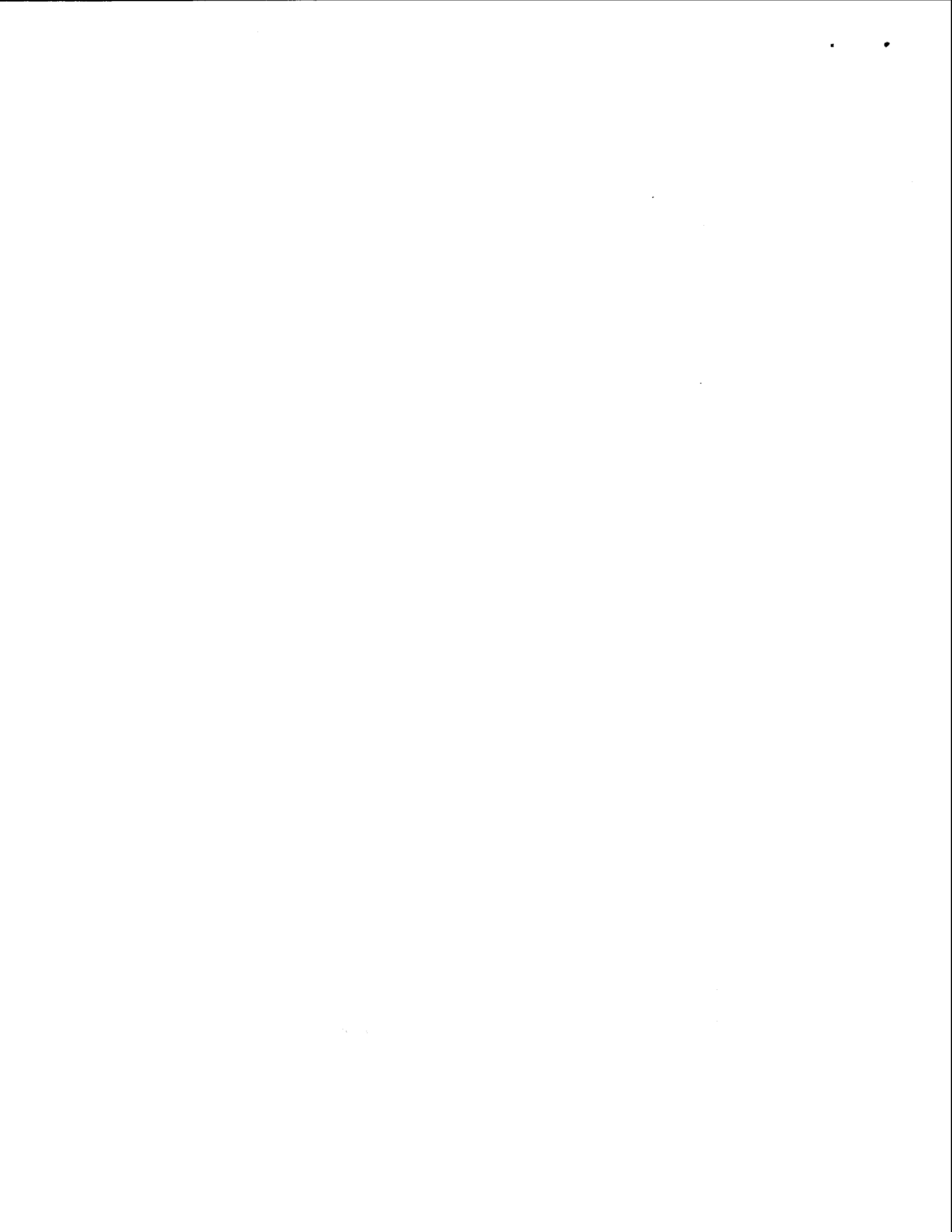
In the meantime, mortars will be fired.

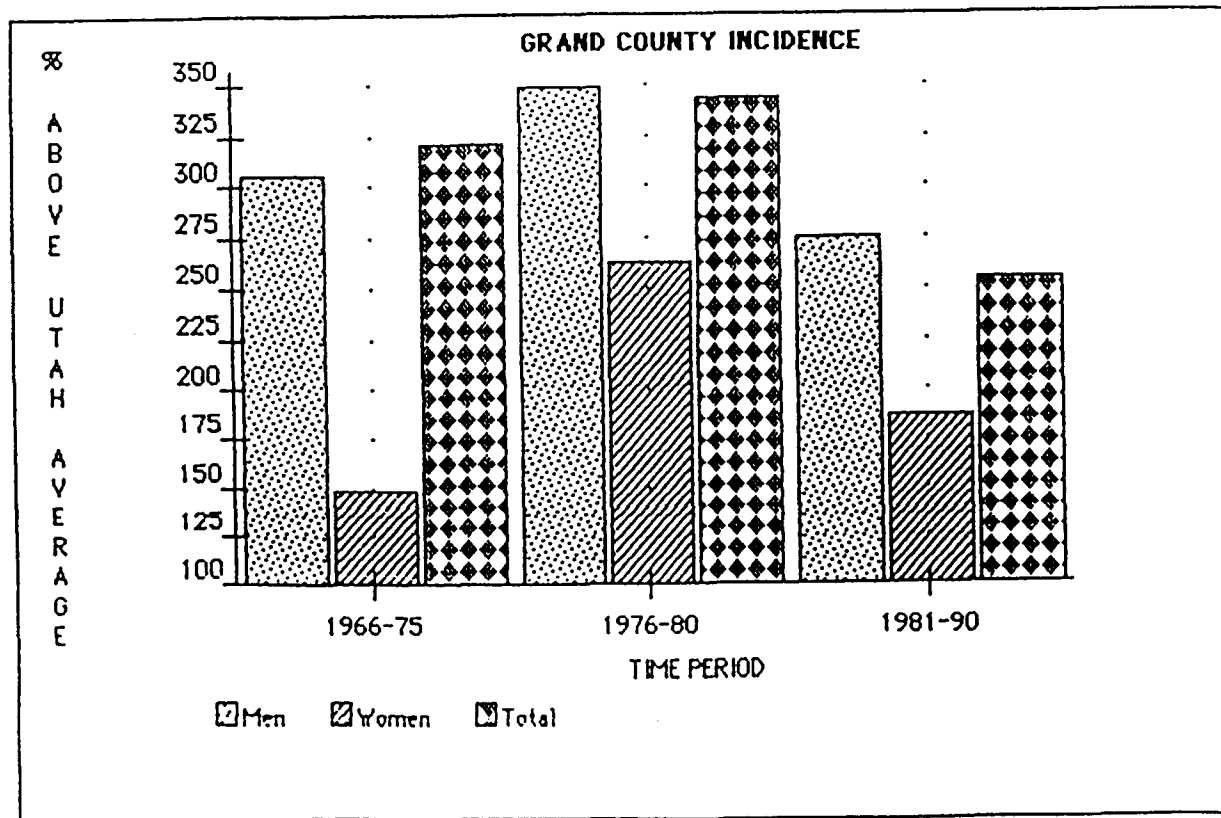
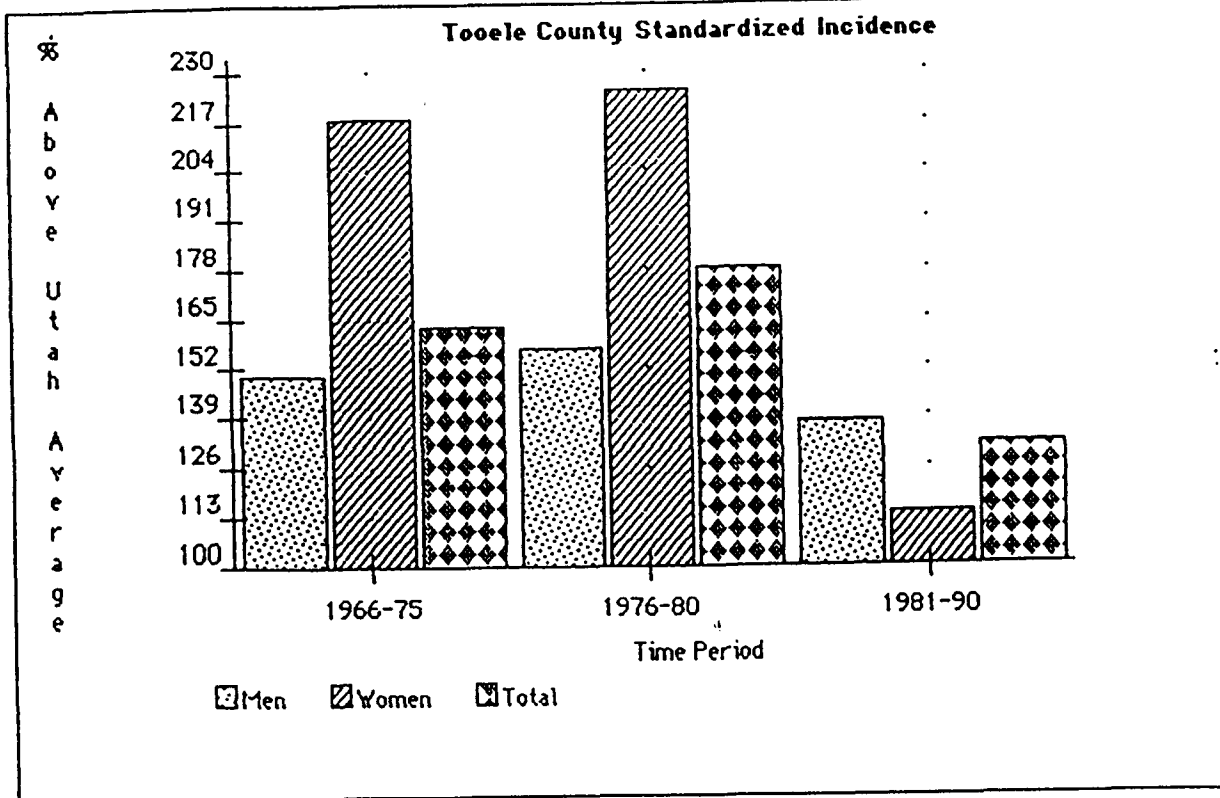
"Our concern is not as great, because mortar propellant does not contain 2,4-DNT or any other known carcinogen we're aware of," said James Begley, an environmental engineer for the Massachusetts Department of Environmental Protection.

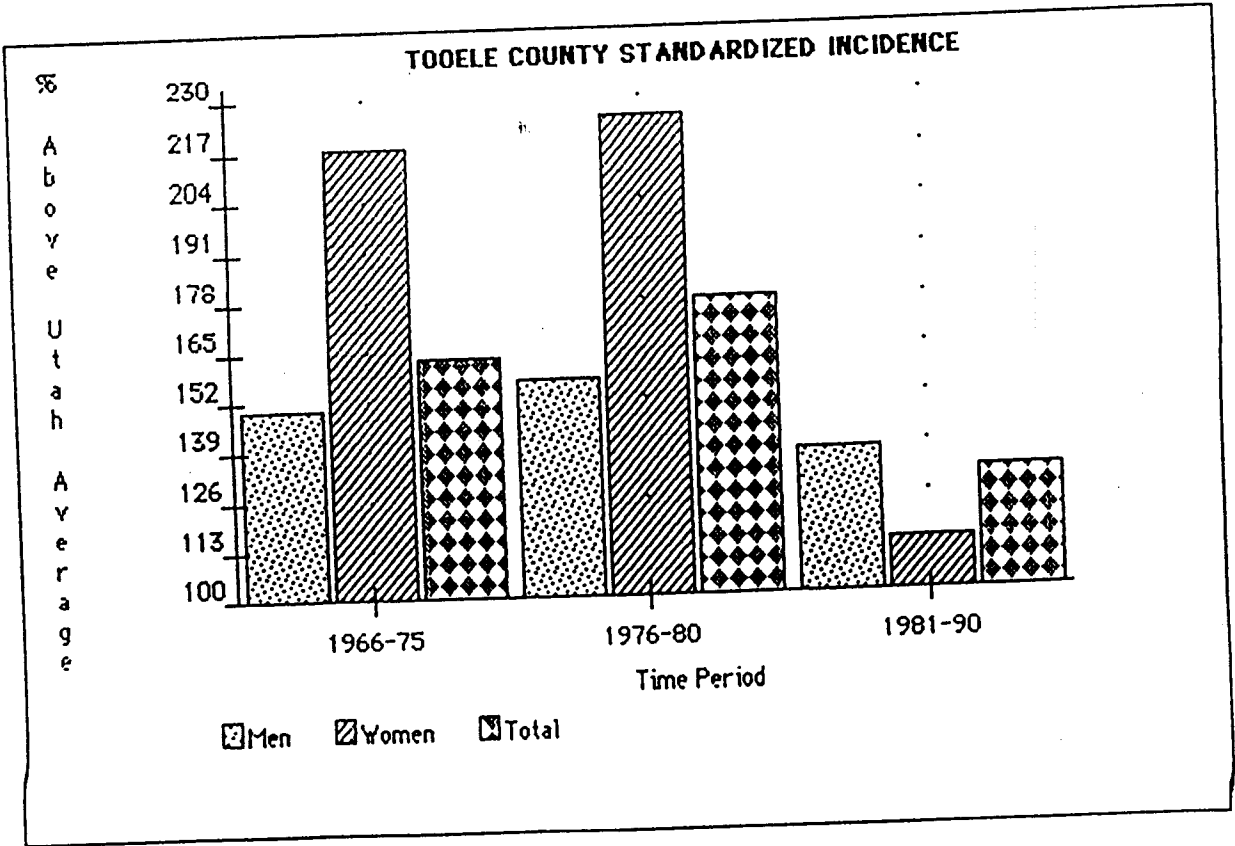
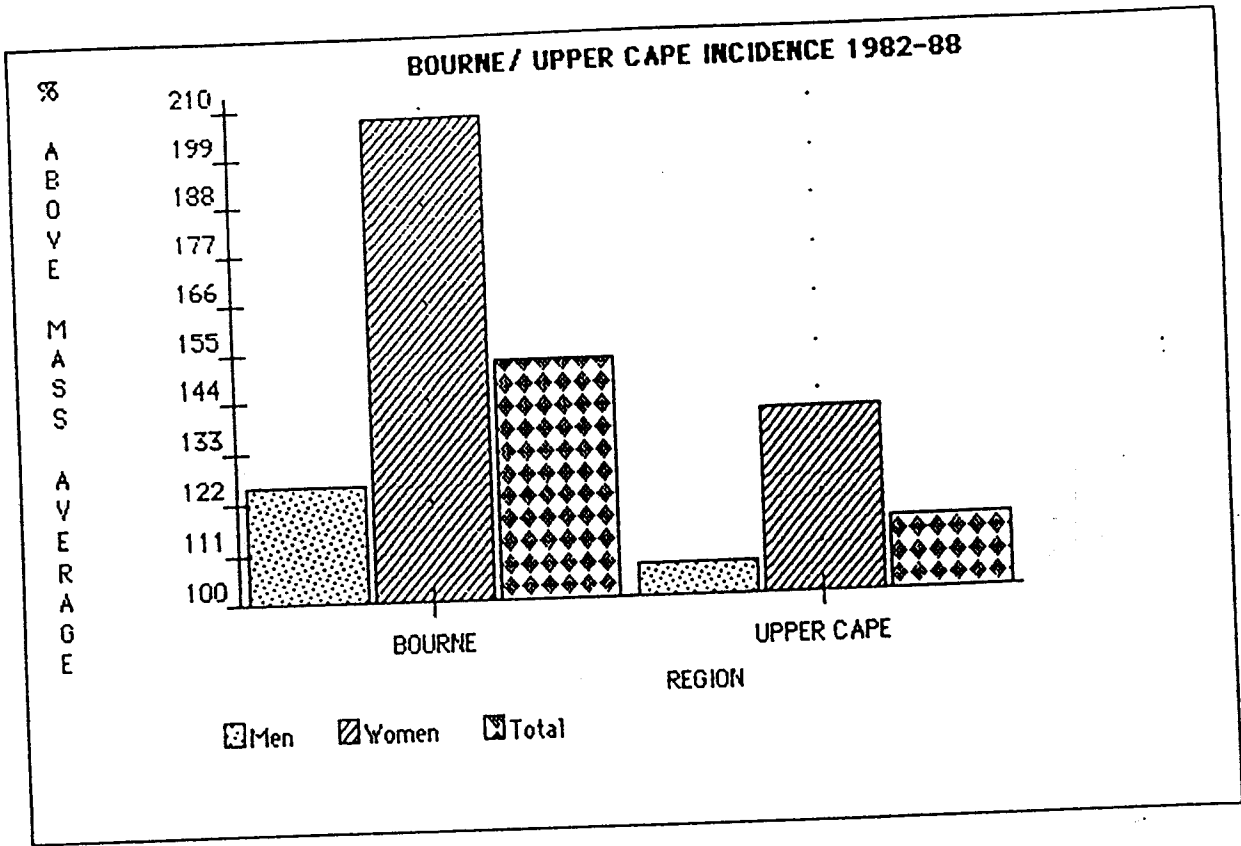
"But one thing we know is when people hear those mortars fired this weekend, everything they've heard about the cancer study and 2,4-DNT will be on their minds. We want them to know that the bags in question will not be being burned," he said.

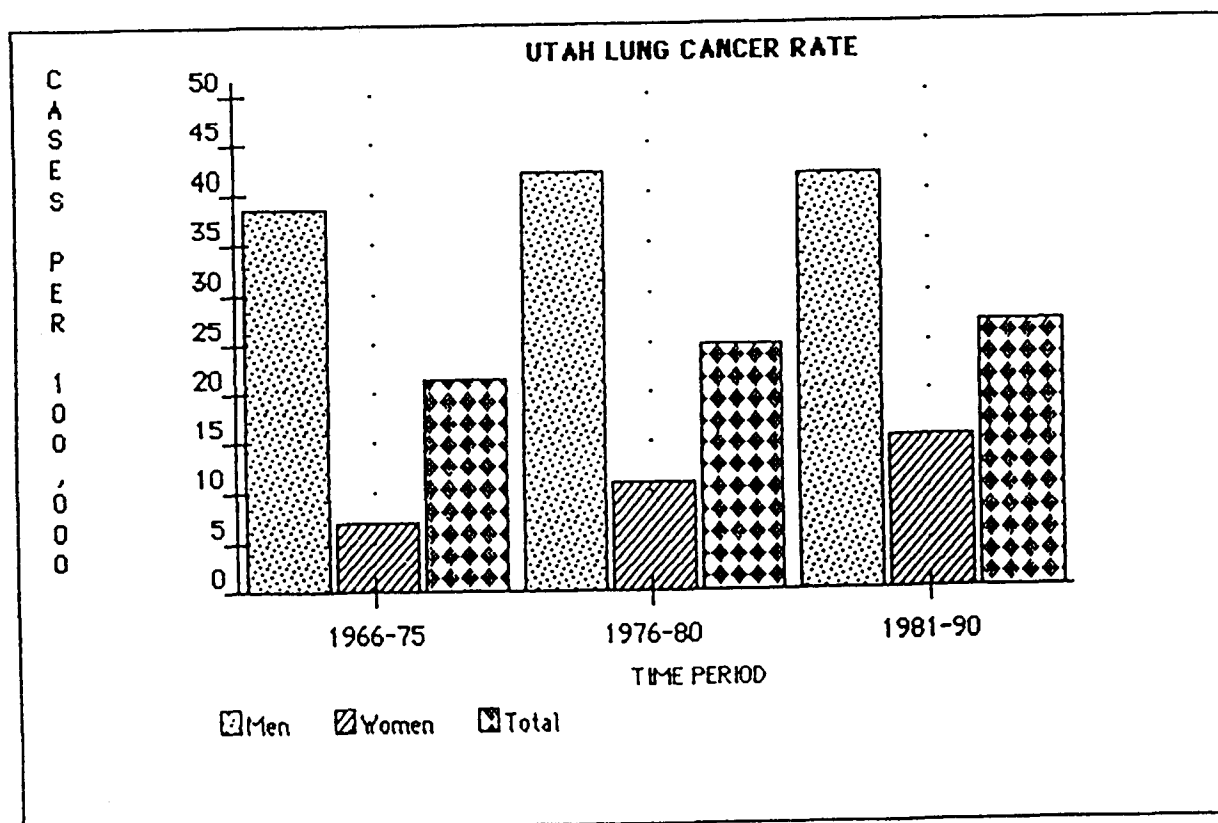
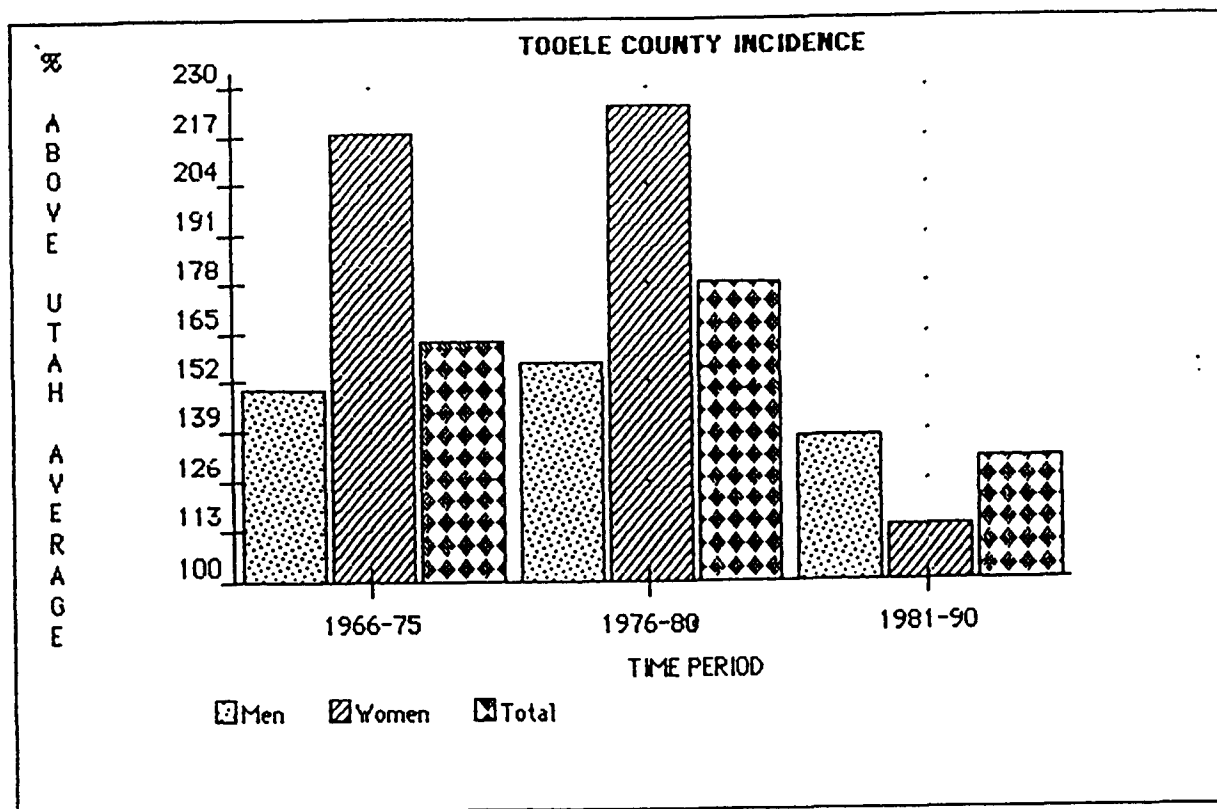
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■ Incineration of explosives poses threat to atmosphere

Disposal of obsolete explosives by incineration may pollute the atmosphere, according to a study carried out by Jehuda Yinon, of the Weizmann Institute of Science, Rehovot, Israel, and Richard Yost, of the University of Florida, Gainesville. In research that will be presented at the 13th International Mass Spectrometry Conference in Budapest, Hungary, later this month, Yinon and Yost pyrolyzed a number of common explosives, analyzed the combustion products by gas chromatography and mass spectrometry, and found that burning common explosives produces toxic gases such as nitric oxide and carbon monoxide. The chemists now aim to determine whether combustion of explosives under different conditions can eliminate toxic product formation. Disposing of large quantities of explosives in an environmentally acceptable manner poses serious difficulties, Yinon says. Dumping, burial, and open-air detonation—methods that have been attempted to date—all cause serious contamination of the surroundings. He adds that bacterial transformation and supercritical water degradation may eventually prove safer, although work on these techniques is still in an early experimental stage.

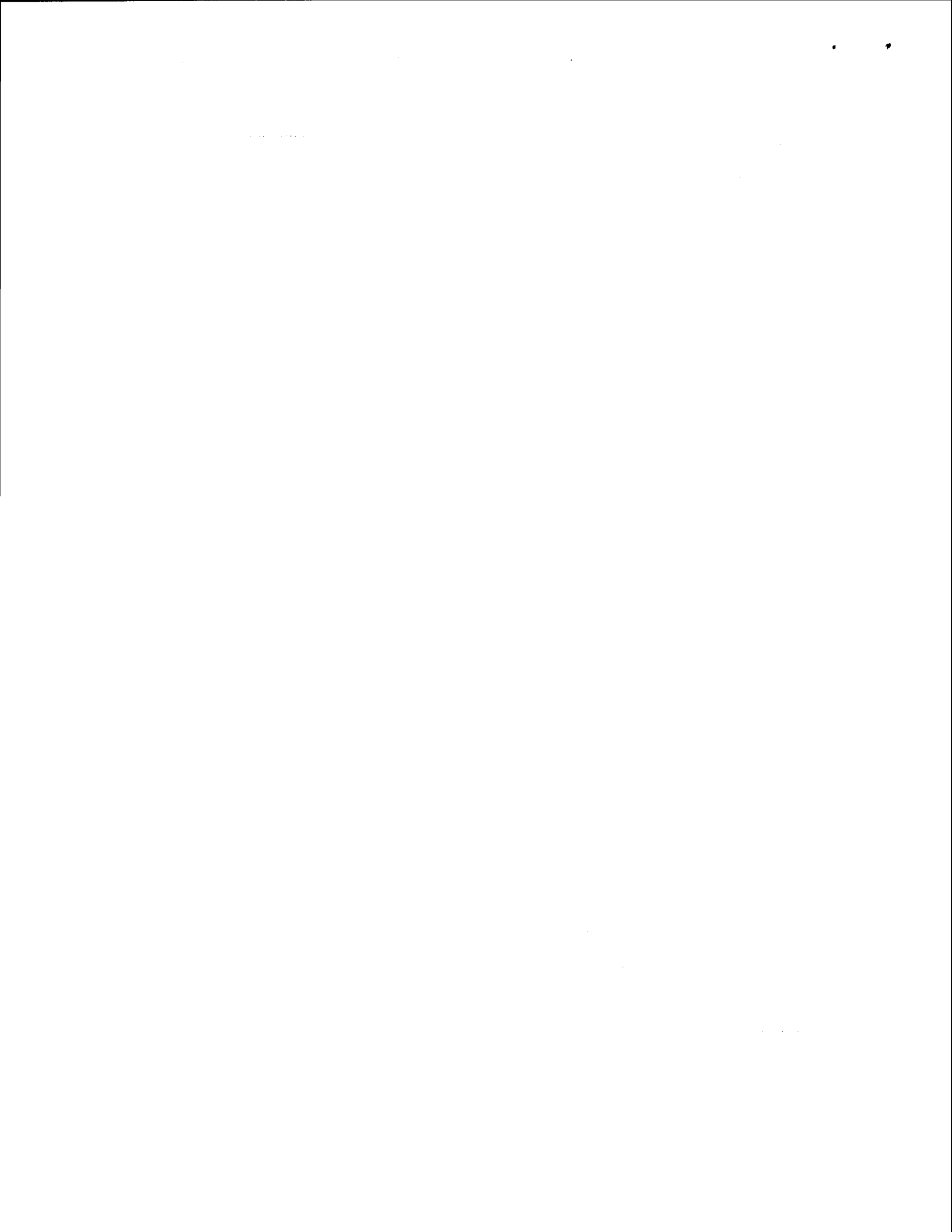


Table 2 Average Emission Factors for Propellant Burns.

Analyte	BangBox		Phase A		Phase B		Phase C		
	Double Base	Composite	Triple Base	Base Res	Manuf Res	M-1	M-6	Double Base*	
INORGANIC COMPOUNDS									
Carbon Dioxide	0.97	0.42	0.66	0.77	1.1	1.06	1.0		
Carbon Monoxide	0.91×10^{-3}	0.13×10^{-3}	0.025×10^{-3}	0.5×10^{-3}	0.25×10^{-3}	0.095×10^{-3}	0.7×10^{-3}		
Nitrogen Oxide	0.14×10^{-3}	3.0×10^{-3}	5.2×10^{-3}	2.8×10^{-3}	1.2×10^{-3}	2.4×10^{-3}	2.6×10^{-3}		
Nitrogen Dioxide	0.88×10^{-3}	0.61×10^{-3}	2.1×10^{-3}	0.5×10^{-3}	0.47×10^{-3}	5.2×10^{-3}	0.150×10^{-3}		
VOLATILE COMPOUNDS									
Methane	67×10^{-6}	20×10^{-6}	BD	BD	8000×10^{-6}	46×10^{-6}	750×10^{-6}		
Total Non-methane Hydrocarbons	160×10^{-6}	33×10^{-6}	15×10^{-6}	45×10^{-6}	460×10^{-6}	13×10^{-6}	560×10^{-6}		
Benzene	11×10^{-6}	5.7×10^{-6}	BD	BD	4.8×10^{-6}	1.7×10^{-6}	16×10^{-6}		
SEMI-VOLATILE COMPOUNDS									
2,4-Dinitrotoluene	BD	10×10^{-9}	BD	BD	1.2×10^{-9}	1.0×10^{-9}			
2,6-Dinitrotoluene	14×10^{-9}	3.7×10^{-9}		BD	BD	0.1×10^{-9}			
2,4,6-Trinitrotoluene	50×10^{-9}	BD		BD	BD	BD			
2-Nitronaphthalene	54×10^{-9}	13×10^{-9}		3.7×10^{-9}	BD	BD			
N-Nitrosodiphenylamine	1500×10^{-9}	35×10^{-9}		19×10^{-9}	BD	0.14×10^{-9}			
4-Nitrophenol	0.69×10^{-6}	0.41×10^{-6}	BD	BD	NA	NA			
Diphenylamine	BD	BD	BD	20×10^{-9}	0.11×10^{-9}	0.26×10^{-9}			
1-Nitropyrene	BD	20×10^{-9}		NA	BD	BD			
Naphthalene	BD	1400×10^{-9}		1500×10^{-9}	19×10^{-9}	75×10^{-9}			
Benz[a]anthracene	BD	BD		38×10^{-9}	BD	BD			
Benzo[a]pyrene	900×10^{-9}	BD		23×10^{-9}	BD	BD			
Pyrene	NA	NA		71×10^{-9}	BD	BD			
Phenol	4400×10^{-9}	3800×10^{-9}		8000×10^{-9}	3.43×10^{-9}	1.5×10^{-9}			
Dibenzofuran	0.26×10^{-6}	0.28×10^{-6}		0.26×10^{-6}	BD	BD			

Attachment J.

Data not available for Semi-volatile compounds. BD - Below Detection Limits. NA - Not a target analyte.



Proposed Open Burning of Hazardous Waste at BAAP

Badger Army Ammunition Plant has applied to the Wisconsin Department of Natural Resources for a permit to Open Burn/Open Detonate (OB/OD) up to 2,500 pounds per day of waste propellants. The current level of open burning is less than 1,000 pounds per YEAR. The new open burning facility would be built at the same site as the old propellant burning grounds on the far West side of BAAP near Highway 12. The Wisconsin Department of Natural Resources recommended utilizing the same site.

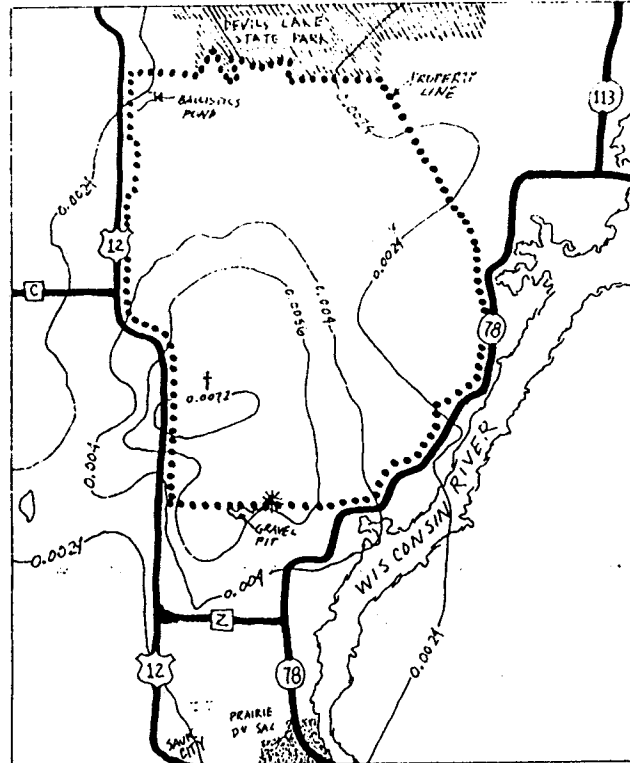
1. Open burning could distribute contaminated ash as far east as the Wisconsin River, as far south as Prairie du Sac, and west beyond Bluffview. See map.

2. One of the contaminants in this ash is lead. SWAB has asked that the army not burn lead-based propellants, and they have refused. SWAB has asked that BAAP never accept waste from other sites for burning, and they have refused. BAAP wrote to the Town of Merrimac on May 4, 1992: "Regarding a prohibition against burning propellants with a lead component, the Department of Army cannot accept such a prohibition." In this same letter, BAAP writes: "The installation will not open burn any waste from other locations except under emergency or written request from appropriate regulatory agency." (Currently, Fort McCoy is trying to get their own OB/OD permit.)

3. If we do not stop this permit, BAAP could become the second-highest emitter of lead in Wisconsin. According to a May 18, 1992 letter from Jay Goldring, Ph.D., who is a toxicologist with the Wisconsin Department of Health, "In addition, if Badger personnel were to burn the full amount allowed them under the permit and if all the material burned were AA2 (consisting of 1.5% lead), the facility would emit approximately 13,688 pounds/year of lead. According to 1990 Toxic Release Inventory data, this emission rate would make Badger the second-highest emitter of lead in Wisconsin."

4. Lead is a serious health concern. According to Dr. Louis Sullivan, Health and Human Services Secretary, lead poisoning is the "number one environmental threat to the children in the United States."

5. Lead is not the only dangerous contaminant. According to the Army document "Residues From Open Burning," nitroglycerin appears to be present in some samples both of the surface and subsurface soils. Nitroglycerin is present in many of the BAAP compounds in amounts ranging as high as 44.5% in the M8 propellant.



**Badger Army Ammunition Plant
Modeled Lead Concentration in Air--Proposed Operation**

Key: † = SOURCE
• = .00832 ug/m³ (Highest concentration)

6. 2,4-DNT is another contaminant in the ash which is also a health concern. According to a March 11, 1992 Letter from Hank Weiss, MS, MPH, of the Bureau of Community Health and Prevention, "Dinitrotoluene (2,4-DNT) appears to have had come up positive in a review by the National Cancer Institute; however, its effect through uptake and metabolism by vegetation is not clear. Next, all of the soils sample contaminants, of course, pose varying degrees of leaching potential and therefore risk to groundwater supplies."

It is interesting to note that in a March 4, 1992 letter, George C. Kopcaak, Director of the Office of Munition, Office of the Secretary of Defense, wrote, "Items which contain known carcinogenic substances are not subjected to OB/OD." This appears to contradict what the Army has proposed at BAAP.

7. The Army's own contractors have advised utilizing an alternative to open burning. According to Warzyn Engineering, Inc. on September 24, 1982: "Steps toward the development of an alternative burning installation should continue. Until an ultimate disposal method is operational, all burning should be confined to as small an area as possible. Inactive areas should be abandoned immediately."

8. According to the Wisconsin DNR, the site is already highly contaminated with lead. In a March 4, 1985 report from L. Egge, after a site visit to BAAP, she states, "We did not see a burn, but it was described as a 10 to 15 foot flame height with a considerable plume of grey smoke (exempt from air regulations, NR 154.10). Since this

area had been used for open burning for many years and surface soil is already contaminated with high levels of lead (EP toxicity of soils samples up to 47 ppm) it would be difficult, if not impossible, to document current impacts from open burning in the dish."

9. State legislators support safe alternatives to open burning and incineration.

State Senator Russ Feingold wrote to BAAP on July 15, 1992: "I believe the burden in this situation lies with the Army to find alternative methods of disposal which do not release toxic by-products into the environment."

"Further, I do not regard the possibility of an incinerator on the plant grounds an acceptable alternative, because this would still result in toxic output in addition to increasing the likelihood of additional waste being shipped to BAAP from other army installations."

"Other Army installations have been subjected to scrutiny with regard to alternative systems. I urge you to lead the way in environmentally hazardous means of disposal with an environmentally safe system. The end goal should be no new contamination."

10. We may have reason to question the Department of Natural Resources' desire for public input.

According to a February 25, 1992 interoffice memo from Mike Netzer, Hydrogeologist, WDNR, "I seriously doubt that anything that the Department could say at such a hearing would sway the SWAB group one way or the other. Instead, we would more likely see more of the "grand standing" by SWAB on issues that may or may not be related to the licensing of the propellant burning grounds."

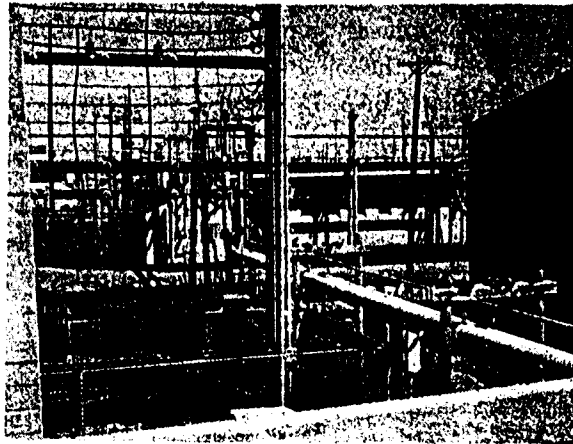
"It is my feeling that rather than putting the Department on the spot, it should be BAAP's responsibility to discuss the status of the propellant burning grounds in any forum that is outside of the required hearing process required by state rules unless we have something to "give" to the SWAB group, which we do not."

11. Without pressure from the public and our legislators, the U.S. Army intends to burn lead-based propellants. Mike Netzer, February 25, 1992: "However, the issue of the propellant burning grounds is only one of many issues at BAAP that we must deal with. I don't think that it's advisable to start having public meetings on each and every issue that crops up with the 10 SWMU's that have been identified at BAAP."

SWAB intends to block this permit.

It is up to Citizens for SWAB to find out how you can help.

50 Years and still contaminating



Badger Army Ammunition Plant contains over 1,400 building and has an extensive network of above-ground pipe systems.

Location and Description

The Badger Army Ammunition Plant (BAAP) is a 7,354 acre industrial installation located approximately four miles north of Sauk City and Prairie du Sac, Wisconsin and 30 miles northwest of Madison.

The ammunition plant consists of 1,642 acres of plant facilities, 1,028 acres of woodland, 300 acres of wildlife areas and 4,383 acres of agricultural land. The site contains over 1,400 buildings. An extensive network of above-ground pipe distributes steam and liquid chemicals between buildings.

Active Periods and Current Status

During wartime, BAAP produced explosive propellants. There have been three active production periods since its construction in 1942: World War II (1942-1945), the Korean Conflict (1951-1958) and the Vietnam Conflict (1966-1975). Between 5,000 and 7,500 workers were employed at the plant during each of these periods. The plant is now on "official standby status." It is maintained by a small number of government workers and 100 full-time employees of Olin Corporation.

Areas of Environmental Concern at Badger Army Ammunition Plant

1. **BALLISTICS POND, 1941+.** The primary contaminants expected are aluminum and possibly sulfate. Currently under study as part of the Remedial Investigation/Feasibility Study (RI/FS).

2. **OLEUM PLANT.** The plant was used to make Oleum, which is concentrated sulfuric acid consisting dissolved sulfur trioxide. 47 tons of Oleum leaked from a tank in 1979. Army reports spill was diked and neutralized. Currently under study as part of RI/FS.

3. **OLEUM POND.** Possible sulfate contamination. Currently under study as part of RI/FS.

4. **OLD ACID AREA.** Site of several major spills including 23 tons of acid in the early 1970s. It was used until 1975 for production of nitric acid from ammonia. During this process, unreacted nitrogen oxides were released from rooftop vents. These gases had a red color and were irritating. During temperature inversions, the Old Acid Area was enveloped in a brown haze. Currently under study as part of RI/FS.

5. **UNDERGROUND FUEL TANKS.** Removed in 1991, evidence of free product at site. Area of future environmental study.

6. **OLD FUEL OIL TANK.** Extent of contamination unknown at this time. Currently under study as part of RI/FS.

7. **PROPOSED SITE FOR SUPER-CONDUCTIVE MAGNETIC ENERGY STORAGE (SMES).** Environmental, economic, social, and health affects of construction at the Badger site are of significant public and professional debate. SMES will produce high magnetic fields.

8. **LANDFILL #3, 1960-1972.** Hazardous wastes and constituents are believed to be buried here. Area of current environmental study.

9. **DETERRENT BURNING GROUNDS.** Site of extensive soil and groundwater contamination including cadmium 1,1,1 Trichloroethane, 2,4-DNT, and lead. Propellant and extraction waste burned and buried here. Extent of contamination subject of current study. Search for a "third pit" will be conducted.

10. **LANDFILL #5, 1972-1988.** Hazardous waste, explosives, and propellants were burned and buried here. Extensive soil and groundwater contamination including volatile organic compounds, lead, cadmium, chromium, nitrate, and sulfates. Extent of pollution under current study.

11. **NEW ACID AREA.** Site of major chemical spills, including spill of 183 tons of acid in 1984. Extent of soil and groundwater contamination to be determined.

12. **LANDFILL #4, 1969-1984.** Area of future study.

13. **SEEPAGE LAGOON.** Elevated lead, cadmium, chromium and nickel in soils.

14. **NITROGLYCERINE POND.** The primary environmental concern of this area, if any, is contamination of sediments and groundwater by nitroglycerine, which is both toxic and carcinogenic. Currently under study as part of RI/FS.

15. **ROCKET PASTE AREA.** Because of the relatively high solubilities of contaminants (e.g., lead salicylate and ethylhexoate), groundwater contami-

nation is a possibility and monitoring will be continued.

16. **ROCKET POND AND DITCH.** Active orange paste containing lead, salicylate and ethylhexoate accumulated in many of these ditches. Extent of soils and groundwater subject of current study.

17. **PCB AND HAZARDOUS WASTE STORAGE.** Building currently utilized to store these materials.

18. **LANDFILL #6.** Currently active. Licensed for demolition debris and asbestos.

19. **PROPELLANT BURNING GROUNDS.** High levels of explosives, benzene, phthalates, lead and copper in the soils. Lead in subsurface soils have been detected as high as 100,000 ug/g and normal background levels are less than 70 ug/g. Contributing source of groundwater contamination flowing off-site and poisoning four private wells in its path. Contamination has reached the Wisconsin River. Currently under study as part of RI/FS.

20. **CURRENT OPEN BURNING AREA.** Surrounding soils are highly contaminated. Toxicity of soil samples show high levels of lead. BAAP has applied to the Wisconsin Department of Natural Resources for a permit to open burns up to 2,500 pounds of waste propellant per day. Current limit is 100 pounds per day. Local citizens' group has formally requested that the Wisconsin Division of Health assess the health affects of this proposal.

21. **CONTAMINATED WASTE AREA PITS.** It has been estimated that as much as 500 gallons per week of 2,6-DNT, benzene, diphenylamine and other chemicals have been dumped in these pits from 1966-70. Area of current study.

22. **LANDFILL #1.** Hazardous waste believed to be buried here. Currently under study as part of RI/FS.

23. **LANDFILL #2.** The unit received structural timbers, asphalt shingles, office refuse and other unknown waste products during unit operations. Area of future environmental study.

24. **WASTEWATER TREATMENT FACILITY.** Area of future study.

25. **CONTAMINATED WASTE PROCESSOR.** Currently operative. Metals such as arsenic, cadmium, chromium and lead are concentrated in the ash from this incinerator.

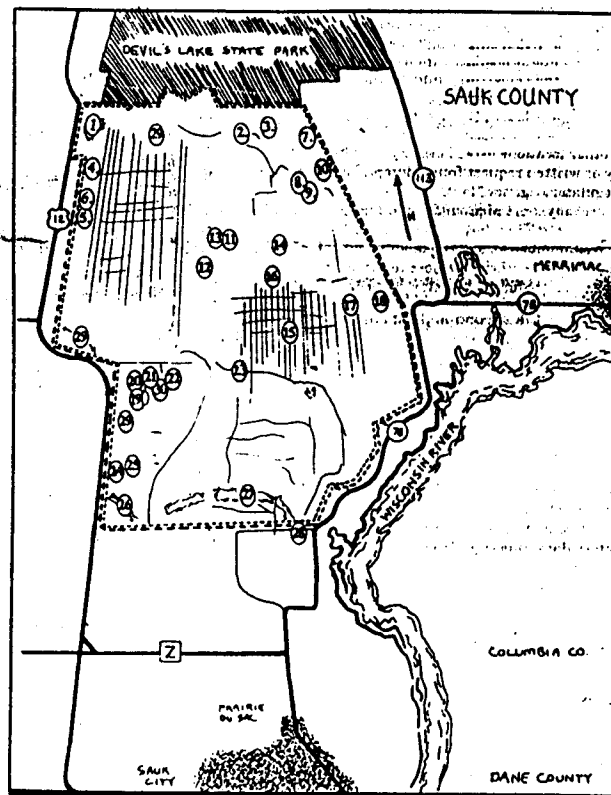
26. **EFFLUENT DITCH.** Currently under study as part of RI/FS.

27. **SPOILS SITES & PONDS.** Soil contaminants include diethylphthalate, 2,4-DNT, nitrocellulose, lead, aluminum, sulfates, and methylene chloride. Extent of groundwater contamination under investigation.

28. **GRUBER'S GROVE.** Contaminated sediments in Gruber's Grove Bay from effluent discharged to the Wisconsin River during active production periods. Lead is a contaminant of concern in these sediments. Previous study of this area recommended not disturbing these sediments based on environmental consequences. Area of ongoing study.

29. **GENERAL PURPOSE SEWER.**

30. **DECONTAMINATION OVEN.**



HEALTH RISKS:

Exposure to the chemicals in the soils, air and groundwater at BAAP may increase your risk for cancer, permanent liver and kidney damage, neurological damage, and developmental damage to unborn babies. Children are at higher risk due to their smaller size and the fact that they are still developing and growing.

REFERENCES USED TO PREPARE THIS REPORT:

- Master Environmental Plan for Badger Army Ammunition Plant, 1988.
- Health Assessment Badger Army Ammunition Plant, Sauk County, Wisconsin, July 1990. Wisconsin Division of Health.
- Preliminary Review Report RCRA Facility Assessment, Document #53.
- Phase I Environmental Report, Badger Army Ammunition Plant, By EC Jordan, January 31, 1990.

FOR MORE INFORMATION CONTACT:

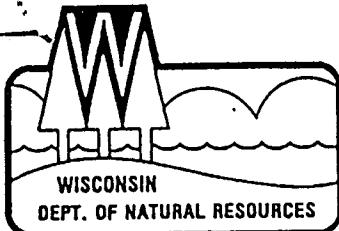
Citizens for Safe Water Around Badger (SWAB)
Route 1, Merrimac, WI 53561, or phone (608) 643-3124.

SWAB will provide phone numbers and addresses for legislators, state and federal agencies and other national and local environmental groups fighting military contamination.

FILE:

BAGS/pics

(copy in 08/00 file + BAGS/PROPELLANTS)



George E. Meyer
Secretary

State of Wisconsin \ DEPARTMENT OF NATURAL RESOURCES

101 South Webster Street
Box 7921

Madison, Wisconsin 53707

TELEPHONE 608-266-2621

DNR TELEFAX 608-267-3579

DNR TDD 608-267-6897

SOLID & HAZARDOUS WASTE MGMT 608-266-2111

SOLID & HAZARDOUS WASTE TELEFAX 608-267-2768

February 17, 1993

File Ref: 157005420

Sauk Co.

HW. Lic. File

Ms. Laura Olah
E 12629 Weigand's Bay South
Merrimac, Wisconsin 53561

SUBJECT: Concerns on Badger Army Ammunition Plant Open Burning License Application as noted in February 8, 1993 Letter

Dear Ms. Olah:

In order to answer your February 8, 1993 letter I have summarized your questions and also provided two related general comments. Note also that I have provided additional explanation for the final steps in the permitting process.

Question #1

What constituents/parameters in the Dugway Utah proving grounds "Bang Box" testing did not correlate with BAAP data.

In our recent phone conversation I think I did not understand your question in regards to the Dugway Proving ground information when I responded to you on it. When I answered that the Dugway information was not very applicable to the open burning at Badger Army Ammunition Plant (BAAP) what I was referring to was that the report I saw only had open detonation information for that site and not open burning. The report did however have information on open burning by the use of modelling through mass and carbon balance at Sandia National Labs in Albuquerque, New Mexico using an enclosed "Bang Box". So in response I was specifically referring to the information obtained at the Dugway site in Utah. The confusion arises in that the Sandia Lab acted as a subcontractor for the Dugway report. The Sandia lab information was used in designing capture equipment and analytical methods for the Dugway open detonation tests.

The information on open burning at the Sandia National Lab "Bang Box" tests was very applicable to the activity at BAAP for open burning. The emission factors that were developed from this testing I believe are the best available. The carbon and mass balance approaches to determining emissions are the most conservative approach that can be used. I have included a copy of one of the tables from the Dugway report showing emission factors for the open burning at the Sandia Lab site.



Printed

Badger Open Burning License Application:

2

Comment# 1

Massachusetts testing.

✓ (The information on open burning in Massachusetts is helpful but their appears to be propellant bags involved in the test and this complicates the analyses. The formulation of the bags and the potential for products of incomplete combustion (pic's) from the burning of the bags could be a major concern. In the past I have talked to people from U.S. EPA headquarters about other open burning licenses pending and they have raised substantial concern over the potential for pic's with the burning of propellant bags. Badger license application is specific to the referenced formulations for propellants and the license will not allow treatment of other materials. Note that at other installations it is sometimes very hard for the propellant to be separated from the bags and so they are burned with the propellant.

Question #2

What is the definition of clean for the propellant burning area.

There are really two parts to this question. The first part being that to what concentration is considered clean and the second part being to what radial extent and depth will the area have to be clean.

In response to the first part the soil would have to be at background concentrations for the surrounding area which has not been impacted by the previous area activities. Note that lead and copper the two major metal constituents found near the burning pads, occur naturally in soils and the acceptable concentration would have to be in that range. In terms of how BAAP proposes to achieve this it is up to them.

In response to the second part, the radial extent of how much has to be cleaned up to establish baseline monitoring conditions, BAAP has been asked this in the Preliminary Notice of Incompleteness and the Notice of Incompleteness will require a response from the facility. The response will have to demonstrate how the radial extent of fallout from the open burning process was determined and to what depth the material will have to be treated to establish a standard reference for monitoring of future open burning.

Also along this same line of questioning the Department and the U.S. EPA have expressed concern to the facility in the preliminary notice of incompleteness on the mobility and transport potential of the fallout material. And the Notice of incompleteness will require a response from BAAP on this issue. I have included a copy of the Preliminary Notice of Incompleteness with this letter.

Badger Open Burning License Application:

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Question #3

Concrete Pads

Along the lines of question #2 the Department is requiring BAAP to determine the extent of the fallout from the open burning process in order to size the pads to prevent releases to the environment. Also the pads will have to manage the water that lands on them to prevent flushing of material off of the pads onto the surrounding soils. The preliminary notice of incompleteness has additional information on this.

Question #4

Closure requirements for federal facilities

BAAP has had memorandum of agreements (MOA) with the State of Wisconsin on previous financial responsibility requirements related to closure and this will be used again. The Federal Facilities Compliance Act does not prevent this type of financial assurance mechanism.

As part of any licensing application the applicant/facility is required to submit a closure plan. The closure plan outlines the steps the facility will follow to close the facility.

Comment #2

If BAAP responds adequately to WDNR and U.S. EPA's concerns a completeness determination can be made. Note that at the same time as the Department is completing its review an Environmental Screening worksheet is done to decide on whether an environmental impact statement is required for this license activity. When the Department has deemed the application is complete an opportunity for a public hearing will be public noticed in the local newspaper and in the Milwaukee Journal, the states official paper for public notices. Also the Department will send a copy of the public notice to people or groups who are on the list of interested parties and the local libraries. You have been included on this list. And the Department will broadcast the notice over a local radio station and a public radio station if there is one available in the area.

If there is an interest a public hearing will be held and this will also be public noticed following the same steps as the initial notification. The hearings are usually held in the early evening hours in a school gymnasium or a courthouse. At the hearing comments will be received in writing and orally. The major purpose of the hearing is to receive public input on the licensing activity but also when relevant concerns specific to the licensing activity are raised, which have not been addressed in the review, they will be acted on after the meeting. It is not uncommon for additional conditions to be added to a license as a result of a public hearing.

Badger Open Burning License Application:

4

Note that the comments have to be relevant to the licensing activity and have to show actual or potential environmental harm or harm to humans and issues such as property values can not be addressed. After the completion of the meeting an additional 30 to 45 day comment period will be held where comments received in writing will also be taken into consideration. After public comment period has expired the Department will respond to the concerns and provide responses to all of the respondents as well as a notice of the Departments decision on the licensing activity

If you have any questions on the above referenced items please contact me at (608) 266-5798.

Sincerely,

Martin Herrick

Martin Herrick
Environmental Engineer
Solid & Hazardous Waste Section

cc: w/o encl.

Ed Lynch - SW/3

Mike Netzer - SW/3

Bob Egan - U.S. EPA - HRP/8J

Mike Ross - AM/7

11W-NOLY
157005420

05/18/92

MEMORANDUM

DATE: May 18, 1992
FROM: Jay Goldring, Ph.D., Toxicologist
Chronic Disease and Health Assessment Section
TO: Marty Herrick
DNR, Bureau of Solid Waste Management, SW/3
SUBJECT: Badger Army Ammunition Plant: RCRA Part 3 Permit



I have completed my review of the Badger Army Ammunition Plant RCRA Part 3 Permit. The purpose of the permit is to allow burning of up to 2,500 lbs per day of propellants in open dishes on the site. A health risk assessment performed by Eder and Associates of Madison is included in the permit. The risk assessment assumes that the two chemicals of concern, lead and dinitrotoluene, will be emitted from the proposed burning operations. I am not qualified to evaluate the modelling procedure used by Eder and Associates. However, assuming that their modeling procedure is accurate, I agree with the conclusions that the potential health risks posed by the proposed burning operation are negligible.

However, I am concerned about the proposed amount of lead emissions. Data contained in the "Draft Interim Final Remedial Assessment" of 1989 (containing data collected by Metatrace) indicates that past burning practices have already contaminated surface soil with lead. However, I am not aware of any analysis of surface soil which associate the rate at which lead concentrations decrease with increasing distance from the burning pads. Such data would be helpful in evaluating the accuracy of their model and should be included in the permit application.

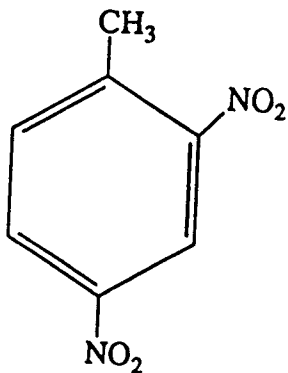
In addition, if Badger personnel were to burn the full amount allowed them under the permit and if all of the material burned were AA2 (consisting of 1.5% lead), the facility would emit approximately 13,688 lbs/year of lead. According to 1990 Toxic Release Inventory data, this emission rate would make Badger the second-highest emitter of lead in Wisconsin.

A potential solution for this problem would be to issue two separate permits: one for non-lead containing propellants and one for lead-containing propellants. Another possibility would be to specify the total amount of lead which could be emitted by the facility. If you or the Bureau of Air Management decide to pursue either of these ideas, I would be happy to provide any assistance you may need.

Thank you for including my input in your review of the permit application.

cc: Mike Ross, DNR, AM/10
Meg Ziarnik, BPH

2,4-Dinitrotoluene



- EPA Reference Dose (RfD): 0.002 mg/kg/day
- EPA Cancer Classification: Group B2, probable human carcinogen; potency factor (q_1^*) = $6.8 \text{ E-1 (mg/kg/day)}^{-1}$ by the LMS2 model
- Health Advisory Values:

One-Day	0.5 mg/L
Ten-Day	0.5 mg/L
Longer-Term (child)	0.3 mg/L
Longer-Term (adult)	1.0 mg/L
Lifetime	NA

Dinitrotoluene (DNT) is a white- to buff-colored solid and commonly occurs as a mixture that may consist of up to six isomers. Uses include military munitions, dye manufacture, and toluenediamine (polyurethane intermediate) synthesis (ATSDR, 1989; NIOSH, 1985; Small and Rosenblatt, 1974). Technical grade DNT (tg-DNT) is a mixture composed of approximately 76.5% 2,4-DNT, 18.8% 2,6-DNT, and 5% other DNT isomers.

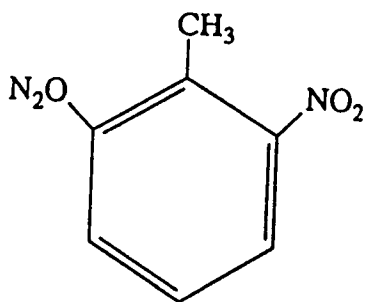
In humans, inhalation and dermal occupational exposures to 2,4- and tg-DNT suggest effects to the heart, circulatory, and central nervous systems (Etnier, 1987; U.S. EPA, 1980, 1986). Chronic exposure produces nausea, vertigo, methemoglobinemia, cyanosis, extremity pain or paresthesia, tremors, paralysis, chest pain, and unconsciousness. Rats, mice, and dogs, orally administered 2,4-DNT for 90-days to lifetime, developed severe reproductive effects in both sexes, and reduced viability and body weight in offspring (Hong et al., 1985; Lee et al., 1985; Ellis et al., 1985). It has not been shown to be a teratogen (Price et al., 1985).

The EPA One- and Ten-day HAs are based on decreased body weight and food consumption, and serum chemistry changes in male and female Sprague-Dawley rats, and testicular lesions in males fed 2,4-DNT for 14 days (LOAEL = 45 mg/kg/day) (McGowan et al., 1983). Dose-related decreases in body weight gain and food consumption in rats (LOAEL = 34 mg/kg/day) administered 2,4-DNT in the diet for 13 weeks (Lee et al., 1985), is the basis for the Longer-term HAs. The Drinking Water Equivalent Level (100 µg/L) and RfD (2E-3) are based on neurotoxicity, Heinz body formation, and biliary tract hyperplasia in dogs (NOAEL = 0.2 mg/kg/day) dosed orally with 2,4-DNT for 2 years (Ellis et al., 1985).

In *Salmonella* assays, 2,4-DNT is a weak mutagen; however, its metabolites are mutagenic (Couch et al., 1987). The DNTs are not genotoxic in mammalian cells *in vitro*, in mouse and rat dominant lethal tests, and in *Drosophila* systems (Abermethyl and Couch, 1982; Styles and Cross, 1983; Rickert et al., 1984; Ellis et al., 1979; Soares and Lock, 1980).

DNT is classified B2 (probable human carcinogen) and thus a Lifetime HA is not recommended (U.S. EPA, 1992d). The cancer potency is associated with hepatocellular and mammary gland carcinogenic activity in rats after 2,4-DNT treatment (Ellis et al., 1979). 2,4-DNT also may be a promoter (Leonard et al., 1983, 1986).

2,6-Dinitrotoluene



- EPA Reference Dose (RfD): 0.001 mg/kg/day
- EPA Cancer Classification: Group B2, probable human carcinogen; potency factor (q_1^*) = $6.8 \text{ E-1 (mg/kg/day)}^{-1}$ by the LMS3 model
- Health Advisory Values:

One-Day	0.4 mg/L
Ten-Day	0.4 mg/L
Longer-Term (child)	0.4 mg/L
Longer-Term (adult)	1.0 mg/L
Lifetime	NA

Dinitrotoluene, (DNT) is a white- to buff-colored solid at room temperature and commonly occurs as a prominent component in mixtures that may consist of two or more of the six DNT isomers. It has been used in military munitions, dye manufacture, and the synthesis of toluenediamine (the organic intermediate used in the production of polyurethane). Technical grade DNT (tg-DNT) is a mixture composed of approximately 76.5% 2,4-DNT, 18.8% 2,6-DNT, and 5% other DNT isomers (2.4% 3,4-DNT, 1.5% 2,3-DNT, 0.7% 2,5-DNT, and 0.4% 3,5-DNT).

2,6-Dinitrotoluene has not been studied epidemiologically; therefore, it is uncertain as to whether it affects people in the same manner as tg- and 2,4-DNT(i.e., heart, circulatory system, and the central nervous system effects). Limited study of experimental animals (dogs, rats, mice) orally administered 2,6-DNT effected the central nervous system, blood, liver, and kidney, and caused death (Lee et al., 1976). No data on the reproductive or developmental effects of 2,6-DNT were found in the available literature.

All EPA HA values for 2,6-DNT are based on a 13-week study with dogs administered 2,6-DNT orally (Lee et al., 1976). The critical effects were neurotoxicity, Heinz bodies, bile duct hyperplasia, liver and kidney histopathology, and death. The HAs were derived from a NOAEL of 4 mg/kg/day. The 20 mg/kg/day dose level is a Frank-Effect Level (FEL) due to neurotoxicity and lethality.

The 2,6-DNT isomer is a weak mutagen in *Salmonella* test systems (Tokiwa et al., 1981; Spanggord et al., 1982; Couch et al., 1981). The DNTs are not genotoxic in mammalian cells *in vitro*, in mouse and rat dominant lethal tests, and in *Drosophila* systems (Abernethy and Couch, 1982; Styles and Cross, 1983; Rickert et al., 1984; Ellis et al., 1979; Soares and Lock, 1980).

DNT is classified B2 (probable human carcinogen) and thus a Lifetime HA is not recommended (U.S. EPA, 1992d). Leonard et al. (1987) demonstrated hepatocellular carcinoma in 85% to 100% of CDF male rats in a 12-month study. However, the cancer potency and risk estimate is associated with 2,4-DNT hepatocellular and mammary gland carcinogenic activity in rats (Ellis et al., 1979). There is some evidence which suggests that 2,6-DNT has both initiation and promotion activity and, therefore, may be a complete carcinogen (Leonard et al., 1983, 1986).

Chemical Exposures, Male Reproduction Problems Are Linked

U.S. Study at Olin Plant Ties
Low Sperm Level to TDA,
DNT; Tests to Continue

By WALL STREET JOURNAL Staff Reporter

A federal study of certain male chemical workers at an Olin Corp. plant in Brandenburg, Ky., has turned up a possible link between exposure to two chemicals and reproductive problems.

Sperm counts of workers currently exposed to toluenediamine (TDA) and dinitrotoluene (DNT) were only one-third as high as levels in workers who never were exposed, the study by the National Institute of Occupational Safety and Health found. In addition, there were indications of abnormalities in the size and shape of the exposed workers' sperm, which also could affect reproductive ability.

Further research already has begun to determine whether TDA and DNT workers at other plants could face problems.

In reporting the results of the Brandenburg study, NIOSH cautioned that further corroboration is needed before any direct link can be proven. Dr. James Mellus, chief of NIOSH's hazard evaluation and technical assistance branch, called the results "strongly suggestive."

An Olin spokesman said the company agrees that further studies are necessary. He noted that the NIOSH study involved only a small number of workers and didn't establish any conclusive links. Exposure to the chemicals has been reduced since the study began, he said.

Thirty workers participated in the Brandenburg study: nine currently exposed, 12 previously exposed and nine with no history of exposure to TDA or DNT. There are about 550 employees at the plant, which makes urethanes and organic chemicals, including 12 employed in the TDA/DNT area. DNT is used in the manufacture of TDA, which is a raw material in flexible urethane foams.

There isn't any occupational health exposure standard for TDA. DNT levels at the Olin plant were well below the Occupational Safety and Health Administration standard.

Workers at the Brandenburg plant requested the study early in 1979 after one of them became concerned about his wife's

miscarriages and subsequent difficulty conceiving a child. From mid-1979 through early 1980, NIOSH investigators questioned workers about their reproductive histories and chemical exposures, conducted physical examinations and analyzed blood and semen samples. Results of the study were published in Friday's issue of *Morbidity & Mortality Weekly Report*, a publication of the Centers for Disease Control.

Among the other studies under way is one by Olin of TDA/DNT workers at its Lake Charles, La., plant. Sixty workers exposed to the two substances and 120 nonexposed workers are participating in the study. The Olin spokesman said results are expected by early next month. NIOSH has interviewed TDA/DNT workers at a Mobay Chemical Corp. plant in West Virginia, and Dr. Mellus said the agency recently received a request from the International Chemical Workers Union to study workers at an Allied Corp. plant in West Virginia.

The additional studies will indicate whether other factors besides TDA or DNT exposure could have caused the lowered sperm counts among the Brandenburg workers. If exposed workers at other plants don't have lowered counts, investigators will have to look elsewhere for the cause.

NIOSH also is considering whether to do additional animal studies of the toxic effects of TDA and DNT.

BADGER ARMY AMMUNITION PLANT
BARABOO, WISCONSIN

TABLE 7.1

SUMMARY OF CANCER RISK OF POTENTIAL EXPOSURE PATHWAYS

Potential Exposure Pathway	Cancer Risk					
	Adults		Children		Proposed Operation	
	Existing Operation	Proposed Operation	Existing Operation	Proposed Operation	Existing Operation	Proposed Operation
Inhalation	2.72E-09	1.07E-08	2.55E-10	9.98E-10		
Soil Ingestion	2.70E-12	9.47E-11	2.02E-12	7.10E-11		
Dermal Contact	1.22E-11	4.28E-10	2.21E-12	7.78E-11		
Food Ingestion (Total)	8.60E-09	1.83E-08	2.16E-09	4.60E-09		
Milk	1.20E-11	2.57E-11	4.99E-12	1.07E-11		
Pork	4.63E-14	9.91E-14	9.85E-15	2.11E-14		
Beef	9.33E-13	2.00E-12	1.74E-13	3.73E-13		
Corn	8.59E-09	1.83E-08	2.16E-09	4.59E-09		
Total Cancer Risk	1.13E-08	2.95E-08	2.42E-09	5.75E-09		

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Attachment M.

BADGER ARMY AMMUNITION PLANT
BARABOO, WISCONSIN

TABLE 7.3

SUMMARY OF HAZARD INDEX OF POTENTIAL EXPOSURE PATHWAYS

CHILDREN

Potential Exposure Pathways	Hazard Index						Total Hazard Index	
	Existing Operation		Proposed Operation		Existing Operation	Proposed Operation	Existing Operation	Proposed Operation
	Copper	Lead	Copper	Lead				
Inhalation	4.81E-06	4.05E-03	1.89E-05	1.60E-02	4.06E-03	1.60E-02	4.06E-03	1.60E-02
Soil Ingestion	5.54E-08	8.32E-07	1.36E-06	3.00E-05	8.87E-07	3.00E-05	8.87E-07	3.12E-05
Dermal Contact	1.09E-08	NA	2.68E-07	NA	1.09E-08	NA	1.09E-08	2.68E-07
Food Ingestion (Total)	4.91E-05	1.18E-02	1.06E-04	2.54E-02	1.19E-02	2.54E-02	1.19E-02	2.55E-02
Milk	9.38E-06	4.45E-04	2.00E-05	1.13E-03	5.32E-04	1.13E-03	5.32E-04	1.15E-03
Pork	3.20E-07	3.33E-06	6.97E-07	7.00E-06	3.54E-06	7.00E-06	3.54E-06	7.69E-06
Beef	6.44E-06	6.59E-05	1.40E-05	1.43E-04	7.24E-05	1.43E-04	7.24E-05	1.57E-04
Corn	3.30E-05	1.12E-02	7.09E-05	2.41E-02	1.13E-02	2.41E-02	1.13E-02	2.42E-02
Total Hazard Index	5.26E-05	1.58E-02	1.26E-04	4.14E-02	1.58E-02	4.14E-02	1.58E-02	4.15E-02

Note:

NA = Not Applicable

Attachment N.

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ATSDR

**Agency for Toxic
Substances and
Disease Registry**

Division of Health Studies

FINAL REPORT

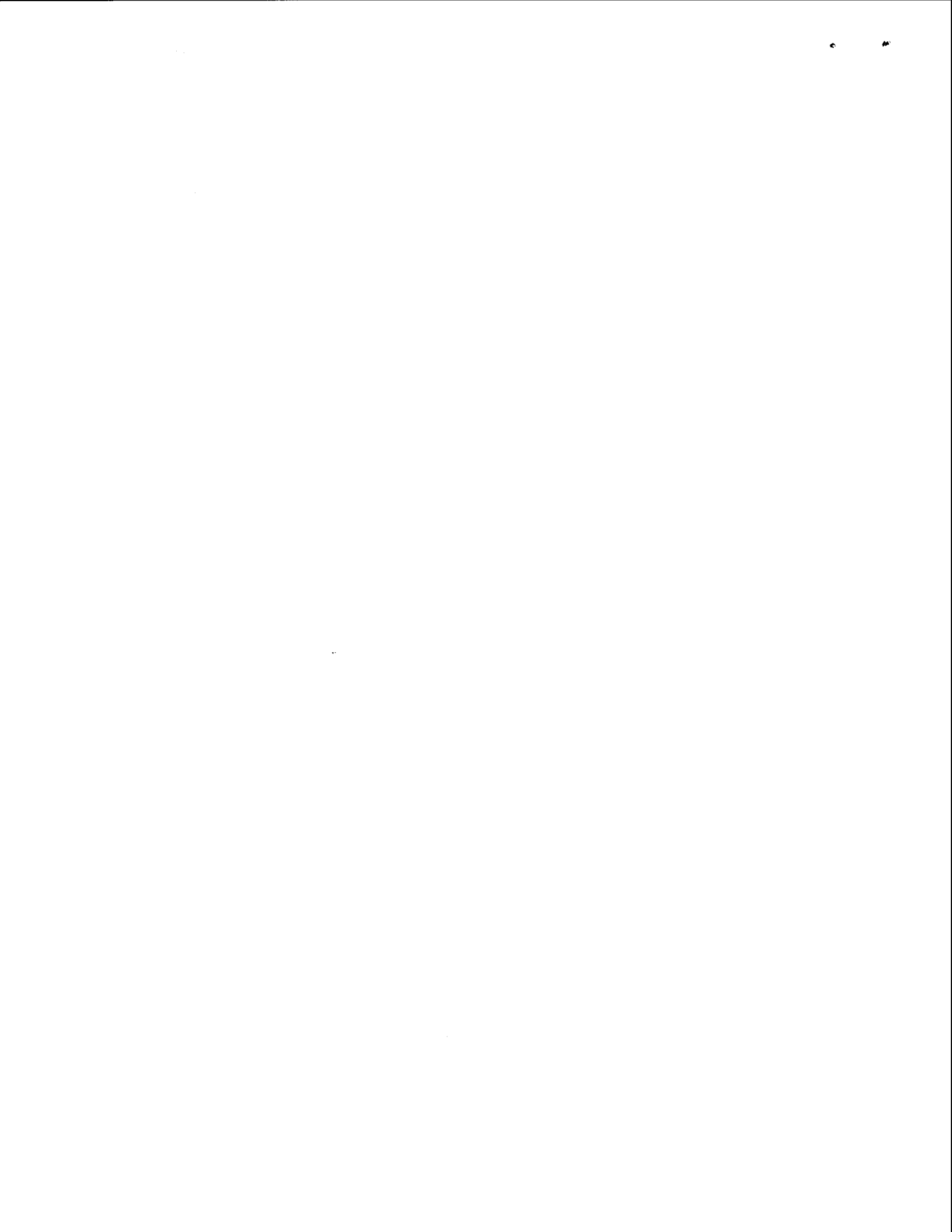
**STUDY OF SYMPTOM AND DISEASE PREVALENCE
CALDWELL SYSTEMS, INC. HAZARDOUS WASTE INCINERATOR
CALDWELL COUNTY, NORTH CAROLINA**

September 1993



**U.S. DEPARTMENT OF HEALTH
& HUMAN SERVICES**

Public Health Service
Agency for Toxic Substances
and Disease Registry
Atlanta, Georgia 30333



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92

HAZARDOUS WASTE

A North Carolina Incinerator's Noncompliance With EPA and OSHA Requirements





• •

Wisconsin State Journal
1990

Continued from Page 1A

But in late 1989 the discovery beyond the original estimate and at least to the boundary of the plant.

This means that for the purification system to work, more extraction wells will have to be drilled —

when the extract end of the plume can be determined.

"The plume follows the ground water, and there are many factors that determine the flow," says

Forstman. "The flow went deeper than we expected."

Grashoff explains there are two sandstone aquifers in the area.

The "outwash," or more loosely composed aquifer, extends down

about 240 feet under the ground to where it meets the bedrock aquifer.

The ground-water flow drops rapidly through the outwash, which could mean the plume might be

drawn under the wells of Schaefer and his neighbors.

Grashoff says that even if the end of the plume can be found and its advance stopped, the sandy nature of the soil makes it act like a

filter for the toxins. This is why the treatment system will consist of as

many as seven wells that will each pump out up to 100 gallons of water

per minute for the next 10 to 20 years.

Not only must the flow be partially, but the sand itself will have to

be flushed for years to clean the ground.

"We know the contamination is within 20 feet of the bedrock," says

Grashoff, "and if it reaches the bedrock the problem of cleaning it

out will be much, much worse. They say the cost will be a great

deal more." "I've been having some aches and

Heleen Schaefer is appreciative. Helten Schaefer is continuing to

leech into the aquifer under the burning grounds. To stop this,

something must be done with the thousands of tons of contaminated

soil on and under the burning grounds.

Schaefer pods, looking out the window at the farm they have

owned for 21 years. He says he knows if the contamination does

turn up in their well. "We'll end up with zero."

aiding the leaching process. He says a feasibility study on how to handle

the soil will be completed in the fall.

Digging up and burning the soil is the most common way of dealing

with it, but Grashoff says that while the burning process is fairly

efficient, the excavation process

could release contaminated dust into the air.

In a related issue, questions have

been raised in the Sauk-Prairie area about the potential of cancer

clusters caused by air pollution from Badger before it was closed

down. Forstman says the Army is cooperating with the state Division

of Health in assessing the possibility.

Grashoff and his group acknowledged the Army is taking

appropriate steps to resolve the situation, but they say what has happened at Badger points to an ongoing

problem with the military, which they say is the largest polluter in the country.

They say the military does not act to prevent these kinds of problems, but instead works on a "crisis management" basis, acting only

after the problem has been created. While cleaning the ground water is the most pressing problem, the contamination is continuing to seep into the aquifer under the burning grounds. To stop this, something must be done with the thousands of tons of contaminated soil on and under the burning grounds.

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efficient, the excavation process could release contaminated dust into the air.

In a related issue, questions have been raised in the Sauk-Prairie area about the potential of cancer

clusters caused by air pollution from Badger before it was closed down. Forstman says the Army is cooperating with the state Division

of Health in assessing the possibility. Grashoff and his group acknowledged the Army is taking

appropriate steps to resolve the situation, but they say what has happened at Badger points to an ongoing

problem with the military, which they say is the largest polluter in the country.

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State Journal said another possible environmental problem is brewing at the Badger Army Ammunition Plant. This time it is the possible construction of a super Magnetic Energy Storage (SMES) project, a 140-foot ring of superconducting magnets funded by the Department of Defense and a consortium of power companies including Wisconsin Power & Light.

The power companies want to use the energy-storing abilities of the project as a "load leveling" device, allowing them to store power during low-use hours and draw on the system when demand is high, saving money.

The DOD sees the project as a possible ground-based power source for the high-intensity lasers that would be used in "Star Wars," the U.S. space-based missile defense system.

Along with WPL, UW-Madison, which helped develop the project, and much of the Wisconsin congressional delegation, has backed the project — including some lawmakers who have spoken out against Star Wars research.

But Sauk-Prairie area peace activists and environmentalists have come together to form the Committee to Stop SMES. They say the enormous initial cost of the project would ensure there would be no savings in utility bills.

They say there are also questions about the intense electromagnetic field, many thousands of times stronger than the Earth's, that would surround the unit. Electromagnetic fields have been linked to cancer in humans, and have been shown to have a detrimental effect on some wildlife.

While the final decision on the placement of the project has not been made, Dennis Dams, one of the founders of SMES, said that at a recent WPL meeting for contractors it was evident Badger was the front runner.

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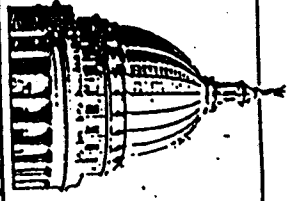
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50 CENTS

MADISON, WISCONSIN

Badger Army plant fires silent gun

Toxic plume seeps toward wells of nearby residents

By Joseph B. Howard
Sauk County correspondent

SAUK CITY — Standing in his front yard, Ervin Schaefer can see Gate No. 10 of the Badger Army Ammunition plant about 100 yards down the road.

For many of the last 50 years, that 100 yards took him to his place of employment. But today, it may be all that separates him and his farm from a ground-water stream of toxic carcinogens that is moving slowly beyond the

boundaries of the now silent plant. Badger, 35 miles north of Madison on Highway 12, is a Department of Defense installation that produced ammunition propellants for the Army during World War II, the Korea War and the Vietnam War. Schaefer worked on the nitrocellulose line during each of those wars. He also helped to build the facility in 1941.

"I was part of a 15,000-man crew," he says. "You'd leave work at night and you wouldn't recog-

nize the place in the morning." When the Vietnam War ended in 1975, the plant was placed on inactive standby and the workers were sent home.

For Schaefer, who is 75, it was for the last time. He went home to his wife, Helene, and their 40-acre farm, which hugs the southern perimeter of the 15-square-mile plant.

David Fordham, supervisor of the plant, said the Army's Toxic and Hazardous Material Agency performed a study in 1977 that discovered 11 areas of soil contamination, two of which presented the possibility of ground-water contamination.

Subsequent studies using up to 175 tests wells confirmed that there is a less-toxic sulfate contamination in the northern part of the plant. It also found a toxic plume — like an underground plume of smoke 2,500 feet wide and 6,000 feet long — carrying carcinogens to, and possibly past, the southern border of the plant near Schaefer's farm.

The plume starts under an area once used to burn old and useless propellants. At some point, chemical solvents were dumped there. That was done to aid the burning of the other materials, said Ron Grasshoff, a Department of Natural Resources soil expert and member of the environmentally oriented Stop SMES group. The carcinogenic components of the solvents are causing the contamination.

When a full study was completed in 1988, Fordham says the army decided on a treatment method that would pump water from three wells at the end of the plume — thought to be inside the plant. This would stop its advance and the water would be purified in a dual extraction system.

The 99-percent pure water would then be pumped into the Wisconsin River, where Fordham says it would have no effect on the

Trees for Earth



Attachment A.

Comins

Home

**TOXICOLOGICAL PROFILE FOR
OTTO FUEL II AND ITS COMPONENTS**

Prepared by: *

Research Triangle Institute
Under Contract No. 205-93-0606

Prepared for:

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Public Health Service
Agency for Toxic Substances and Disease Registry

June 1995

AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

PUBLIC HEALTH ADVISORY
FOR
CALDWELL SYSTEMS, INC.
CALDWELL COUNTY, LENOIR, NORTH CAROLINA

July 25, 1990

INTRODUCTION

As a result of an Environmental Protection Agency (EPA) Region IV request for an Agency for Toxic Substances and Disease Registry (ATSDR) Health Consultation, ATSDR has concluded that former conditions at the Caldwell Systems, Inc. (CSI) facility are of public health concern and have led to the issuance of a Public Health Advisory. This Public Health Advisory is issued to advise the EPA, the State of North Carolina, and the public of a significant threat to human health associated with past work practices at the CSI facility located in Caldwell County, near Lenoir, North Carolina. The Health Advisory also addresses the potential current and future threat to human health associated with this facility. The site or areas included in this Advisory are the former CSI incineration operations, the current CSI property, and the adjacent properties (municipal landfill, former dairy cattle farm) where suspected illegal burial and dumping of waste may have occurred.

The ATSDR has determined that there is a significant threat to human health for some former employees of the CSI facility because of past workplace conditions. In addition, preliminary investigations indicate that family members of some former CSI employees may also have been placed at risk. The facility is known to have incinerated waste material from the furniture manufacturing industry (toluene, xylene, paint, lacquer, and miscellaneous halogenated and nonhalogenated solvents) and waste torpedo fuel (Otto Fuel II) from the U.S. Navy. From interviews with former employees, ATSDR believes that work practices and conditions known to have existed at CSI may have led to adverse health effects resulting from: (1) dermal contact with hazardous materials; (2) inhalation of hazardous materials; and (3) potential ingestion of hazardous materials. Documented adverse health problems in several of the former employees, including toxic encephalopathy, dermatitis, respiratory complaints, arthritic complaints, and chest pain may be associated with past exposures to the wastes handled at CSI. Secondary exposures and subsequent adverse health problems of some worker family members are suspected to have occurred by the same exposure routes as noted above. For these reasons, the ATSDR recommends that actions be taken to (1) identify all CSI personnel and family members that may have come in contact with these wastes and include them in the proposed ATSDR/National Institute for Occupational Safety and

Health (NIOSH) health investigations and (2) dissociate any current on-site workers and their family members from hazardous substances remaining on-site.

Some pulmonary health problems of nearby residents may have occurred because of past inhalation exposures to CSI incinerator emissions and other air releases that may have occurred. Air sampling data reviewed to date, combined with the currently known operational history of CSI (refer to the Background Section of this document), are consistent with this finding.

Off-site environmental sampling investigations have been conducted by both the EPA Region IV and the State of North Carolina. Currently available data are inadequate to characterize fully the nature and extent of any contamination. Additional sampling data would assist in determining the possibility of any potential health problems. It is possible that CSI operations and work practices resulted in (1) off-site soil contamination due to particulate fallout from waste incineration processes and (2) potential contamination of groundwater resulting from reported waste disposal in the municipal landfill (refer to the Background Section of this document). The ATSDR is currently unaware of any health problems in the population surrounding the facility that could be attributed to exposure to potentially contaminated residential soils and groundwater; however, investigation of these potential routes of exposure is prudent.

To evaluate and/or ameliorate the possible health problems that may affect the population surrounding the CSI facility, ATSDR recommends the following actions: (1) dissociate the public from any contaminants released from the CSI facility that may pose a health concern; (2) conduct multi-media environmental sampling both on- and off-site; and (3) include the population surrounding the CSI facility in an ATSDR health survey.

BACKGROUND

The CSI facility is located in a rural residential area near Lenoir, in Caldwell County, North Carolina. The facility was permitted by the State as an interim status Resource Conservation and Recovery Act (RCRA) facility for the incineration of hazardous chemical wastes and was in operation from May 1976 through December 1988. It was initially owned and operated by the County of Caldwell. In mid-1977, the incinerator operation was leased to a private party (CSI). Currently, CSI is not operational and is undergoing RCRA closure. Public access to the CSI facility is currently restricted (fence).

The analysis and quantities of materials incinerated at CSI are uncertain, allegedly as the result of a fire that destroyed CSI records. According to annual reports submitted by CSI to the State (Attachment 1), the majority of the waste stream materials reportedly incinerated at CSI included furniture industry wastes (toluene, xylene, other halogenated and

nonhalogenated solvents, paint, and lacquer) and waste torpedo fuel (Otto Fuel II). The spent torpedo fuel comprised up to 10 percent of the CSI incineration waste stream. Reportedly, Otto Fuel II, as used in torpedoes, contains propylene glycol dinitrate (76 percent), 2-dinitrophenylamine (1.5 percent), and di-N-butyl sebacate (22.5 percent). In the spent or waste fuel, cyanide may be present in concentrations up to 0.1 percent. Refer to Attachment 1 for a summary of materials handled at CSI.

During past incineration operations, inhalation of air emissions may have affected the health of the surrounding population. According to a State report, an air pollution control system that consisted of two parallel bag filters to control particulate emissions from the incinerator and carbon adsorption modules to control evaporative losses from storage tanks was installed in 1987. Particulate and contaminant fallout from past incineration operations may have resulted in off-site soil contamination. State reports suggest that the significant and widespread vegetative damage that occurred in areas immediately around the site may have been the result of incinerator operations. The damage was attributed to hydrogen chloride deposition on the flora. A private citizen also collected samples of the material that was deposited onto the leaves. Analysis of the material by an independent laboratory showed the material to contain a tetrachlorodibenzodioxin (dioxin) at a level of 2.6 ug/kg (ppb). The specific congener was not identified.

Off-site soil contamination (EPA and State data) detected on an adjacent property (former dairy farm) appears to be due to past CSI practices. Former workers claim (ATSDR interview) to have occasionally dumped wastes onto this property. This activity is supported by the detection of low concentrations of volatile and semivolatile organic compounds (VOCs) in soil and soil gas samples (refer to Attachment 2, Tables 2a, 2b, 2c). This property was used for grazing of approximately 30 dairy cattle. Although chemicals were never detected in the milk, the customer discontinued purchasing milk from this farming operation. The dairy cattle operations were discontinued, and the land is now owned by Caldwell County.

A potential for area groundwater contamination exists because of former CSI operations. Information from former employees indicates that drums (reportedly up to 70,000) containing waste were routinely buried in the adjacent County municipal landfill. The landfill is currently in operation. Because of ongoing landfill covering operations, EPA contractors have estimated that the drums would now be approximately 80 feet below the surface grade. Groundwater is estimated by EPA contractors to be at least 160 feet below the surface. The landfill is located on a groundwater divide. A portion of the groundwater appears to discharge into springs located on the former dairy farm property. According to EPA contractors, approximately 30 percent of the residents within a 5-mile radius from the CSI facility use groundwater for their potable water supply.

A concerned citizens group reported that approximately 60 residences are located within a half-mile radius of the CSI facility. The majority of the homes are located in the community of Mount Harmon Heights. Approximately 3 years ago, reportedly because of the presence of VOCs in private area wells, the majority of area residences were connected to a municipal water supply. The source and extent of the groundwater contamination have not been defined. The number of residents whose dwellings are presently not connected to municipal water or who still use private wells for potable purposes is unknown to ATSDR.

Results of an EPA contractor's 1988 sampling investigation revealed elevated concentrations of contaminants in and around the CSI facility in soils, soil gas, and springs (former dairy farm property). Elevated levels of VOCs and semi-VOCs were detected in soil gas over most of the facility and in one area of the former dairy farm property. Elevated levels of VOCs were also detected during off-site sampling of the springs and a private well on the former dairy farm property. Refer to Attachment 2 for contaminants and concentrations detected.

BASIS FOR ADVISORY

When interviewed by ATSDR, former employees of CSI claimed they received little or no training about the potential toxic nature of the materials they handled. Because of alleged improper or nonexistent safety procedures, they believe that they were routinely exposed to hazardous materials. To date, ATSDR has concluded that 5 of the approximately 60 to 80 former employees have medically documented health problems that may have been caused by exposure to wastes handled at CSI. Health problems documented by physicians in Lenoir, North Carolina, and at Duke University, North Carolina, and the University of California at San Francisco, include toxic encephalopathy, dermatitis, respiratory complaints, arthritic complaints, chest pain, and transient elevations of liver function tests. Toxic encephalopathy includes tremors and balance difficulty (implying cerebellar dysfunction), short-term memory loss, behavioral changes, headache, and autonomic dysfunction (sweating and swings in blood pressure, temperature, and heart rate). Two of these former employees have had progressive deterioration of central nervous system functions, despite cessation of work at CSI. The ATSDR review of the toxicology literature for substances allegedly handled by CSI shows that some of the substances possess neurotoxic properties.

The experience of one family raises the question regarding whether family members of some former employees may have experienced adverse health problems. This family's 2-year-old child developed asthma. When the parent began leaving work clothes at CSI, rather than wearing them home and washing them, the child's symptoms rapidly disappeared.

During CSI incineration operations, many of the residents in areas adjacent to the facility complained of respiratory problems, eye and skin irritations, and nausea. On the night of September 13, 1989, a fire at CSI forced the evacuation of approximately 250 area residents. Area hospitals treated 54 persons for respiratory ailments. The fire involved a roll-off box of waste lacquer solids. An area physician has reported to ATSDR that he is aware of 14 current cases of reactive airway disease in residents surrounding the CSI facility. This health information has become available since the May 21, 1990, Health Consultation.

The ATSDR is currently unaware of any health problems in the population surrounding the facility that could be attributed to exposure to potentially contaminated soil and groundwater. Until comprehensive off-site and residential environmental sampling data have been received and reviewed, the potential exposure of area residents to possible soil and groundwater contamination cannot be overlooked.

Finally, exposure to contaminants on-site (Attachment 2) may pose a health hazard to persons who may gain access to the site and are improperly protected.

CONCLUSION

The ATSDR has determined that there is a significant threat to human health for some former CSI employees of the CSI facility because of past workplace conditions. In addition, preliminary investigations indicate that family members of some former CSI employees may also have been placed at risk. Work practices and conditions known to have existed at CSI may have led to health problems, resulting from: (1) dermal contact with materials; (2) inhalation of hazardous materials; and (3) potential ingestion of hazardous materials. Documented adverse health effects in several of the former employees, including toxic encephalopathy, dermatitis, respiratory complaints, arthritic complaints, and chest pain, may be associated with past exposures to the wastes handled at CSI. Secondary exposures and subsequent health problems of worker family members are suspected to have occurred by the same exposure routes as noted above.

Some pulmonary health problems of some nearby residents may have occurred because of past inhalation exposures to CSI incinerator emissions and other air releases. As this possible health problem is the result of past exposures via inhalation of incineration emissions, which are no longer occurring, no further exposures are expected.

The ATSDR is currently unaware of any health problems in the population surrounding the CSI facility that could be attributed to exposure to contaminated soil and groundwater. Because currently available data are inadequate to fully characterize potential contamination in off-site and residential areas, the following routes of exposure remain a possible

concern: (1) the potential for current and future human health problems resulting from exposure to potentially contaminated soils; (2) the potential for current and future health problems resulting from exposure to the potential present or future contamination of private wells used for potable water in the areas surrounding the facility; and (3) the potential human health problems resulting from exposure to contaminated soils on the CSI facility and the adjacent former dairy farm properties, if security is breached.

RECOMMENDATIONS AND PROPOSED ACTIONS:

The ATSDR and NIOSH will take the following actions:

- NIOSH will identify all worker personnel who may come in contact or were formerly in contact with these wastes. In conjunction with this activity, ATSDR will identify all family members (of workers) and residents who reside in the area surrounding the CSI facility who may come in contact or were formerly in contact with these wastes. Appropriate public health follow-up for the identified populations will be undertaken.

The ATSDR and the State of North Carolina should:

- Provide health education materials and assistance to the local health care providers and County health officials.

The ATSDR recommends that EPA:

- Dissociate all populations from the contaminants associated with the CSI facility that may pose a public health hazard. Private well water used for potable purposes (drinking, bathing, other personal use) should be regularly monitored for site-related contaminants, or residents should be provided with an alternate water supply. Access to the CSI facility by the public should remain restricted. Access to the former dairy farm property should be restricted until the extent of contamination and potential health threats have been adequately characterized. In the event that surface soil sampling results reveal elevated contaminant concentrations in traffic areas in and around the landfill (i.e., roadways, dumping areas for the general public), restricting access to these areas may be recommended.
- To better determine the potential threat to health of populations surrounding the former incinerator facilities, conduct multi-media on- and off-site environmental sampling. This sampling should include an area private well survey and subsequent sampling and analysis; residential surface soil sampling; identification of the source and extent of groundwater contamination; and a characterization of the extent of contamination on the CSI facility, the former dairy farm property, and the municipal landfill.

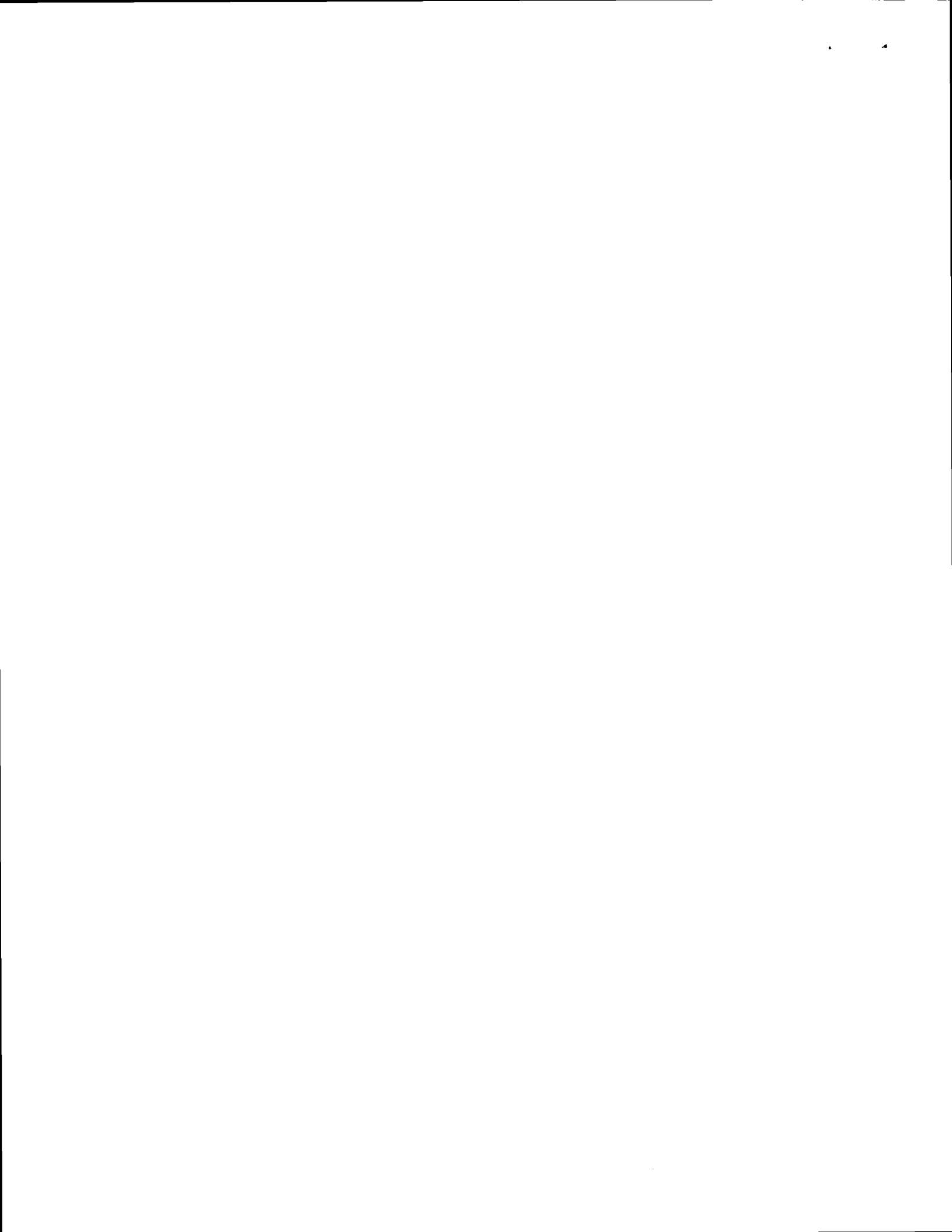
- Consider inclusion of the Caldwell Systems, Inc. facility on the National Priorities List, and/or using other statutory or regulatory authorities as appropriate to characterize the site and take necessary action.

- Investigate facilities that currently handle the unique kinds of waste formerly handled at the CSI facility, to ensure that proper controls are in place and proper handling procedures are being followed to prevent or identify similar public health problems.

For additional information, please contact the ATSDR at the following address:

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Atlanta, Georgia 30333
(404) 639-0610
FTS 236-0610

Attachments



UPDATE

Delayed Reaction

Two years after an incinerator stopped burning, government and the press begin sorting out what went wrong

BY ADAM SSESSEL

The hazardous waste incinerator in Caldwell County has been shut down for more than two years, but the heat it generated—emotional, political and social—continues to be felt. Indeed, that heat seems to be intensifying.

The incinerator, privately operated from 1976 to 1988, has been a long-running controversy among people living in the foothill county of Caldwell. People who lived near the incinerator complained for years of breathing problems, and ex-workers now suffer from severe neurological and brain damage. The facility, run by a company called Caldwell Systems Inc., was closed in May 1988 not by the state, which was responsible for enforcing environmental laws, but by the county.

In recent months, as the state has tried to convince people in several counties to accept a major new hazardous-waste incinerator, the state's handling of the Caldwell incinerator has come under increasing scrutiny. *The Independent* ran a story in April, called "Burning Questions," that reported examples of state employees who tried without success to bring problems at the incinerator to their bosses' attention. In our July 18 issue, in a story called "What the Governor Knew," *The Independent* reported for the first time that Gov. Jim Martin

allowed the incinerator to keep burning after he was given detailed information about sick neighboring residents.

Since our story three weeks ago, other newspapers and some television stations have made the Caldwell incinerator major news across the state. But most of the state's media has allowed Martin to say, without challenge, that he was unable to act.

At his weekly news conference the day after *The Independent's* story appeared, Martin spoke for roughly 40 minutes on the subject. Martin praised the story, saying it was "carefully reported" and "gave the facts," but asserted he had neither enough proof nor authority to shut down or otherwise curb the incinerator.

"The governor and the state do not have the right to shut down a business because somebody complains," Martin told reporters. "There's always some basis for complaining, and if you operated that way it would go overboard. To do something about it, we had to have evidence that would stand up."

This defense of the state's actions—that legally, neither Martin nor any other state official had the power to act—has been repeated numerous times since the governor's original press conference. Both Martin and reporters have cited the complicated matrix of laws and regulations that tied state officials' hands. But Martin failed to point out that state



Gov. Jim Martin from STUART ROSSMAN

officials, including Martin himself, had substantially more than complaints to go on.

Indeed, the report Martin received said a Caldwell County doctor had diagnosed about 15 people with breathing problems related to the incinerator. Martin also read letters from a specialist at Duke University Medical Center who said one neighboring resident breathed smoke from the stack that probably contained phosgene, a poison gas used in World War I. Finally, the state medical doctor who wrote the report for Martin said it was "plausible" that the incinerator was making people sick—and he quoted from a state inspector's report showing vegetative damage around the incinerator to back that conclusion up.

What's more, Martin did have the authority to shut down the incinerator—or at least to try. The governor could have invoked state statute G.S. 130A-19, which gives the state authority to direct any facility deemed a public health nuisance to "take any action necessary" to cease the nuisance. The law also says that if a facility refuses, the state can sue, and the suit must be heard within 60 days. Even Phil Kirk, Martin's former chief of staff and now head of North Carolina Citizens for Business and Industry, acknowledged to *The Independent* that Martin could have invoked such general laws and taken his chances in court later.

At least one state official has said he did use his authority to close the Caldwell incinerator. For our July 18 story, Martin's secretary of Human Resources, David Flaherty, told *The Independent* that he became so frustrated with the health problems that he ordered state officials to shut it down. The public record, how-

ever, contradicts Flaherty's assertion: Caldwell Systems closed the incinerator in May 1988 to settle a lawsuit that the county—not the state—had filed.

Yet, at his press conference, Martin attempted to show that the state had acted to protect citizens. The governor did so by refining Flaherty's claim, saying that Flaherty had requested Earl Mac Cormac, the governor's science advisor, to meet with Caldwell Systems and county officials to settle their dispute.

Martin claimed that as a result of that meeting, held in January 1988, the company "agreed it would be closed down without having to go to court." Martin added, "That meeting did produce an agreement that led within a few months to the closing of the incinerator."

But the two Caldwell County officials who attended that meeting, county manager Bill Forbes and Bill Ross, a Greensboro attorney hired by the county, told *The Independent* that wasn't so. Indeed, they said, the county had sued Caldwell Systems a month before the meeting; all Mac Cormac asked for during the meeting was a statement of position from both sides. Ross and Forbes said they heard nothing back from Mac Cormac after that. "The meeting didn't seem to move either of the parties," Ross said.

For the first week after Martin's press conference, his comments were largely unreported, as were *The Independent's* revelation that Martin had knowledge of ill health effects.

Then, two weeks ago, a federal agency called a news conference in Charlotte to say they were launching an unusual inquiry into the health damage Caldwell Systems did. The group, called the Agency for Toxic Substances and Disease Registry, said that the problems at Caldwell Systems appeared severe enough for the federal Environmental Protection Agency to launch a nationwide "strike force" to determine if other U.S. incinerators have been as harmful (see accompanying story).

That made front-page news in many of the state's dailies, and since then the issue of how the state handled an old hazardous waste incinerator has figured prominently in whether citizens should allow the state to site a new one. Gov. Martin, under pressure from other Southern states to build a place where toxic substances can be processed, wants the new incinerator built and located by the end of next year. But grassroots opposition in the two areas targeted for the incinerator has been fierce. And until now, the editorial pages of the state's biggest newspapers have sided with Martin.

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Martin, NC

Caldwell incinerator could prove national test case

REACTION

continued from page 9

accusing opponents of falling prey to the "not-in-my-backyard" syndrome.

A day after the federal probe was launched, however, *The News and Observer* carried a lead editorial, headlined "State incinerates trust," whose tone was quite different. The editorial said that the Caldwell County situation "gives reason to ask if the Martin administration has taken seriously enough the health risk of toxic waste incineration" and concluded that "there has been far too little caring by this state about the effects of industrial technology on the bodies and nerves and lives of Tar Heel citizens."

The *N&O* said the facts of the Caldwell case are only now emerging, and the paper was exactly right: Doctors are only now uncovering the severity of the health problems the incinerator caused. A Caldwell County doctor, Marc Guerra, has diagnosed roughly a dozen people with asthma-like breathing problems from the incinerator. Most of those affected have a disease called reactive-airways distress syndrome, which involves a shortness of breath, sensitivity to strong scents like perfumes, greater susceptibility to infections like bronchitis and pneumonia and special difficulty getting around in cold weather. Specialists at Duke have confirmed most of Guerra's diagnoses.

Just in the last two months, Guerra has diagnosed one 53-year-old person who lived close to the incinerator as having bronchio-obliterans with obstructed pneumonia, a disabling condition that involves scarring of the lungs. Another person probably has the disease, Guerra says. A specialist at UNC-Memorial Hospital has confirmed his diagnoses.

Now, the federal government will get in on the act, conducting in the next few months a comprehensive health study of both workers and roughly 200-400 nearby residents. The Agency for Toxic Substances and Disease Registry's work should result in a conclusion about whether residents living near the incinerator have more health problems than control populations, says agency medical officer Mike Straight.

For the people of Caldwell County who worked and lived around the incinerator, the federal government's involvement has been a godsend. There is little but distrust and disgust for the state of North Carolina among Caldwell County residents, and that's not just among those affected. "The state knew and they didn't do anything about it," one elderly lady said as she ended her bridge game recently in the card

room of Lenoir's Cedar Rock Country Club. "Doctors were telling them there was a problem and they didn't do anything about it."

Residents' mistrust was sparked once again in late June in another incident which has received little attention. An official of the state Industrial Commission ruled that Gordon Shatley, an ex-incinerator worker who now has severe neurological damage, was not harmed as a result of exposures to highly toxic chemicals while on the job. The ruling came despite three doctors' testimony that Shatley's impairments came from exposure at Caldwell Systems.

Still, some state officials in other departments are beginning to admit the state did a poor job of regulation. "The serious adverse

Martin did have the authority to shut down the incinerator—or at least to try.

health effects that we heard described today are regrettable," *The News and Observer* quoted state health director Ron Levine as saying when the federal study was announced. "I'm really disappointed, retrospectively, that the various agencies—including our own—were unable to prevent the adverse health effects near this facility."

For his part, Gov. Martin, a Republican, is trying to shift some of the blame to the state Department of Labor, which is controlled by Democrat John Brooks. A front-page story in *The Winston-Salem Journal* repeated what *The Independent* reported in its April 12 issue: The labor department inspected the company only once, and fined them \$720 for a series of relatively minor offenses.

Environmental groups, though, are not letting Martin deflect the blame: Two weeks ago, a coalition of more than 30 of them asked the governor to appoint a special, independent commission to investigate the state's regulatory breakdown. Martin press spokesman Tim Pittman says Martin will probably appoint such a commission after conferring with environmental leader Bill Holman.

That commission may or may not conclusively decide what went wrong. The public might have to wait until a jury decides whether the county, which is suing the state for failing to enforce its environmental laws, has a case. But to people like Holman, this much is clear: "It appears the state just put operation of the hazardous waste incinerator above public health," Holman said at a news conference. "We want to make sure this doesn't happen again." ■

TEST CASE

continued from page 9

on it and a stack." But these facilities were regulated under "interim" permits: Tougher, final permits were slow to take effect.

By the mid-1980s, grassroots groups like the Citizens Clearinghouse for Hazardous Waste were writing papers saying that like landfills, incinerators are not a safe way to get rid of toxic chemicals. Now, many of these groups are starting to point to Caldwell Systems as the classic case of why incineration doesn't work.

"Caldwell Systems is the showcase for an abominable facility and an abominable, irresponsible state response," Paul Connert, an associate professor of chemistry at St. Lawrence University in upstate New York and national coordinator of Work on Waste, a coalition of citizens' groups.

Gov. Martin is now trying to persuade citizens in Granville County and on the Rowan-Iredell County line that a new incinerator the state wants to site in one of them will be safe—different from the Caldwell incinerator. One of Martin's main points is that the new incinerator will be vastly more sophisticated than the old one—a Rolls Royce, state officials have said, compared to a Model T.

But people like Steve Lester, science director of Citizens Clearinghouse for Hazardous Waste, find this argument uncomfortably familiar: That's what the EPA and others said after clay-lined landfills didn't work. Then plastic linings were the answer, but they turned out to leak as well. Now incinerators are the panacea.

"As examples like Caldwell become more aware to the public, it's going to stimulate some of the same kind of studies that landfills did," Lester says.

And, he and others hope, such evidence will finally bring Americans to the end of the line when it comes to hazardous waste. "Dealing with waste after it's generated is a losing proposition," Lester says. "The only way to deal with the stuff is right up front."

That means waste reduction and recycling. In 1986, a federal agency called the Office of Technology Assessment said that at least half of all the toxic waste industry produces now could be eliminated—by substituting non-toxic chemicals for toxic ones, by changing the manufacturing process to use less toxins and other such means.

Connert, the St. Lawrence University chemist, says that companies could exchange waste

with each other because in some cases, "one company's waste is another company's dying material." Recycling, especially of solvents, is fairly easy, he adds. And technology exists to take the toxins out of such highly toxic chemicals such as PCBs. "It's not just technology that's the problem," Connert says, "it's the strategy that's the problem."

The strategy has been to build more incinerators and pay what critics call lip-service to waste reduction. Nationally, industry's own surveys show toxic-waste production increasing, according to Joel Hirschhorn, a former federal official and the author of a forthcoming book, *Prosperity Without Pollution*. And in North Carolina, people like Bill Holman of the Conservation Council note that the state has spent more money on trying to site a new incinerator than its annual budget for helping industry find ways to eliminate its toxic waste.

North Carolina has one of the best waste reduction programs in the nation—but environmentalists say that's only because other

The battle over hazardous waste doesn't just pit those who produce and use it against those who say "not in my backyard."

state's programs are so weak. Hirschhorn says that much of North Carolina's program, called Pollution Prevention Pays, has been "good P.R." without substance. "It's easy to say you have a program, but I've never seen a scrap of evidence that would show what they've accomplished," Hirschhorn says.

The state of North Carolina has promised four other Southern states to build a regional hazardous waste facility by the end of next year. But environmentalists think the state should renegotiate the agreement so the focus is on toxic-waste reduction and not on a huge new incinerator.

Those who favor moving ahead with the incinerator say health studies show the risk it will pose is low to those who live around it.

Those who oppose incineration, like Connert, say those studies are no substitute for the real-life experience the state has already gained in Caldwell County. "The best monitors we have right now are humans," he says, "and human beings who live near commercial hazardous-waste incinerators right now are being disabled."

—Adam Seessel

the country. "There was some feeling before that

See POLICE Page 4C

ber. Martin said it could be a foundation for the larger and larger project.

Pressure Builds To Close CSI For Good

BY LAURA ZELENKO

Caldwell Valley Bureau

Caldwell County is trying any legal means possible to shut down its chemical-waste plant permanently, but closing Caldwell Systems Inc. may still be months away, a county attorney said Tuesday. On Monday, a judge ordered CSI to close for 10 days, enforcing a health department order that declares the plant a public nuisance.

Or the county could terminate its lease with CSI, but that would likely take several months of arbitration, said county attorney George House. All the maneuvering was prompted by a chemical fire last Wednesday that forced more than 250 people from their homes for several hours and sent about 50 others to hospitals complaining of dizziness, nausea and breathing problems. "We want it gone," commissioners' Vice Chairman John Thuss said. "Everybody on the board wants it closed down, cleaned up and gone." On Tuesday, CSI turned away several out-of-

state trucks bringing waste to the plant, said Bruce Vanderbloemen, a CSI attorney. County sheriff's deputies patrolled the area.

CSI has accepted chemical waste from 27 states and Puerto Rico, as well as the Navy, which sends spent torpedo fuel.

Vanderbloemen said county commissioners bowed to political pressure when they asked a judge to close the business.

"I think the citizens are putting a great deal of pressure on commissioners to terminate the lease or close Caldwell Systems in any way that

See CALDWELL Page 4C

THE CHARLOTTE OBSERVER

7/20/89

... meet with their attorney

The Charlotte Observer, NC 9/20/89

Caldwell County Is Pushing To Close CSI Permanently

Continued From Page 1C

can be accomplished," Vanderbloemen said. "We're still here and plan to still be here."

The plant, which was a chemical-waste incinerator from 1977 to 1988, has drawn opposition from its neighbors for years.

Two years ago, the county sued to evict CSI. The result was a new contract between the county and CSI, with the company closing its incinerator and opening a storage and treatment plant.

The contract called for an outside arbitrator to settle any disagreement. That way, House said, the county can end its lease with CSI quicker than going to court.

But after last week's fire, the county searched for an even quicker way to close the plant.

On Sunday night, Health Director Marjorie Strawn issued an order to close the plant, saying it was unsafe and a "public health nuisance."

When CSI ignored the order Monday, the county went to court.

After 10 days, the county again will ask a judge to close the plant

until a full hearing can be scheduled on Strawn's order, House said. The law requires such a hearing within 60 days.

The county is looking at several options to close CSI permanently:

- Terminate its lease by saying CSI has failed to "substantially comply with federal state and local environmental laws." CSI likely would appeal to an arbitrator.

- Have the health director issue another order seeking a permanent closing, saying CSI won't ever be safe. Sunday's order said CSI plant should close until Strawn has determined it is safe. Any permanent order probably would go to trial.

- Encourage the state to shut down CSI by revoking its state operating permit.

- Encourage the federal Environmental Protection Agency to close CSI by finding the plant a "degradation to public health."

County officials said the EPA has promised to release in about 45 days its report on CSI, including an investigation begun several years ago.

Students Dangling



State of Wisconsin / DEPARTMENT OF NATURAL RESOURCES

State Office Building, Room 104
3550 Mormon Coulee Road
La Crosse, WI 54601

Carroll D. Basadny
Secretary

May 14, 1987

4530

Major Henry F. Simon
Director, Directorate of Engineering and Housing
Department of the Army
Headquarters Fort McCoy
Sparta, WI 54656

Dear Major Simon:

RE: Request to Open Burn 240,702 Pounds of Waste Propellant at
Fort McCoy

The Wisconsin Department of Natural Resources denies your request to open burn waste propellant to be received from the Savanna Army Depot Activity (SVADA), located in Illinois. In making this decision I have reviewed your proposal with staff of the department's Bureau of Air Management, Madison and with District Hazardous Waste Specialist, George Anderson.

Although Section NR 429.04(1)(d), Wisconsin Administrative Code, allows for the open burning of explosive material, such allowance can only be considered when no other safe means of disposal exists. Our concern is that the Army has not thoroughly investigated other options prior to proposing to bring this quantity of waste to Wisconsin for open burning. Specifically, although SVADA may not have a permitted incinerator for controlled burning of this waste, we question if there may not be an incinerator available in the Army system or outside of the Army. As long ago as 1978, when working with the U. S. Army/Badger Army Ammunition Plant, the Department of Natural Resources ordered the Army to develop an alternative disposal method for waste explosives.

Assuming all searches for an existing incinerator fail and the U. S. Army does not proceed with developing an incinerator for this disposal, this department recommends the Army coordinate with the Illinois EPA the disposal of the waste propellant at the site the waste is generated. There appears to be no environmentally beneficial reason to bring 240,702 pounds of waste propellant to Wisconsin, where no better combustion conditions exist than in Illinois. Also, Wisconsin follows the same federal hazardous waste guidelines as Illinois and, according to George Anderson, the question of a variance from the Wisconsin hazardous waste rules has not yet been resolved.

Major Henry F. Simon - May 14, 1987

2

If you have questions on this decision, or wish to further discuss this matter, please call me at 608-785-9000.

Sincerely,

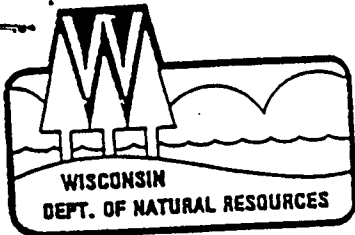


Martin F. Sellers
Air Quality Engineer

MFS:jd

cc: George Anderson - WCD
Dean Packard - AM/3
Jon Heinrich - SD
Suzanne Bangert - SW/3
Marcia Penner - LC/5

RECEIVED
MAY 15 1987
AIR MGMT.



George E. Meyer
Secretary

State of Wisconsin \ DEPARTMENT

Attachment P.

101 South Webster Street
Box 7921
Madison, Wisconsin 53707
TELEPHONE 608-266-2621
DNR TELEFAX 608-267-3579
DNR TDD 608-267-6897

SOLID & HAZARDOUS WASTE MGMT 608-266-2111
SOLID & HAZARDOUS WASTE TELEFAX 608-267-2768

October 28, 1993

IN REPLY REFER TO: FID # 642024900
Monroe County
HW Licensing File

Colonel Scott W. Hyatt
United States Army, Ft. McCoy
Office of the Commander
Sparta, WI 54656

SUBJECT: Emergency Waiver Approval
U.S. Army, Ft. McCoy
Explosive Ordnance Demolition (EOD) Unit
EPA#: WID3210020563

Dear Colonel Hyatt:

The Western District & Central Offices, Wisconsin Department of Natural Resources, have completed their review of the Waiver request received on October 26, 1993 for the above referenced facility. The submittal requests an emergency waiver for the management of hazardous waste as follows:

After an October 5, 1993 inspection, representatives of the Army Material Command's (AMC) Quality Assurance/Quality Control Inspection Team expressed concern with both the amount and condition of munitions stored at the Ammunition Storage Point (ASP) with serviceable ammunitions. Munitions not performing as intended or designed, or those recovered after misfires, are stored in the ASP for future treatment. These munitions have accumulated at the ASP pending the issuance of a Subpart X permit which would allow their treatment at Ft. McCoy.

AMC informed Ft. McCoy the accumulated munitions may be unstable due to having already been fired and not detonating as designed. Additionally, many munitions degrade over time increasing their susceptibility to shock and/or temperature changes. As a result, these munitions cannot be safely transported over public roads for treatment. Furthermore, since these munitions are thus considered a hazard, and are not to be stored with serviceable ammunitions, the AMC has recommended the demilitarization of these hazardous ordnances immediately.

Ft. McCoy has consequently been granted permission by the department to treat the following 935 pounds (Net Explosive Weight) of munitions currently stored at the ASP. Treatment of these munitions will be conducted at Ft. McCoy's Explosive Ordnance Demolition Unit.

FINDINGS OF FACT

1. The U.S. Army, Ft. McCoy Training Facility was notified, after an inspection by representatives of the Army Material Command's (AMC) Quality Assurance/Quality Control Inspection Team, the storage of unexploded ordnances with serviceable munitions was a hazard. Due to the potential instability and location of these ordnances, the AMC recommended the unexploded ordnances immediate demilitarization. The Department was notified by Ft. McCoy via letter on October 26, 1993 of this necessity to demilitarize 932 pounds (Net Explosive Weight) of unexploded ordnances.
2. The Department finds that these circumstances constitute an emergency situation and warrant issuance of a waiver for the treatment of hazardous waste.

CONCLUSIONS OF LAW

1. The Department has the authority pursuant to s. 144.62(13) Stats. and s. NR 600.09, Wis. Adm. Code to issue a waiver to allow treatment or storage of hazardous waste in the event of an emergency condition threatening public health, welfare or the environment.

DETERMINATION AND CONDITIONS

Based on the above findings, the Department hereby grants to United States Army a waiver under s. NR 600.09, Wis. Adm. Code and Section 144.62(13), Stats. from the requirement to obtain an operating license or variance for the wastes. This waiver is granted for a term of fourteen days, ending on November 15, 1993. The granting of this waiver is subject to the following conditions:

1. The management of the wastes constitutes a one-time occurrence. If waste is to be routinely treated or stored, then the facility shall obtain an operating license or variance in accordance with ch. NR 600-685, Wis. Adm. Code. This waiver covers the management of the following wastes:

<u>Name</u>	<u>Haz. Waste Code</u>	<u>Quantity</u>
40mm TP (Training purpose)	D003	189
40mm HE (High explosive)	D003; D005, D008	7
60mm HE	D003, D030	9
81mm ILL (Illuminating)	D003, D008, D030	1
105mm HE	D003, D008, D030	4
4.2" HE	D003	3
Grenade HE	D003	4
Grenade SMK (smoke)	D003, D005, D008, D030	13
Rockets HE	D003	46
Activators HE	D003	2
Signal	D003, D005, D008, D030	27

(Cont'd)

<u>Name</u>	<u>Haz. Waste Code</u>	<u>Quantity</u>
Simulators (booby trap)	D003	29
Simulators (Artillery)	D003	37
Simulators (hand grenade)	D003	2
Demo	D003	70
Fuzes	D003	6
3" projectile w/ M1907 fuse	D003	1
M228 grenade fuse	D003	1
Hosksin projectile	D003	1
57mm M306 HE projectile	D003	1
Type 97 Japanese hand grenade	D003	1
RGD-5 USSR hand grenade	D003	1
155mm M18 Illum. projectile	D003, D008, D030	1
M125A1 flare	D003, D008, D030	1
MK2 hand grenade	D003	1
Blu 26T dispersed munitions	D003	1
81mm mortar	D003, D008, D030	1
M17 heat rifle grenade	D003, D008	1
M50A1 signal ground red star	D003, D008, D030	1
3" projectile	D003	1
1 lb TNT blocks	D003	16
C-4 blocks	D004	8
Detonation chord	D003	60 ft.
M142 base coupler	D003, D008	5
M117 simulator booby trap flash	D003, D005	3
2.56mm blank rounds	D003, D005, D008	100
Fuse M228	D003	16
MK1 British grenade	D003	1

of foreign manufacture; similar design and performance to US equivalence.

2. The Facility shall comply with the site selection, security and record keeping requirements of ss. NR 630.14, 630.18 and 630.31, Wis. Adm. Code.
3. The hazardous waste management unit shall not be located in a floodplain, wetland or critical habitat area as required in Wis. Adm. Code.
4. The facility shall keep a written record at the facility in accordance with s. NR630.31, Wis. Adm. Code, which includes:
 - a. A description of the waste including its common name, hazardous waste number, physical form and quantity.
 - b. The method and date of the waste's handling and disposal.
 - c. The location of waste handling process.

5. Any residual material left after treatment shall be containerized immediately after the procedure has been completed. The residual material must be evaluated to determine if it is hazardous waste so it can be appropriately managed.
6. The minimum distances specified in s. NR 630.21(1), Wis. Adm. Code shall be complied with.
7. The facility shall obtain approval from the local fire department and/or bomb squad and provide them the opportunity to oversee the detonation process.
8. The detonation of the waste explosives shall be done by personnel trained in handling this type of waste. The facility shall provide the Department with records that the personnel are so trained in the documentation report.
9. A written report shall be provided to the District and Central Office's Solid and Hazardous Waste Program Supervisors within 45 days after compilation of management activities. The report should include:
 - a. A narrative describing an overview and necessity of the activities, site condition and security.
 - b. Information on the handling procedures.
 - c. Any problems that arose.

The Department reserves the right to require changes should conditions arise making it necessary. The granting of this waiver does not relieve you of the legal obligation to meet all other state, federal and local permit, zoning and regulatory requirements.

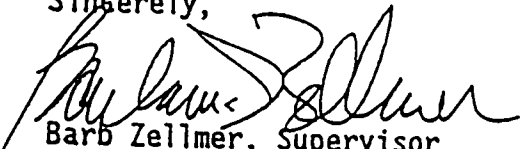
NOTICE

If you believe you have a right to challenge this decision, you should know that Wisconsin statutes and administrative codes establish time periods within which requests to review Departmental decisions must be filed.

For judicial review of a decision pursuant to ss. 227.52 and 227.53, Stats., you have 30 days after the decision is mailed, or otherwise served by the department to file your petition with the appropriate circuit court and serve the petition on the Department. Such a petition for judicial review shall name the Department of Natural Resources as the respondent. This notice is provided pursuant to s. 227.48(2), Stats.

Should you have any questions regarding this determination, please contact Ms. Ginger Hooper (Environmental Specialist, Wisconsin Department of Natural Resources, Western District Office) at 715-839-3759 or Mr. Matthew Talarczyk (Environmental Engineer, Wisconsin Department of Natural Resources, Central Office) at 608-264-6016.

Sincerely,


Barb Zellmer, Supervisor
Hazardous Waste Management Section
Bureau of Solid and Hazardous Waste Management

MRT:FtMcCoy\waiver1.doc

cc: Ed Lynch - SW/3
Matthew Talarczyk - SW/3
Steve Sletten - SW/3
Edwina Kavanaugh - LC/5
Dave Lundberg/Ginger Hooper - WD
Chuck Slaustas/Robert Egan - EPA Region V-HRP-8J
Jean Gromnicki - EPA Region V-HRM-7J
Steve Stokke - Ft. McCoy
Ralph Basinski - Brown & Root Environmental
Terry Buchholz - USACE, Omaha, Nebraska



CONGRESSMAN SCOTT KLUG'S SPECIAL UPDATE ON THE BADGER ARMY AMMUNITION PLANT

Dear Friends:

For many months, local residents have been concerned about the safety of the drinking water.

No doubt by now, you know the problem: Waste that is considered "hazardous" was generated by the Badger Army Ammunition Plant in Baraboo. Improper handling of the waste used in the manufacture of ammunition contaminated the plant's groundwater.

In 1988, the Army assured the public that all of the polluted water was contained on the base grounds. But in January 1990, two years after these assurances, new information indicated that chemicals are now contaminating wells *outside* of the grounds. Some of the waste is migrating toward the Wisconsin River, north of the water supply of Prairie du Sac.

Ever since the pollution was discovered, however, efforts to clean up the toxic waste have stalled. While U.S. statutes require federal agencies to obey national and state environmental laws, the Wisconsin Department of Natural Resources and the Environmental Protection Agency have limited power to force federal agencies to comply.

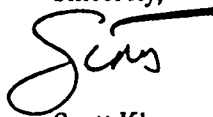
Meanwhile, the longer we wait for the Army to act on its own to clean up the hazardous waste, the more widespread and dangerous the pollution becomes.

That's why I recently endorsed a measure in the House that could help Sauk County and other communities across the country stop the spread of dangerous waste.

The "Federal Facilities Compliance Act" would force federal facilities such as Badger to comply with existing waste disposal laws. If the facilities do not, the measure would give the states the right to levy fines and penalties against the violators.

This bill sends a strong message that the Federal Government's own operations are not above the law.

I would like to share with you a statement that I made on the floor of the House urging other representatives to join me in passing the Federal Facilities Compliance Act. The problems we face in the area around Badger speak for themselves; they're the best illustration of why we need this measure passed into law.

Sincerely,

Scott Klug
Member of Congress

Vol. 137

WASHINGTON, THURSDAY, MAY 2, 1991

No. 66

Congressional Record

.....

Mr. KLUG. Mr. Speaker, I rise today, as my colleague just before me, to ask your support for the Federal Facilities Compliance Act. If I can, let me give you an example from my home State of Wisconsin why this legislation is necessary.

In 1977, as part of an assessment of military facilities across the country, the U.S. Army indicated there might be problems on what was a prominent ammunition site in World War II. Ten years later, the Army finally got around to testing the facility and assured everyone in the neighborhood that the facility was fine and no pollution was on site.

Now several years later, we find ourselves with wells contaminated on nearby farms and homes. We also discovered that the company which was hired by the Federal Government to do much of the assessment has now pleaded guilty to charges of filing fraudulent testing on that site itself, so the problem may be much worse than we ever expected it was; and now the State of Wisconsin, like States around the rest of this country, cannot do anything to force the Federal Government to clean up the site. It cannot even force the Federal Government to expedite the hiring of a new firm to test that site once again and cannot even force the Federal Government to pay the same kind of fines it can force private industry to do.

Mr. Speaker, the Federal Government should be a model for the clean-up of hazardous waste sites around the country, and instead we find it is a model for the way that sites should not be cleaned up. So I urge my colleagues to support the Federal Facilities Compliance Act, H.R. 1056.

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Scott Klug

U.S. House of Representatives
Washington, D.C. 20515
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1224 Longworth House Office Building
Washington, D.C. 20515
(202) 225-2906

.....

16 N. Carroll Street
Room 600
Madison, WI 53703
(608) 257-9200

SCOTT KLUG'S
OFFICES:

KLUG AND WISCONSIN WELCOME TROOPS HOME FROM OPERATION DESERT STORM



In April, Congressman Scott Klug joined hundreds of Second District families at Volk Field to welcome home the 13th Evacuation Hospital, a National Guard unit based in Madison. Three hundred troops returned to Wisconsin from the Madison unit after proudly serving our country in Saudi Arabia during Operations Desert Shield and Desert Storm.

International Citizens Declaration on Chemical Weapons

Russian-American NGO Summit on Chemical Weapons
October 20-22, 1995 Saratov, Russia

We, the citizen representatives of Russian and American chemical weapons production, testing, storage, and disposal sites having met for the first International Citizen Summit on Chemical Weapons Disposal in Saratov, Russia, on October 20-22, 1995, do hereby declare:

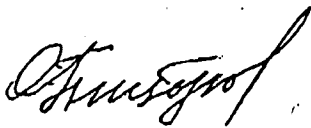
The primary criteria for all decisions related to chemical weapons disposal must be public safety and health. Citizens should be involved in all decision-making processes related to chemical weapons disposal, at the local, state, national and international levels. Thus, technology for chemical weapons disposal must be selected with citizen input and approval and should release no acutely toxic or persistent substances into the air, water, or land.

Because the technology at current destruction facilities, including incineration, does not meet the above standards, all existing chemical weapons disposal facilities and proving grounds must be closed immediately. Construction and planned construction of any additional chemical weapons disposal facilities must be halted until all of the following are developed: appropriate technologies meeting these standards, the legislative structure, and methods for constant monitoring and control.

An independent international scientific assessment, with public participation, should be conducted in the following areas: existing and proposed disposal technologies; risk evaluation; environmental damage to existing chemical weapons sites; public health and safety; and observed medical effects related to chemical weapons production, testing, storage, and disposal. All information related to the chemical weapons issue must be available for public review without restriction. Special medical care and compensation, as well as insurance, should be provided to those living in the areas where chemical weapons are located or whose health or environment has been impacted by chemical weapons.

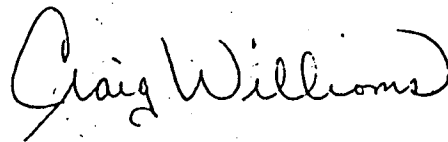
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The citizens and NGOs are prepared to work with their respective governments and militaries to develop appropriate solutions to this difficult problem. Once acceptable solutions are developed, we advocate swift disposal, under citizen physical review, of these dangerous remnants of the Cold War.



Olga Pitsunova
Center for Assistance to Environmental Initiatives
On behalf of:

Alternative Civilization Network, Saratov
Bashkir Chapter, Socio-Ecological Union
Bashkortostan Socio-Ecological Union
Benning Biostation, Saratov
Bird Protection Union of Russia, Saratov
Bryansk Union for Chemical Safety
Center of Independent Ecological Programs, Moscow
Chapaevsk Ecological Group
Chapaevsk Initiative Group
EcoDefense, Kaliningrad
Ecological Academy of Russia, Saratov
"Ecology and Human Health" Kirev-Chapetsk
Ecolaw, Saratov
Gorny Socio-Ecological Union
"Health to the Children" Saratov
Ishevsk Ecological Union
Kambarka GreenPeace
Lawyers for the Environment, Moscow
"Nature and Human Being", Kirov
Penza EcoKlub, Penza
Perm Chapter of Socio-Ecological Union
Pocep Union of Chemical Safety, Pocep
Rainbow Keepers, Nizhniy Novogrod
Saratov "EcoPrava", Saratov
Saratov Green Cross, Saratov
Saratov Union for Chemical Safety, Saratov
Shikhany Initiative, Shikhany
Socio-Ecological Union Press Service, Moscow
Soyuz Chernobyltzev, Volsk
Udmurdia Green Cross, Kambarka
Union of Chernobyl Victims, Pocep
"Volgograd EcoPress" Information Center
Volgograd Union of Chemical Safety, Volgograd
Zelenia Don, Cheboksary

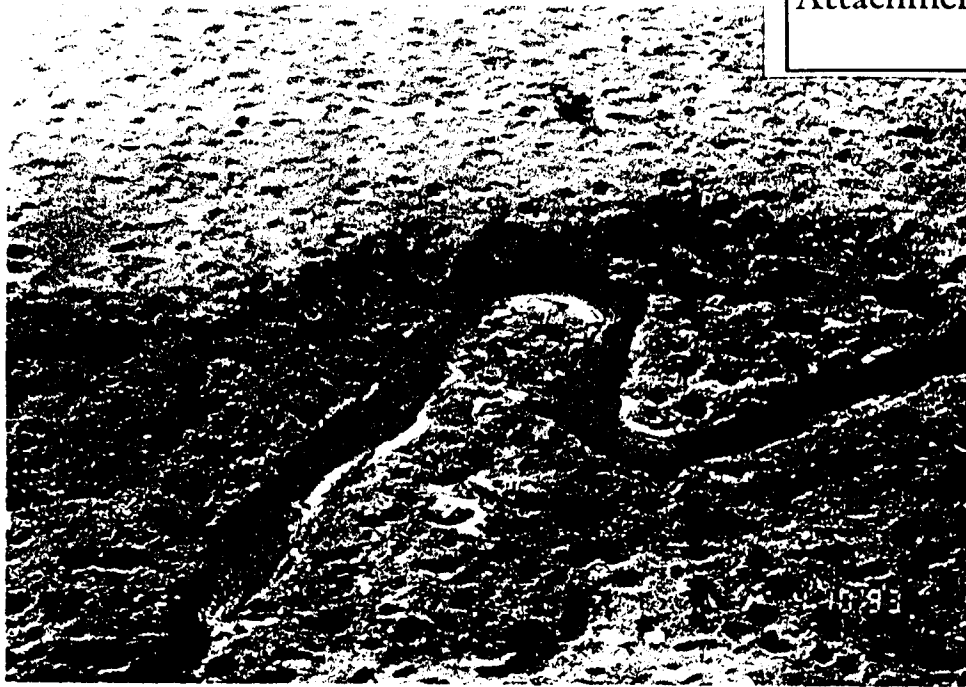


Craig Williams
Chemical Weapons Working Group
On behalf of:

Aberdeen Proving Ground Superfund
Citizens Coalition, Md.
Arkansas Fairness Council, Ark.
Citizens Clearing House on Hazardous
Waste, Virginia
Citizens Against Incineration, Ind.
Citizens for Environmental Quality, Ore.
Citizens for Safe Disposal, Md.
Coalition for Safe Weapons Disposal, Co.
Common Ground, Ky.
Concerned Citizens for Md.'s Environment
Concerned Citizens of Madison Co., Ky.
Families Concerned about Nerve Gas
Incineration, Ala.
Global Green USA, Washington, D.C.
Government Accountability Project,
Washington, D.C.
GreenLaw, Washington, D.C.
Greenpeace International Toxics Campaign
Indigenous Environmental Network, Minn.
Institute for Advancement of Hawaiian
Affairs, Hawaii
Kentucky Environmental Foundation, Ky.
Military Toxics Project, Maine
Newport Study Group, Ind.
Nuclear Free & Independent Pacific
Pacific Council of Indigenous Peoples, Hi.
Pine Bluff for Safe Disposal, Ark.
Sangre de Cristo Chapter of Sierra Club, Co.
Serving Alabama's Future Environment, Ala.
Tooele Clean Air Coalition, Utah
Utah Sierra Club, Utah
Veterans International, Washington, D.C.
Vietnam Veterans of America Foundation
Le Vao Matua, American Samoa

La Crosse River

Apr. 93



supposably in
protected buffer

Fort McCoy Wisconsin

La Crosse River, eight trout spawning tributaries & associated wetlands are being illegally and indiscriminately bombed. DoD intends that such use increases.

An immediate moratorium is needed until effective buffer areas are set up, and clean up must begin now.

It is the **responsibility** of State regulators and elected officials to respond by posting this info. and by taking action.



downstream from
bombing range

April, 1993

what a protected area
should look like

Dummy bombs will contain explosive

By N.S. Nakkewed 8/26/93
Times-News writer

TWIN FALLS - Dummy bombs dropped from Air Force planes at a proposed bombing range in Owyhee County will include an explosive "marker charge," according to a leaked federal document.

The document - an as-yet unreleased environmental impact statement - appears to contradict Gov. Cecil Andrus, who reportedly interrupted a top federal land manager's news conference Monday to insist that no explosives would be dropped during Air Force training.

Andrus took issue with Bureau of Land Management Director Jim Baca's characterization of the governor's proposal, which left the impression of exploding bombs, Andrus aide Scott Peyton said Wednesday.

Baca visited Idaho and toured the proposed range area Monday.

The governor said the bombs used on the proposed range would not contain any explosive, only a white power, like talcum, to mark the spot of impact.

According to the preliminary draft of the environmental impact statement, the Air Force will use one of two types of spotting charges in 96 percent of the practice bombs to be dropped. Spotting charges are used in visual scoring of bomb training.

Andrus maintains his proposal for about 25,000 acres of state land - still to be agreed to - Please see **EXPLOSIVE/C2**

Explosive

Continued from B1
gated through land trades with the BLM - in southwestern Owyhee County is more properly termed a "training range."

The Air Force proposes to use nine different types of ordnance - from 20 mm cannon shells to 2,000-pound dummy bombs - on the proposed range.

The Air Force would drop about 24,000 dummy bombs on bomb impact areas within the governor's proposed range each year.

The two marking charges in the bombs will be:

- The Hot Spot, which uses red

phosphorus. The charge burns at 2,732 degrees F for one-tenth of a second and produces a 6- to 8-foot flame capable of starting vegetation on fire.

The Cold Spot, which uses a small gunpowder charge to expel a chemical. The chemical creates a smoke cloud when it reacts with moisture in the air. It is not generally capable of starting vegetation on fire.

The practice bombs and flares - dropped by aircraft as a radar-avoidance

device - increase fire risk in the area, the preliminary draft impact statement said. The Air Force proposes to put 150-foot wide firebreaks around targets where vegetation is susceptible to fire.

But bomb impact areas are only part of the governor's proposal. It includes 33 sites for electronic emitters that would create an electronic combat range over most of southern Owyhee County.

could include no parking of vehicles on vegetated areas, use of spark arrestors, and restrictions on smoking. Monitoring of activities by the state would be necessary to ensure compliance with these policies.

→ During operation of the ranges, the use of training ordnance and flares would increase fire risk. In general, the ranges would be operated similarly to the SCR. Where required, firebreaks will be maintained around the target areas, and personnel with fire suppression responsibility and capability will be present whenever the range is active throughout the fire season. As proposed, 150-foot wide firebreaks would encircle the railyard and industrial complex impact areas in the South ITR, whereas similar width firebreaks would be strategically placed around 40 and 80 percent of the perimeter of the impact areas for the NW and SE FEBAs, respectively. Due to the lack of susceptibility of its vegetation, the area associated with the command post and airfield targets does not require a firebreak. Communication capabilities on the North and South ITR would provide for much more rapid notification. Furthermore, the State of Idaho will be part of an Interagency Support Agreement with the BLM for mutual fire suppression support. Under this agreement, it is likely that the state would be responsible for suppression within the target areas and on the acquired private lands, while the BLM would retain responsibility for public lands. However, it seems likely that the on-site personnel would respond to fires outside the targets first so as to reduce response time and the extent of fires. With this capability on-site, fire suppression would undoubtedly meet or exceed the BLM's acreage objectives for this area. Water would be available at the maintenance facilities on both the North and South ITR in sufficient quantity to support fire suppression efforts.

→ As noted above, the potential sources of fires from the proposed action include ordnance and flares. On the North ITR, approximately 16,071 training bombs are projected to be dropped per year. On the South ITR, approximately 8,005 bombs per year will be dropped. Ninety-six percent of this ordnance would include spotting charges. There are two predominant types of spotting cartridges used in training ordnance. The first is the Hot Spot cartridge, which on impact, expels red phosphorous to produce a brilliant flash of light and dense white smoke. Red phosphorous has an ignition temperature of 500 degrees Fahrenheit (F). When activated, the cartridge produces a high temperature of approximately 2,732 degrees F, and burns for approximately one-tenth (0.1) of one second, producing a flame approximately 6 to 8 feet in length (Sax and Lewis 1987). Although brief, this heat would be sufficient to ignite vegetation. The second type cartridge used, designated the Cold Spot, contains gunpowder and titanium tetrachloride in a glass ampule (T.O. 11A4-4-7). On impact, the gunpowder charge crushes the glass ampule and discharges it. The titanium tetrachloride reacts with moisture in the air to produce a smoke cloud. This chemical reaction does not produce the extremely high temperatures associated with the burning red phosphorous described above, and is generally incapable of igniting vegetation.

The probability of a fire starting from ordnance is expected to be low for two reasons. First, only cold spots would be employed when the fire ratings indicate sufficient risk. This restriction would likely apply throughout the fire season. Second, most of the ordnance would impact directly on or near the targets characterized by a relative lack of vegetation. Ordnance impacting outside these areas would likely contact more vegetation, but the requirements for the use of cold spots during periods of fire risk would reduce the probability of starting a fire to negligible levels.

Flare use in the training areas could also increase fire risk. Under the proposed action, approximately 6,900 and 4,500 flares would be released on the North and South ITR, respectively. Air Force specifications for flares require a 97 to 99 percent manufacturing reliability. The resulting 1 to 3 percent rejected units are comprised of those that fail receipt inspection, inspection prior to loading, those that fail to fire and eject from the dispenser on the aircraft, or, those that fall to the ground without igniting (duds). Because of the mechanism used to ignite flares, it is not possible for a flare to be discharged non-ignited, and then ignite spontaneously or unexpectedly during its fall. Similarly, no slow-burning flares occur; they either ignite and burn rapidly or they do not ignite.

Definitions

the authors this information could not be applied to human exposures. In some cases this information is mentioned so that the reader may know that some experimental work has been done.

(c) Published toxicity data were felt by the authors to be of questionable validity.

0 = No Toxicity. This designation is given to materials which fall into one of the following categories:

(a) Materials which cause no harm under any conditions of use.

(b) Materials which produce toxic effects on humans only under the most unusual conditions or by overwhelming dosage.

1 = Slight Toxicity:

(a) Acute Local. Materials which on single exposures lasting seconds, minutes or hours cause only slight effects on the skin or mucous membranes regardless of the extent of the exposure.

(b) Acute Systemic. Materials which can be absorbed into the body by inhalation, ingestion or through the skin and which produce only slight effects following single exposures lasting seconds, minutes, or hours, or following ingestion of a single dose, regardless of the quantity absorbed or the extent of exposure.

(c) Chronic Local. Materials which on continuous or repeated exposures extending over periods of days, months, or years cause only slight harm to the skin or mucous membranes. The extent of exposure may be great or small.

(d) Chronic Systemic. Materials which can be absorbed into the body by inhalation, ingestion or through the skin and which produce only slight effects following continuous or repeated exposures extending over days, months or years. The extent of the exposure may be great or small.

In general, those substances classified as having "slight toxicity" produce changes in the human body which are readily reversible and which will disappear following termination of exposure, either with or without medical treatment.

2 = Moderate Toxicity:

(a) Acute Local. Materials which on single exposure lasting seconds, minutes or hours cause moderate effects on the skin or mucous membranes. These effects may be the result of intense exposure for a matter of seconds or moderate exposure for a matter of hours.

(b) Acute Systemic. Materials which can be absorbed into the body by inhalation, ingestion or through the skin and which produce moderate effects following single exposures lasting seconds, minutes or hours, or following ingestion of a single dose.

(c) Chronic Local. Materials which on continuous or repeated exposures extending over periods of days, months or years cause moderate harm to the skin or mucous membranes.

(d) Chronic Systemic. Materials which can be absorbed into the body by inhalation, ingestion or through the skin and which produce moderate effects following continuous or repeated exposures extending over periods of days, months or years.

Those substances classified as having "moderate toxicity" may produce irreversible as well as reversible changes in the human body. These changes are not of such severity as to threaten life or produce serious permanent physical impairment.

3 = Severe Toxicity: ~~2~~ ^{Titanium tetrachloride}

(a) Acute Local. Materials which on single exposures lasting seconds or minutes cause injury to skin or mucous membranes of sufficient severity to threaten life or to cause permanent physical impairment or disfigurement.

(b) Acute Systemic. Materials which can be absorbed into the body by inhalation, ingestion or through the skin and which can cause injury of sufficient severity to threaten life following a single exposure lasting seconds, minutes or hours, or following ingestion of a single dose.

(c) Chronic Local. Materials which on continuous or repeated exposures extending over periods of days, months or years can cause injury to skin or mucous membranes of sufficient severity to threaten life or to cause permanent impairment, disfigurement or irreversible change.

(d) Chronic Systemic. Materials which can be absorbed into the body by inhalation, ingestion or through the skin and which can cause death or serious physical impairment following continuous or repeated exposures to small amounts extending over periods of days, months or years.

Toxicology Defined

In simple terms, toxicology may be defined as the study of the action of poisons on the living organism. Industrial toxicology is concerned with the human organism and consequently lies within the broad field of medicine. Since medicine cannot be considered an exact science in the same sense as chemistry, physics or mathematics, *toxicologic phenomena cannot always be predicted with accuracy or explained on the basis of physical or chemical laws.* It is this unpredictability which frequently reduces conclusions and decisions to opinion rather than fact.

THIRD EDITION

Dangerous Properties of Industrial Materials

N. IRVING SAX

Director, Radiological Sciences Laboratory, New York State Health Department, Albany, N. Y.

ASSISTED BY: MILTON S. DUNN / BENJAMIN FEINER / JOSEPH J. FITZGERALD / LEONARD J. GOLDWATER
JOHN H. HARLEY / DWIGHT F. METZLER / BERNARD L. OSER / ALEXANDER RIHM / MEREDITH THOMPSON



REINHOLD BOOK CORPORATION
New York Amsterdam London

PHOSPHOROUS ACID**General Information**

Description: Feather-like crystals.

Formula: HPO_3 .

Constant: Mol wt: 63.99.

Hazard Analysis and Countermeasures
See phosphorus compounds, inorganic.**PHOSPHOROUS ACID****General Information**

Description: Colorless to yellow deliquescent crystals; soluble in water and alcohol.

Formula: $\text{H}_2(\text{HPO}_3)$.

Constants: Mol wt: 82.0, d: 1.651 at 21°C, mp: 736°C, bp: decomposes at 200°C.

Hazard Analysis

See phosphorous compounds, inorganic.

Countermeasures

See phosphorous compounds, inorganic.

Shipping Regulations: Section 11.

IATA: Other restricted articles, class B, no limit (passenger and cargo).

PHOSPHORUS (AMORPHOUS, RED)**General Information**

Synonym: Red phosphorus.

Description: Reddish-brown powder.

Formula: P.

Constants: Mol wt: 124.08, bp: 280°C (with ignition), mp: 590°C at 43 atm., d: 2.20, autoign. temp.: 500°F in air, vap. d.: 4.77.

Hazard Analysis

Toxic Hazard Rating:

Acute Local: Ingestion 1.

Acute Systemic: Ingestion 1.

Chronic Local: 0.

Chronic Systemic: 0.

Toxicology: Relatively harmless unless it contains white phosphorus as an impurity.

Fire Hazard: Dangerous, when exposed to heat or by chemical reaction with oxidizers.

Spontaneous Heating: No.

Explosion Hazard: Moderate, by chemical reaction or on contact with organic materials.

Disaster Hazard: Dangerous; when heated, it emits highly toxic fumes of oxides of phosphorus; can react with reducing materials.

Countermeasures

Ventilation Control: Section 2.

To Fight Fire: Water (Section 6).

Personnel Protection: Section 3).

Storage and Handling: Section 7.

Shipping Regulations: Section 11.

I.C.C.: Flammable solid; yellow label, 11 pounds.

Coast Guard Classification: Inflammable solid; yellow label.

IATA: Flammable solid, yellow label, not acceptable (passenger), 5 kilograms (cargo).

PHOSPHORUS (WHITE)**General Information**

Description: Cubic crystals; colorless to yellow, wax-like solid.

Formula: P.

Constants: Mol wt: 124.08, mp: 44.1°C, bp: 280°C, flash p: spontaneously in air, d: 1.82, autoign temp: 86°F, vap. press.: 1 mm at 76.6°C, vap. d.: 4.42.

Hazard Analysis

Toxic Hazard Rating:

Acute Local: Irritant 3; Ingestion 3.

Acute Systemic: Ingestion 3; Inhalation 3.

Chronic Local: U.

Chronic Systemic: Ingestion 3; Inhalation 3.

TLV: ACGIH (recommended) 0.1 milligrams per cubic meter of air.

Toxicology: This material is dangerously reactive in air and turns red in sunlight. If combustion occurs in a confined space, it will remove the oxygen and render the air unfit to support life. High concentrations of the vapors evolved by burning it are irritating to the nose, throat and lungs as well as the skin, eyes and mucous membranes. If phosphorus is ingested, it can be absorbed from the gastrointestinal tract or through the lungs. The absorption of toxic quantities of phosphorus has an acute effect on the liver and is accompanied by vomiting and marked weakness. The long-continued absorption of small amounts of phosphorus can result in necrosis of the mandible or jaw bone, and is known as "phossy-jaw." Long-continued absorption, particularly through the lungs, and through the gastrointestinal tract can cause a chronic poisoning. This gives rise to a generalized form of weakness attended by anemia, loss of appetite, gastrointestinal weakness and pallor. The most common symptom, however, of chronic phosphorus poisoning is necrosis of the jaw. It can also cause changes in the long bones, and seriously affected bones may become brittle, leading to spontaneous fractures. It is especially hazardous to the eyes and can damage them severely. It also has adverse effects on the teeth, and workers should have periodic dental examinations. The yellow form of phosphorus, when it comes into external contact with the eyes, can cause conjunctivitis with a yellow tint. If the material is inhaled, it can cause photophobia with myosis, dilation of pupils, retinal hemorrhage, congestion of the blood vessels and rarely an optic neuritis.

Radiation Hazard: Section 5: For permissible levels, see Table.

Artificial isotope ^{32}P , half life 14.3 d. Decays to stable ^{32}S by emitting beta particles of 1.71 MeV.

Fire Hazard: Dangerous, when exposed to heat or by chemical reaction with oxidizers. Ignites spontaneously in air.

Spontaneous Heating: No.

Explosion Hazard: Moderate, by chemical reaction with oxidizing agents.

Disaster Hazard: Dangerous; it emits highly toxic fumes of oxides of phosphorus; can react vigorously with oxidizing materials.

Countermeasures

Ventilation Control: Section 2.

To Fight Fire: Water (Section 6).

Personnel Protection: Section 3).

First Aid: Section 1.

Storage and Handling: Section 7.

Shipping Regulations: Section 11.

White or yellow-dry, in water for both I.C.C. and Coast Guard.

I.C.C.: Flammable solid; yellow label, not accepted (dry), 25 pounds (in water).

Coast Guard Classification: Inflammable solid; yellow label.

MCA warning label.

IATA (white or yellow, dry): Flammable solid, not acceptable (passenger and cargo).

(white or yellow, in water): Flammable solid, yellow label, not acceptable (passenger), 12 kilograms (cargo).

PHOSPHORUS CHLORIDE. See phosphorus trichloride.

PHOSPHORUS CHLORIDE NITRIDE**General Information**

Description: Prisms.

Formula: $\text{P}_2\text{N}_2\text{Cl}_4$.

Constants: Mol wt: 603.05, mp: 237.5°C, bp: 251-261°C at 13 mm.

Hazard Analysis

Toxicity: Highly toxic. See hydrochloric acid.

dusts of titanium or titanium compounds such as titanium oxide, may be placed in the nuisance category. Titanium tetrachloride, however, is an irritating and corrosive material, because, when exposed to moisture, it hydrolyzes to hydrogen chloride. See hydrochloric acid.

TITANIUM DIBROMIDE

General Information
Description: Black powder.
Formula: $TiBr_2$.
Constants: Mol wt: 207.73, mp; decomposes $> 500^\circ C$.
Hazard Analysis and Countermeasures
See bromides.

TITANIUM DICHLORIDE

General Information
Description: Light brown to black, deliquescent solid.
Formula: $TiCl_2$.
Constants: Mol wt: 118.81, mp; sublimes in H_2 .
Hazard Analysis and Countermeasures
See titanium compounds and hydrochloric acid.

TITANIUM DIOXIDE

General Information
Synonym: Rutile.
Description: Blue crystals.
Formula: TiO_2 .
Constants: Mol wt: 79.90, mp: $1640^\circ C$ (decomp.), d: 4.26.
Hazard Analysis
Toxicity: See titanium compounds. A common air contaminant (Section 4).
TLV: ACQIH (recommended); 15 milligrams per cubic meter of air.

TITANIUM DISULFIDE

General Information
Description: Yellow scales.
Formula: TiS_2 .
Constants: Mol wt: 112.03.
Hazard Analysis and Countermeasures
See sulfides.

TITANIUM HYDRIDE

General Information
Description: Metallic, dark gray powder or crystals.
Formula: TiH_2 .
Constants: Mol wt: 49.9, d: 3.76.
Hazard Analysis
Toxicity: See hydrides and titanium compounds.
Fire Hazard: Moderate, when exposed to heat or flame. Burns brilliantly in air. See hydrides.
Explosion Hazard: Moderate, in the form of dust, by chemical reaction.

Disaster Hazard: See hydrides.

Countermeasures

Storage and Handling: Section 7.

Shipping Regulations: Section 11.

IATA: Flammable solid, yellow label, not acceptable (passenger), 12 kilograms (cargo).

TITANIUM ISOPROPYLATE. See isopropyl titanate.

TITANIUM METAL POWDER, DRY

Shipping Regulations: Section 11.
ICC: Flammable solid, yellow label, 75 pounds.
IATA: Flammable solid, yellow label, not acceptable (passenger), 35 kilograms (cargo).

TITANIUM METAL POWDER, WET WITH NOT LESS THAN 20% WATER

Shipping Regulations: Section 11.
Coast Guard Classification: Inflammable solid; yellow label.
ICC: Flammable solid, yellow label, 130 pounds.

IATA: Flammable solid, yellow label, not acceptable (passenger), 70 kilograms (cargo).

TITANIUM MONOSULFIDE

General Information
Description: Reddish solid.
Formula: TiS .
Constants: Mol wt: 79.97.
Hazard Analysis and Countermeasures
See sulfides.

TITANIUM NITRIDE

General Information
Description: Brassy crystals.
Formula: TiN .
Constants: Mol wt: 62.0, mp: $2930^\circ C$, d: 5.43.
Hazard Analysis and Countermeasures
See titanium compounds and nitrides.

TITANIUM OXALATE

General Information
Description: Yellow prisms.
Formula: $Ti_2(C_2O_4)_3 \cdot 10H_2O$.
Constants: Mol wt: 540.02.
Hazard Analysis and Countermeasures
See oxalates and titanium compounds.

TITANIUM OXIDE. See titanous dioxide.

TITANIUM PHOSPHIDE

General Information
Description: Gray, metallic solid.
Formula: TiP .
Constants: Mol wt: 73.88, d: 3.95 at $25^\circ C$.
Hazard Analysis and Countermeasures
See phosphides and titanium compounds.

TITANIUM SESQUISULFATE. See titanous sulfate.

TITANIUM SESQUISULFIDE

General Information
Description: Grayish-black crystals.
Formula: Ti_2S_3 .
Constants: Mol wt: 192.00.
Hazard Analysis and Countermeasures
See sulfides and titanium compounds.

TITANIUM TETRACHLORIDE

General Information
Description: Colorless, light yellow liquid; fumes in moist air.
Formula: $TiCl_4$.
Constants: Mol wt: 189.73, mp: $-30^\circ C$, bp: $136.4^\circ C$, d: 1.722 at $25^\circ / 25^\circ C$, vap. press.: 10 mm at $21.3^\circ C$.

Hazard Analysis

Toxic Hazard Rating:

Acute Local: Irritant 3; Inhalation 3.

Acute Systemic: U.

Chronic Local: Inhalation 3.

Chronic Systemic: U.

Toxicology: Highly corrosive because it liberates heat and hydrochloric acid upon contact with moisture. If spilled on skin, wipe off with dry cloth before applying water.

Disaster Hazard: See hydrochloric acid.

Countermeasures

Storage and Handling: Section 7.

Shipping Regulations: Section 11.

I.C.C.: Corrosive liquid; white label, 10 gallons.

Coast Guard Classification: Corrosive liquid; white label.

IATA: Corrosive liquid, white label, 1 liter (passenger), 40 liters (cargo).

TITANIUM TETRAFLUORIDE

General Information
Description: White powder.

*IMPAIRS RUBBER
SEE WITH
MATERIAL*



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

Attachment U.

JUL 17 1993

REPLY TO THE ATTENTION OF:
HRE-83

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Colonel Scott Hyatt
U.S. Army Garrison Fort McCoy
Headquarters, Building 100
Sparta, Wisconsin 54656-5000

Re: Complaint, Findings of Violation,
and Compliance Order
U.S. Army Garrison Fort McCoy
U.S. EPA I.D. No.: WI3 210 020 563

Dear Colonel Hyatt:

VIEW- 21 - '93

Enclosed please find a Complaint, Findings of Violation, and Compliance Order which specifies U.S. EPA's determination of certain violations by your facility of the Resource Conservation and Recovery Act (RCRA) as amended, 42 U.S.C. §6901 et. seq., based on information in our files about your facility located in Sparta, Wisconsin. This Complaint states the reason for such determination. In essence, Respondent (hereinafter Fort McCoy) operated its open detonation hazardous waste unit for which they did not have a RCRA permit.

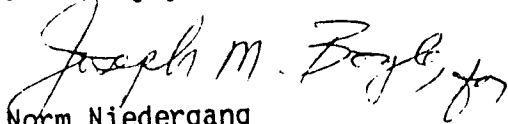
Accompanying the Complaint is a Notice of Opportunity for Hearing. Should you desire to contest the Complaint, a written request for a hearing is required to be filed with Ms. Beverly Shorty, Regional Hearing Clerk (MFF-10J), United States Environmental Protection Agency, 77 West Jackson Boulevard, Chicago, Illinois 60604, within thirty (30) days of the filing of this Complaint. A copy of your request should also be sent to Mr. Jerome Kujawa, Office of Regional Counsel (CS-3T), United States Environmental Protection Agency, 77 West Jackson Boulevard, Chicago, Illinois 60604.

Regardless of whether you choose to request a hearing within the prescribed time limit following service of this Complaint, you are extended an opportunity to request an informal settlement conference.



If you have any questions or desire to request an informal conference for the purpose of settlement with Waste Management Division staff, please contact Ms. Sharon Travis, RCRA Enforcement Branch (HRE-8J), United States Environmental Protection Agency, 77 West Jackson Boulevard, Chicago, Illinois 60604. Her phone number is (312) 886-6533.

Sincerely yours,



Norm Niedergang
Acting Associate Director for RCRA
Waste Management Division

Enclosure

cc: Barbara Zellmer, WDNR
Ed Lynch, WDNR
Matt Talarczyk, WDNR

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION V

IN RE:

U.S. ARMY GARRISON FORT MCCOY
SPARTA, WISCONSIN

U.S. EPA ID. NO.: WI3 210 020 563

Respondent.

Docket No. **VAW- 211 - '93**

COMPLAINT FINDINGS OF VIOLATION, AND PROPOSED COMPLIANCE ORDER
and
NOTICE OF OPPORTUNITY FOR HEARING

I

COMPLAINT

GENERAL ALLEGATIONS

1. This is a civil administrative action instituted pursuant to Section 3008(a)(1) of the Resource Conservation and Recovery Act of 1976, as amended (RCRA), 42 U.S.C. Section 6928(a)(1) and Sections 22.01(a)(4), 22.13 and 22.37 of the Consolidated Rules of Practice Governing the Administrative Assessment of Civil Penalties and the Revocation or Suspension of Permits.
2. The Complainant is the Associate Director, Office of RCRA, Waste Management Division, Region V, United States Environmental Protection Agency (U.S. EPA).
3. The Respondent, U.S. Army Garrison Fort McCoy, (hereinafter "Fort McCoy" or "Respondent"), is and was at all times relevant to this Complaint, the owner and operator of a facility located in Sparta, Wisconsin.

EDITORIALS

Tampa Tribune Feb 1, 1994

The global menace of land mines left over from a long list of wars

If you thought the Persian Gulf War was over, think again. Since hostilities officially ended three years ago, more than 1,700 Kuwaiti citizens have lost their lives as a result of stepping on mines left over from the war, and so have more than 80 highly trained mine disposal experts.

But the lethal aftermath of war is felt not only in the countries that fought Iraq's Saddam Hussein. Experts say as many as 100 million (that's right, 100 million, although the State Department puts the figure at "only" 85 million) inexpensive, easy-to-export land mines lie hidden just out of sight in at least 56 countries, including Afghanistan, Cambodia, Angola, Mozambique and Vietnam.

Judging by frightening accounts in *The Economist*, the British newsweekly, and a recent edition of the *Sunday New York Times Magazine*, the proliferation of land mines amounts to a modern, man-made plague upon civilization.

ORIGINALLY, MINES WERE deployed as a tactical, defensive weapon to delay an advancing enemy, but now they are used offensively and, importantly, as a weapon of terror. A U.N. protocol forbids their use against civilians, but that has become a meaningless prohibition. When mines are scattered far and wide, especially when they are part of airborne cluster bombs, the havoc they cause cannot be confined to military targets.

Military strategists see mines as offering the advantage of maiming, rather than killing, the enemy. It may sound harsh, but an army that is tied down treating its wounded is more vulnerable, or at least less threatening, than one that has suffered more fatalities than crippling injuries.

One of the problems with mines, the *Economist* commented, is that they cost so much to remove (\$300 to \$1,000 a mine) and so little to buy (often less than \$20), and that they are laid much faster than they can be cleared.

In the Persian Gulf War, an estimated 7 million land mines were deployed by both sides and then abandoned. Many were laid in compliance with the U.N. protocol, part of which dictates patterns for mine-laying, but others weren't, especially those that were scattered from the air.

And Iraq, for all its compliance with the U.N. guidelines, was not above hiding additional antipersonnel mines directly underneath

thinking the area had been made safe.

A Tampa-based firm, CMS (Conventional Munitions Systems), is among those retained by various governments to disarm the leftover mines. CMS, which also produces the warheads for Patriot missiles and is heavily engaged in other projects for the U.S. Defense Department, relocated its headquarters to Tampa (from Washington, D.C.) in 1990.

A company spokesman told *The Tribune* that two of its employees are among the 83 mine experts the *Times* said have lost their lives attempting to disarm mines in Kuwait.

In all, about 4,000 munitions experts from six countries have gone to Kuwait to help rid the land of mines. These contracts have cost the Kuwaiti government nearly \$1 billion. The job is dangerous, but because it pays about \$90,000 a year and because those trained to do the job welcome the work, companies such as CMS report they have no problem finding willing workers.

It hasn't gained a great deal of public attention, but there's a debate raging in and around the defense industry over whether land mines should be required to meet certain danger-reducing specifications or be simply outlawed altogether.

Those who favor modifying the mines say they can be made less menacing by making them easier to detect or by building in a self-destruct mechanism. Human rights and aid groups, whose missions are made infinitely more dangerous by the proliferation of mines, would welcome these changes but argue that the better solution is to ban them, period.

COMPANIES IN THE United States and its allies produce — and sell — their share of the lethal weapons, although many are also made in China and the former satellites of the Soviet Union. In price, they range from as little as \$3 each for a device roughly the size of a hockey puck to almost \$40 for larger weapons designed to disable tanks.

The question central to the debate is this: Does the military value of the land mine justify the toll it takes on civilians around the world? But for the debate to produce a meaningful result, it needs to be given far more attention than it has so far. The public — and not just the American public — must be given all the facts, on both sides of the debate, and then must be given a chance to be heard.

Navy returning for further mine search

45 already found in South Amboy

By **GEORGE FRANCY** 3/31/94
Staff Writer

SOUTH AMBOY Navy officials are scheduled to be back in the city today to further look at waterfront areas that might contain buried land mines.

Last Friday, 45 mines were discovered on Conrail land on the Raritan Bay, near the Jersey Central Power & Light Co. plant.

The waterfront section in question, known locally as the "T Docks," was the scene of a 1950 explosion of a barge loaded with military ordnance. The blast reportedly scattered the weapons on surrounding land and in the bay.

Today's visit will be a general assessment of the area by Navy experts from Norfolk, Va., and may include an aerial fly-over of the city's waterfront, said Herman Phillips, information specialist for the U.S. Environmental Protection Agency, the lead bureau involved in the investigation.

But South Amboy Mayor John T. O'Leary said he was told by the EPA that Navy technicians will search from the mouth of the Raritan Bay and along the coast to the Morgan section of Sayreville.

This investigation will determine if a cleanup should be done.

"This certainly could result in an actual cleanup," Phillips said. "It's going to depend on what we

find out in this investigation."

This process, however, could go on for "quite some time," Phillips said.

O'Leary said that after years of residents occasionally finding items, he's glad something is being done to look for ordnance.

"We've known about it for years. I'm happy that at least now, someone's going to have it all cleaned up," O'Leary said.

He said that several months ago he requested that the agencies take a thorough look at the area.

Phillips cautioned that, though the area is fenced off, officials advise fishermen or other people walking in that area to report anything they find.

The 45 items found last week were detonated at the Earle Naval Weapons Station in Monmouth County, Phillips said.

The EPA first got involved in January 1993, and executed an inter-agency agreement with the Navy, which has the expertise for such an operation, on March 24, leading to the inspection last Friday.

Initially, the site was thought to be under the purview of the Army Corps of Engineers, but since the docks were privately owned, the EPA, which also oversees hazardous-waste cleanup sites, was given jurisdiction, Phillips said.

Form 1100-1
Rev. 5-91

NATURAL RESOURCES BOARD AGENDA ITEM

Item No. **3.F**

SUBJECT: INFORMATIONAL ITEM - Conformity of Wisconsin's environmental quality standards with Federal standards.

FOR: August BOARD MEETING

TO BE PRESENTED BY: Maryann Sumi, Executive Assistant

SUMMARY:

At its May 1995 meeting, the Natural Resources Board requested that the Department identify and evaluate proposed legislative changes to "federalize" environmental quality standards in Wisconsin. The proposed statutory changes would limit the state's authority to promulgate environmental standards different from federal law.

The Department's analysis and recommendation appear in the attached memorandum.

RECOMMENDATION: Informational presentation.

LIST OF ATTACHED MATERIALS:

- | | | | |
|--|---|---|----------|
| No <input checked="" type="checkbox"/> | Fiscal Estimate Required | Yes <input type="checkbox"/> | Attached |
| No <input checked="" type="checkbox"/> | Environmental Assessment or Impact Statement Required | Yes <input type="checkbox"/> | Attached |
| No <input type="checkbox"/> | Background Memo | Yes <input checked="" type="checkbox"/> | Attached |

APPROVED:

Bureau Director,

Date

Administrator,

Date

George E. Meyer

Secretary, George E. Meyer

8-16-95

Date

cc: Judy Scullion - AD/5
Maryann Sumi - AD/5
Jim Kurtz - LC/5

Date: August 9, 1995
To: Natural Resources Board
From: George E. Meyer *George*
Subject: Proposal to Federalize Wisconsin Environmental Standards

I. Introduction

At the May Natural Resources Board meeting, you requested an analysis and recommendation concerning a proposal to initiate legislation to limit the Department's authority to promulgate environmental standards more stringent than federal standards. In accordance with your request, we have analyzed six environmental programs to which such a limitation would apply: air, solid waste management, hazardous waste, wastewater (including stormwater), safe drinking water, and the environmental response and repair program. The program-by-program impacts are discussed in detail in Attachments 1-6. This memo will set forth options for the Board's consideration, an analysis of the strengths and weaknesses of each option, and a recommendation.

The following discussion starts with two basic premises: first, we assume that under any option Wisconsin would want to retain the authority to establish environmental standards in the absence of any federal regulation. Second, where there is federal regulation, there is invariably a federal requirement that no state may be less stringent than federal requirements. Therefore, we are essentially considering a proposal to duplicate federal law in Wisconsin standards.

II. Options

We evaluated three options: first, no statutory change; second, a statutory mandate that for each affected environmental program, Wisconsin environmental standards shall be equivalent to federal standards ("strict equivalency"); and third, a mandate for equivalency with federal standards with limited exceptions ("equivalency with exceptions").

III. Analysis of Options

No Statutory Change. A program-by-program look at existing environmental standards demonstrates that, as noted, federal law already requires that state standards be no less stringent than federal. In some cases, as in the air and wastewater programs, Wisconsin statutes prohibit the Department from promulgating standards more stringent than federal, so no change would be needed. In other programs, such as safe drinking water and environmental repair, the state retains flexibility to regulate beyond federal requirements.

opposite this!

Before embarking on a comprehensive and controversial legislative initiative, the Board may first wish to consider if there is a problem under the existing statutory framework, and if so, identify it and tailor a solution to meet the problem directly. The Board already has the authority, as administrative rules come forward for adoption, to require explicit justification for exceedance of federal requirements. Such an approach would avoid the need for legislation yet limit agency discretion where appropriate.

Strict Equivalency. This approach offers a wide array of advantages and disadvantages. First, a statutory mandate that standards must be no more and no less than federal standards, with no exceptions, offers simplicity and uniformity, with decreased customer confusion and uncertainty, particularly for multi-state businesses. Second, mandated strict equivalency enhances the perception of a "level playing field" among states. Third, strict equivalency may result in lower costs of environmental compliance, at least in the short term, due to relaxed environmental standards. Finally, uniformity of regulations may result in increased compliance, although this may be offset by confusion over what constitutes a "standard" under federal law.

disadvantages

There are, however, distinct disadvantages to strict equivalency. Federal standards provide the absolute minimum or lowest common denominator in environmental standards. For example, federal regulations governing municipal solid waste facilities are generic and widely viewed as not protective of groundwater. Federal standards do not allow flexibility to meet specific Wisconsin needs related to topography, climate, socio-economic conditions, citizen expectations, or the needs of business and agriculture.

literal issues

Strict equivalency would shift decisionmaking on environmental matters from Wisconsin to Washington, directly contrary to the trend toward increased local decisionmaking and contrary to the efforts to promote "block grants" to states. Strict equivalency assumes "one size fits all" in environmental needs and regulations, and runs contrary to expressed state preferences for devolution of more discretion in federal regulation to states.

Although one of the benefits of strict equivalency may be to reduce short term environmental compliance costs, the opposite may be true for the long term. Failure to provide adequate environmental standards may result in higher long-term costs to clean up damaged resources.

Finally, statutory strict equivalency runs counter to the Wisconsin tradition of innovation at the state level, in which the state tries out new solutions to problems as a "laboratory of democracy". Wisconsin would lose opportunities to be innovative in its approaches, instead submerged in the federal one-size-fits-all formula.

Equivalency with limited exceptions. Under this option, any statutory mandate to conform strictly to federal law would also provide for exceptions where, for example, public health, welfare or the protection of the environment require deviation from federal law. The exception clause could require the Department to demonstrate by clear and convincing evidence that the exception is necessary. Exceptions may also be justified where deviation from strict equivalency is desired or concurred in by the regulated community.

This option offers many of the advantages of the strict equivalency option (simplicity, uniformity, level playing field, lower short-term costs of compliance) while providing the flexibility to meet unique Wisconsin needs. The Department's burden to demonstrate need for an exception to federal law would circumscribe the agency's discretion to go beyond federal law.

meaning?

IV. Recommendation

We recommend that the Board consider adoption of a Board policy to require that any rule proposed for promulgation which would exceed the requirements of federal environmental standards be accompanied by a written justification of need for the deviation, based on such factors as protection of public health, welfare or the environment. This option accomplishes the benefits of the equivalency-with-exceptions option, while not invoking a difficult and controversial legislative process which could be perceived as weakening environmental laws.

CORRESPONDENCE/MEMORANDUM

State of Wisconsin

DATE: June 15, 1995

FILE REF: 8300

TO: Rick Prosis, LC/5

FROM: Tom Steidl, LC/5, (608) 266-0235

SUBJECT: Pros and Cons of Federalizing Air Management Standards

This document lists the pros and cons of various options associated with a proposal to "federalize" air management standards. This exercise involves consideration of 3 options associated with a proposal to require that air management standards be no more stringent than the federal standards on which they are based. The 3 options identified are:

Option 1 - Make no changes to the state statutes currently governing the air management standards.

Option 2 - Make changes as recommended in an earlier response to a request to consider federalizing environmental quality standards, (allowing for limited exceptions to an absolute requirement that state air management standards be no more stringent than the federal standards).

Option 3 - Make changes to state statutes to provide absolute criterion that state air management standards be no more stringent than the federal standards.

General Background

As noted in the earlier response, the current statutes governing the state's air management program include several key provisions that incorporate the concept that state standards can be no more restrictive than federal standards, with certain specified exceptions. It was for this reason that the earlier response recommended that no statutory changes be made relating to the air management program, since the major elements of the air management program (i.e., ambient air quality standards and air increments, new source performance standards, emission standards for hazardous air contaminants, and the rules or control strategies for control of ground level ozone) were already "federalized".

Other elements of the air management program (e.g., development of emission limitations for the criteria pollutants) are based on the need to meet a Clean Air Act requirement, but there is no specific federal regulation on which the state can pattern its rule. The Clean Air Act requires states which contain areas that do not meet the national

ambient air quality standards to develop a State Implementation Plan (SIP) for the area which meet certain specified, but general criteria. To implement the Act and to assist the states in their regulatory efforts, USEPA develops "policy guidance" which it provides to states.

For example, although the Clean Air Act requires that all major sources of a pollutant for which an area is nonattainment must be subject to Reasonably Available Control Technology (RACT) emission limits, USEPA does not establish RACT emission limits for those sources. In most instances, USEPA publishes Control Technology Guidelines (CTGs) for major source categories. The CTGs are then to be used by states to develop specific RACT emission limits for the major sources in the nonattainment area. In other instances, USEPA publishes Alternative Control Techniques (ACT) documents, in lieu of CTGs—which require more extensive public scrutiny before publication—for certain major source categories. The status of these federal policy guidance documents can complicate any consideration of "federalizing" the state's air management program, as outlined below.

Evaluating the PROs and CONs of the Options

The following is a brief analysis of the PROs and CONs of the various options associated with a federalization of the air management program in Wisconsin.

OPTION 1

Make No Changes to the state statutes currently governing air management standards.

OPTION 2

Make Changes as recommended in earlier response (allowing for limited exceptions to a basic "no more stringent than federal standards" policy).

[Since Option 2 is essentially the same as Option 1, the PROs and CONs of Option 1 and Option 2 are combined.]

PRO

- The current statutory provisions governing the air program represent for the most part "consensus" legislation developed through participation by the representatives of the regulated community and environmental organizations. The current statutes have served all interested parties well over the course of implementation of the statutes.

plus previous page

- U.S. EPA has approved the current statutory provisions as a fundamental part of Wisconsin's State Implementation Plan (SIP) required under the Clean Air Act.

- The current statutory provisions tie the state's key air program elements to those promulgated by the federal government, but provide some limited flexibility to address state-specific concerns and where: 1) the federal government has failed to act; 2) it is necessary to develop regionally-acceptable ozone controls; or 3) it is appropriate to tailor federal standards or federal guidance which is ambiguous, counterproductive, incomplete or in error (DNR staff have identified errors in New Source Performance Standards promulgated by USEPA which EPA staff have acknowledged as in error).

- The policy reflected in the current statutory provisions (i.e., set national standards which the states must adopt and allow states the flexibility of determining how they will meet those standards) is consistent with the notion that states be provided some flexibility in determining how they meet general national standards.

CON

- Allowing flexibility in adopting standards in the absence of federal standards or allowing variations from federal standards may result in expending staff resources in order to justify such standards or variations, which may be resource intensive depending on the nature of the standard or variation (substantial staff resources were expended in developing state hazardous emission limits for contaminants for which the federal government had not promulgated standards (ch. NR 445, Wis. Adm. Code), even though those standards were necessary to provide adequate protection for public health).

- Allowing state standards, in the absence of federal standards, may result in complaints from industry that with varying state standards there is no "level playing field" and that states with more restrictive standards put their regulated industries at a competitive disadvantage as compared to their less-regulated or unregulated competitors.

OPTION 3

Make Changes to state statutes to require absolute criterion of no more stringent than the federal standards. [In light of the current statutory provisions for the air management program (which includes exceptions to the "no more stringent than federal standards" for circumstances where there is no federal standard), it is assumed that Option 3 means that if there is no federal standard, the state cannot act.]

PRO

- The Department's regulatory efforts would be substantially simplified, since the federal government promulgates standards only to address national issues. Therefore, the

Department would only be required to regulate on air management issues which were related to a national air issue.

- The state's regulatory efforts would be identical to USEPA's, thereby avoiding concerns of the regulated community that DNR was being more restrictive than the federal government required and that the DNR was putting the regulated industries at a competitive disadvantage.

CON

- The state would be precluded from "tailoring" its rules to address problems specific to Wisconsin or to modify federally-mandated elements of the program to address concerns of the regulated industries in Wisconsin.

- If USEPA's "policy guidance" documents are not construed to be "standards" (and the DNR is precluded from acting in the absence of federal standards), DNR would be precluded under Option 3 from promulgating emission limits for major stationary sources under the current method USEPA uses to provide guidance to states for those emission limits. However, even in the absence of federal standards, the state would still be obligated under the Clean Air Act to develop a SIP for nonattainment areas and would therefore be obligated to promulgate some emission limits to satisfy federal requirements.

- If USEPA's "policy guidance" documents are construed to be standards (and DNR is precluded from being more stringent than these standards), the process would be subject to the problem of trying to determine what "more stringent" means and whether an alternative control technology is "more stringent" than federal guidance documents. In addition, the Department would be subject to challenge if its emission limit rule contains any provision which is not specifically addressed in the federal guidance, even if the provision clarifies the rule or addresses (satisfactorily) concerns from the regulated community about "gaps", ambiguity or potential conflicts in the federal guidance. On the other hand, a rule which excludes an inapplicable, redundant or unnecessary element of the federal guidance would also be subject to challenge as to whether its exclusion made the rule more stringent than the federal guidance.

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CORRESPONDENCE/MEMORANDUM

State of Wisconsin
Department of Natural Resources
Bureau of Legal Services

DATE: June 15, 1995 FILE REF: 8300

TO: Rick Proise - LC/5

FROM: Peter D. Flaherty - LC/5, (608) 266-8254

SUBJECT: Potential advantages and disadvantages of alternatives to making state hazardous waste program standards no more stringent than federal standards

Background

Previously, you asked for draft legislation which would require that the Department's hazardous waste program standards be no more stringent than comparable federal standards. The option was given to draft legislation that included appropriate or necessary exceptions to the "no more stringent than" approach. In addition, you asked for a brief discussion of potential advantages and disadvantages of the draft legislation.

I drafted legislation which, in summary, would require that our hazardous waste standards be no more stringent than EPA's, except where the Department determines and makes specific findings that more stringent standards are necessary to protect public health, safety, welfare or the environment, and I listed some pros and cons of such legislation.

Now you have requested further discussion of the pros and cons of the legislation I drafted and of 2 other options: The "no action" alternative (maintenance of the legal status quo) and the alternative of requiring that, without exception, Department hazardous waste standards be no more stringent than federal standards.

In evaluating the pros and cons, you should keep in mind that, in the hazardous waste program, there are relatively few instances where the Department has set hazardous waste standards that are more stringent than the comparable federal standards, and very few situations where the Department has established state standards in the absence of a comparable federal standard.

This memo reviews the advantages and disadvantages of these three options in the following order:

1. The "no action" alternative;
2. The "no more stringent than federal standards except ..." alternative (Also discussed in my previous memo.); and

3. The "no more stringent than federal standards, with no exceptions" alternative.

Discussion

1. The "no action" alternative. (Fed = state)

a. Some advantages of the "no action" alternative, or maintaining the status quo, include:

1) Saving substantial hazardous waste program and legal services staff time by avoiding need to review hundreds of pages of existing rules for equal stringency;

2) Saving time of staff, administrators and Natural Resources Board if current hazardous waste standards needed to be revised to conform to federal standards;

3) Avoiding legal uncertainty and debate with regulated entities over whether Department standards are more stringent than federal standards;

4) Avoiding the time, expense and confusion involved for the regulated community associated with possible changes in standards arising out of the need for the Department to be no more stringent than EPA; and

5) Maintaining a higher degree of environmental quality and better protection for Wisconsin's public health and welfare against the potential hazards posed by hazardous wastes.

b. In contrast, some disadvantages of the "no action" alternative, or maintaining the status quo, include:

1) Perpetuation of slightly higher compliance costs, (assuming that more stringent Department hazardous waste standards are in fact more expensive to comply with than comparable federal standards), which in turn make private businesses less competitive and public institutions more costly to operate;

2) Continued potential confusion for some regulated entities familiar only with federal hazardous waste standards, when confronted with more stringent state hazardous waste standards;

3) Potential for violations of more stringent Department hazardous waste standards by hazardous waste transporters, hazardous waste management facilities and hazardous waste generators who are not familiar with Wisconsin's regulatory program;

4) More staff time spent persuading EPA that, for purposes of hazardous waste program authorization, the Department's standards are at least equivalent in stringency to EPA's because any differences in state vs. federal standards must be explained; and

2. The "no more stringent than federal standards except ..." alternative (Also discussed in my previous memo.).

a. Among the beneficial features of this alternative are the following:

1) More uniform rulemaking requirements will simplify future rule making;

2) Greater consistency with federal hazardous waste standards (in the absence of a showing that more stringent standards are necessary) may result in reduction or elimination of potential competitive disadvantages for Wisconsin hazardous waste generators, transporters, and operators of hazardous waste treatment, storage and disposal facilities;

3) Greater uniformity in hazardous waste program requirements may result in increased compliance;

4) Where more stringent standards are found to be necessary, increased environmental protection may contribute to the state's attractiveness as a tourist destination; and

5) Increased environmental protection may reduce long term adverse public health problems, resulting in medical cost savings and improved quality of life for state citizens.

b. This alternative's harmful consequences may include the following:

1) Legal uncertainty about the enforceability of hundreds of pages of state hazardous waste rules may result in agency reluctance to vigorously pursue violations;

2) Potential harm to public health and safety or the environment due to relaxation of standards, with attendant individual and societal costs, may result from increased pollution;

3) Significant transaction costs may be incurred by revising existing state hazardous waste standards and internal guidance to satisfy new legislative mandates for equivalency;

4) The effort involved to justify more stringent standards by making the required special findings and determinations of need may dissuade Department staff from proposing beneficial measures; and

5) Except where a special showing of need is made, blanket deferral to the EPA on the stringency of hazardous waste standards abrogates the state's responsibility to exercise its police powers in an independent, flexible fashion suited to protect Wisconsin's unique assets.

3. The "no more stringent than federal standards, with no exceptions" alternative.

a. Among the possible advantages of this final alternative are the following:

1) Uniform national standards for hazardous waste management will simplify compliance, resulting in fewer unintentional violations;

2) A "level playing field" compared to other states may increase the state's attractiveness to economic development (assuming other states adopt a similar policy);

3) New federal hazardous waste regulations can be adopted as state rules sooner and with less controversy, since no discretion exists to consider more stringent standards for state facilities;

b. Some of the possible disadvantages of this final alternative are the following:

1) Department policy on hazardous waste management will effectively be set by decision-makers in Washington, D.C., or EPA Region V., who may have little or no knowledge of Wisconsin's problems;

2) The state's ability to afford better than the "lowest common denominator" level of protection to its citizens and its environment will be abandoned;

3) Current Department standards will be in legal limbo during the transition period and litigation by violators will be encouraged, resulting in the need for more legal resources but allowing violators to further delay compliance with all standards;

4) If the Department desires to regulate a waste due to a particular problem or concern that is not covered by federal standards, the Department will not have the ability to do so;

X 5) The quality of the state's environment will deteriorate; and

6) Public health and welfare will be jeopardized by relaxed standards and reduced or ineffective enforcement during the period of transition from the status quo to the new statutory directive.

Conclusion

In comparing the pros and cons of the 3 legislative policy options, the "no action" alternative seems to be the most prudent, least costly and most efficient choice. It also has the advantage of zero transaction costs, since there is no transition to new standards or change in authority. Finally, it maintains the state's independence to establish more protective hazardous waste standards instead of deferring to the federal government's judgement about the degree of protection to be afforded public health, safety, welfare and the environment in our state.

cc: Paul Didier - SW/3
Barb Zellmer - SW/3
Edwina Kavanaugh - LC/5

o:Vedhwleg.2 6/9/95

CORRESPONDENCE/MEMORANDUM

State of Wisconsin

DATE: June 15, 1995

FILE REF: 8300

TO: Rick Prorise, LC/5

FROM: Charles Leveque, LC/5, (608) 266-0228

SUBJECT: Analysis of Alternatives for Federalizing Wisconsin's Solid Waste Management Program

INTRODUCTION

Section 144.435(1), Stats., currently requires the Department to promulgate rules for solid waste facilities ". . . to ensure compliance and consistency with the purposes and standards established under the resource conservation and recovery act . . . [RCRA]."

On October 9, 1991, the United States Environmental Protection Agency (USEPA) issued new solid waste disposal facility criteria (Subtitle D) for all non-hazardous municipal solid waste landfills (MSWLFs). There are no federal standards relating to other types of non-hazardous solid waste landfills, such as industrial landfills or other solid waste facilities such as storage facilities, processing facilities, collection and transportation services, etc.

In its preamble to the Subtitle D regulations, the USEPA specifically recognizes that the federal criteria are nationwide minimums designed to be implemented in States without approved programs. However, for approved State solid waste programs such as Wisconsin's, local conditions can be considered in setting appropriate controls for MSWLFs. This approach preserves the traditional State role in defining appropriate standards to the greatest extent possible, while having a minimum national standard. Under this approach, approved States may consider a wide range of site-specific factors such as differences in climatic and hydrogeologic conditions when determining the appropriate landfill design necessary to ensure human health and the environment are protected. "The rule's standard requires that an approved States's program be capable of protecting ground water that is currently used or reasonably expected to be used for drinking water purposes . . ."

The following analysis of three alternatives for "federalizing" the solid waste program relates to MSWLFs only, since there currently are no federal standards for other types of solid waste facilities. The assumption is that the Department would still be able to enact standards in situations where USEPA has not adopted standards. If that were not the case, it would mean that there would be no standards, state or federal, for industrial waste landfills, demolition waste landfills, solid waste treatment facilities, storage facilities, landspreading facilities, and other types of solid waste facilities. Also, since



Subtitle D does not include preventative action limit groundwater standards, the application of the state groundwater law in Ch. 160. Stats., would be unclear.

ALTERNATIVE 1: NO CHANGE IN EXISTING STATUTORY AUTHORITY.

ARGUMENTS FOR THIS ALTERNATIVE INCLUDE THE FOLLOWING:

1. More flexibility is allowed in establishing standards than in Alternatives 2 and 3.
2. All arguments against Alternatives 2 and 3 are reduced or eliminated.
3. Additional requirements, if justified, would reduce long-term environmental and economic costs to landfill owners and the citizens of Wisconsin.
4. The Natural Resources Board could require explicit justification for more stringent standards without statutory change.
5. Maintaining the "status quo" would minimize confusion and delays in the construction of new facilities while the standards are being determined.

ARGUMENTS AGAINST THIS ALTERNATIVE INCLUDE THE FOLLOWING:

1. More controversy in establishing standards and rule-making than Alternatives 2 and 3.
2. If more stringent standards were adopted which were not justifiable, this would add to the economic costs of landfilling without commensurate benefits to the citizens of Wisconsin or the environment.
3. If more stringent standards were adopted which were not justifiable, the Department's credibility would suffer.

ALTERNATIVE 2: DEPARTMENT COULD ADOPT STANDARDS NO MORE STRINGENT THAN FEDERAL CRITERIA WITH EXCEPTIONS POSSIBLE, IF JUSTIFIED.

ARGUMENTS FOR THIS ALTERNATIVE INCLUDE THE FOLLOWING:

1. There would be a strong presumption that the federal criteria are adequate and sufficient to protect Wisconsin's environment. However, this alternative allows flexibility to permit more stringent standards, based upon explicit justification, and circumstances which are specific to Wisconsin.

2. All of the arguments against Alternative 3 would be reduced or eliminated.
3. Wisconsin would be allowed to make its own decisions under this proposal.
4. Assuming more stringent standards are justified, the long-term costs of landfilling in Wisconsin, both in terms of environmental quality and economics would be reduced.

ARGUMENTS AGAINST THIS ALTERNATIVE INCLUDE THE FOLLOWING:

1. This alternative is not needed since the Natural Resources Board could implement this proposal without legislation.
2. This alternative would result in more controversy in the rule-making process in establishing standards than under Alternative 3.
3. Less flexibility would be allowed under this alternative in establishing standards specific to Wisconsin than under Alternative 1.

ALTERNATIVE 3: DEPARTMENT COULD ADOPT STANDARDS NO MORE STRINGENT THAN FEDERAL CRITERIA WITH NO EXCEPTIONS PERMITTED.

ARGUMENTS FOR THIS ALTERNATIVE INCLUDE THE FOLLOWING:

1. Assuming the minimum federal "Subtitle D" criteria are adequate and sufficient to protect Wisconsin's ground water resource, elimination of more stringent State standards should result in lower landfill costs in terms of economic costs.
2. Controversy over reasonableness of standards would be reduced and the rule making process would be simplified.
3. From a competitive standpoint, landfill owners would have a more even playing field on a national level.

ARGUMENTS AGAINST THIS ALTERNATIVE INCLUDE THE FOLLOWING:

1. Wisconsin is better able to determine what is needed in Wisconsin than the USEPA. This alternative assumes that the USEPA knows the use, value, and vulnerability of potentially affected ground water resources in Wisconsin, as well as the social and economic values of these resources. In Wisconsin, Chapter 160, Stats. addresses these issues. The proposed alternative does not, for example, account for the climatic and hydrogeological differences between Wisconsin and other states; and the differences in the extent to which various states rely on their

ground water resources for drinking and other purposes. Wisconsin currently enjoys a high quality environment and its citizens should be able to make their own choices regarding the tradeoffs between costs and benefits in the environmental area.

2. If this alternative is adopted, the USEPA's interpretations of the federal criteria would apply to Wisconsin's rules. In some environmental programs, this dependance on the USEPA has resulted in unreasonable time delays, little or no flexibility and lack of local responsiveness.
3. More stringent site-specific standards, even if they are environmentally justifiable, would be prohibited. This would likely result in a reduction in the quality of Wisconsin's environment since more pollution would occur. The long-term costs to landfill owners and Wisconsin's citizens would also increase since the cost of repairing environmental damage is usually many times greater than the initial costs of complying with additional landfill design standards that would have prevented the damage from occurring.
4. In Wisconsin, MSWLFs already have incorporated design features that are accepted as "state of the art" and are more stringent than the recently enacted federal minimum MSWLF design. If this alternative is adopted new MSWLFs or expansions of existing MSWLFs would be allowed to be constructed with a less stringent design. This would put many of the existing facilities at a economic competitive disadvantage.
5. In Wisconsin, the landfill siting process works because the Department is able to convince citizens that our requirements are stringent enough to be protective of the environment. Reducing requirements which are now applicable to landfills in Wisconsin would make landfill siting even more controversial than it is now. Host communities and local citizens would be even less accepting of new proposals. There may also be difficult credibility problems with local communities if the Department's review staff are unable to support a proposed landfill design as protective of the environment without more stringent design requirements.
6. There are no existing federal criteria for industrial landfills, such as paper mill sludge and coal-ash landfills or for other types of solid waste facilities.
7. Considerable litigation and delay over debate of whether or not federal "standards" exist in a specific situation.
8. This alternative is not needed, since the Natural Resources Board can implement it without legislation.

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CORRESPONDENCE/MEMORANDUM

State of Wisconsin

DATE: June 15, 1995

FILE REF:

TO: Rick Prosis, LC/5

FROM: Judy Ohm, LC/5, (608) 266-9972
Linda Meyer, LC/5, (715) 839-2785

SUBJECT: Pros and Cons of Proposals to "Federalize" Wisconsin's Hazardous Substance Spill Program and Environmental Repair Program

You have asked for comments from all environmental programs in the Department concerning the pros and cons of the following alternatives:

(1) Making no changes to existing statutes that require or authorize the creation of environmental standards.

(2) Amending Wisconsin statutes to provide that Wisconsin's environmental quality standards may only be more stringent than comparable federal standards if the DNR determines that a more stringent standard is necessary to protect public health, safety or welfare, or the environment in Wisconsin.

(3) Amending Wisconsin statutes to provide that Wisconsin's environmental quality standards may be no more stringent than comparable federal standards. (In the absence of federal standards, the State could adopt a standard based on State criteria.)

We would like to suggest that the following Pros and Cons be added to or substituted for what was in the May 17th memo from you to George Meyer under the Heading "Emergency and Remedial Response Program."

Hazardous Substance Spill Program and Environmental Repair Program:

Arguments FOR Making No Changes to Existing Statutes (In Favor of Alternative 1);

1. This is the simplest alternative, in that it would require no additional staff time to implement.

2. If the current system is working, there is no need to change it. If you believe that the current statutes efficiently require or authorize environmental standards for the State, then no changes to current law are necessary. Conversely, if you believe that there are problems with the current statutes, then change is probably necessary.

3. The current state statutes have been drafted with the problems specific to the State of Wisconsin in mind. If there is an environmental issue for which Wisconsin's unique geologic circumstances (or other unique factors) require standards more stringent than the federal standards, then the state law has probably been drafted considering these unique factors.

Arguments AGAINST Making No Changes to Existing Statutes (Arguments Against Alternative 1):

1. As noted in #2 above, if you believe that there are problems with the current state statutes governing environmental standards, then the state standards need to be changed.

2. If businesses are required to comply with state environmental standards that are more stringent than federal standards, they may leave the State or may not locate here, choosing instead to locate in States which have less stringent environmental standards.

The Pros and Cons for alternative 2 are similar to the Pros and Cons for alternative 3. For the reasons outlined above, alternative 1 (making no change to existing statutes) is preferable to alternative 2 as well as alternative 3. There is no good justification for making the change proposed in alternative 2. DNR staff already take existing federal standards into account in establishing state environmental standards and already base their decisions on what is necessary to protect public health, safety and welfare and the environment.

Arguments FOR Changing Existing Statutes to "Federalize" Wisconsin's Environmental Quality Standards (In Favor of Alternative 3):

1. Consistency between state and federal standards would make it easier for businesses and industries to comply with Wisconsin's environmental standards. For industries and businesses operating in multiple states, if Wisconsin's standards were the same as the federal standards, industry would be better able to comply with the State standards since they would be familiar with them.

2. Industries would have a better environmental reputation if they did not have to report small spills that they have adequately contained or cleaned up. Currently, all hazardous substance spills are required to be reported in Wisconsin and are recorded in DNR's spill data base even if they are completely contained or cleaned up. Someone who looks at the DNR's spill data bases alone (and does not review DNR files on the site) could be left with the impression that the owner of a property with a number of reported spills is an environmental "bad actor" (not recognizing that they should be given credit for complying with the reporting requirements) or could be left with the impression that the property is still contaminated. (However, if small spills are not reported to DNR, there would be no way for DNR to confirm that those small spills have

been adequately contained or cleaned up. Even small spills can have a very significant cumulative impact on public health and the environment if several small spills occur on the same site over a period of time.)

3. Industry or business may be less likely to leave the State or to locate elsewhere if Wisconsin's environmental standards are no more stringent than the federal standards. Standards that are uniform across the country may result in the reduction or elimination of competitive disadvantages for Wisconsin industries, assuming that Wisconsin industries are currently at a disadvantage because they are required to incur higher costs for cleaning up hazardous substance spills in Wisconsin than they would in another state. (However, DNR staff believe that the adoption of federal reportable quantities for spill reporting purposes will require industries to establish more costly and sophisticated reporting systems that are currently required, which will increase, rather than reduce, industry's spill reporting costs in Wisconsin.)

4. Avoiding state promulgation of environmental standards because the Legislature has decided to defer to the standards established by the federal government will allow WDNR to blame U.S. EPA whenever anyone complains about Wisconsin's environmental standards.

5. Avoiding state promulgation of environmental standards because the Legislature has decided to defer to the standards established by the federal government would relieve the State of the need (or the responsibility) to do testing to determine if more stringent standards are necessary to protect the public health, welfare or safety of the citizens of Wisconsin or the environment of Wisconsin.

Arguments AGAINST Changing Existing Statutes to "Federalize" Wisconsin's Environmental Quality Standards (Arguments Against Alternative 3):

1. The Hazardous Substance Discharge Statute's immediate reporting requirement (with no minimum quantities for reporting being established) has been in place for many years (since May of 1978). The existing reporting system seems to be working well. The DNR is almost always notified of significant spills in a timely fashion and DNR is able to make sure that there is an adequate response to reported spills. Insignificant spills are quickly and easily dealt with. It is easy and inexpensive for industry and the public to comply with the existing requirements.

2. The spills data base maintained by DNR (a record of all reported spills) provides a convenient source of information for consultants and other persons who are looking at the history of land use on a particular property. Prospective purchasers of property are able to check to see if spills have been reported for the property in question.

3. The reportable quantities (RQs) established by U.S. EPA under 42 USC 9602 or 42 USC 11004 were primarily intended to address bulk storage facilities and industrial plant sites which are required to have spill containment systems and spill prevention and contingency plans, and only apply to about 1100 specific chemical compounds. Federal RQs have not been established for common chemical mixtures, like gasoline. A relative small quantity of a hazardous substance that is easily contained and cleaned up under the facility's spill plan may present a very big problem if the hazardous substance is spilled next to a private or municipal water supply well or on the bank of a trout stream. Relative small quantities of a hazardous substance that would not be required to be reported under the federal standards may create a significant environmental problem in some areas of the State with unique geologic features, such as the "Central Sands area" or areas with fractured bedrock in Door County and Marathon County. In these areas of the State, a relatively small discharge of a hazardous substance could travel directly to groundwater and could adversely impact on drinking water wells very quickly, if not reported and properly remediated. The federal Emergency Planning and Community Right-to-Know Act and the federal Superfund Law which authorize the establishment of the federal reportable quantities were never intended to completely replace state spill regulations. Federal lawmakers and policy makers cannot be expected to consider the unique circumstances of all 50 states.

4. The DNR has recently completed the time-consuming process of promulgating the NR 700 rules series to better implement the Hazardous Substance Spill Statute and the Environmental Repair Statute. The Department needs to administer the spills program and the environmental repair program under the new rule series for a period of time to see how well the various standards and procedures created by the NR 700 rule series (for example, ch. NR 720, the soil cleanup standards) serve the purposes that they were designed to serve. To change the underlying statutes now would mean that Department staff would have to immediately begin another rule drafting effort.

5. There are no federal soil quality standards at the present time. Numbers recently established by U.S. EPA for screening sites with possible soil contamination are not comparable to the numbers established in ch. NR 720, Wis. Adm. Code. Even if federal soil cleanup standards were established in the future, there is good reason for the DNR to evaluate how those federal standards should be applied in Wisconsin. Generic soil numbers that are appropriate in some states may not be appropriate in Wisconsin, since soil types, geology, hydrogeology, and climate vary so much from one state to another.

6. "Federalizing" state environmental standards at this time would run counter to the current effort to give states more block grants and more flexibility to run federally-mandated programs in a manner that is tailored to the State's needs. The public and the business community in Wisconsin are more environmentally concerned than people and businesses in many other states (partly because they realize that a clean environment is

essentially for a healthy economy). Wisconsin citizens are unlikely to support a proposal to give the federal government the job of setting environmental standards for Wisconsin.

7. There is a current trend toward scaling back federal regulations. Thus, it is more likely that there will be fewer federal standards governing hazardous substance spills and environmental repair issues in the future. This means the State would have to adopt its own standards anyway. It may be more efficient to simply retain the current state standards than to repeal them and have to replace them in the near future.

8. Industry or business may move to Wisconsin to escape more stringent environmental standards in other States, resulting in greater environmental damage to the State. If other States have environmental standards that are more stringent than the federal standards and Wisconsin does not, this may encourage industry or business to move to Wisconsin. However, the result may be more pollution, which would certainly pose a greater threat to the public health, welfare and safety and to the environment.

JO:i:\procon.mem

CORRESPONDENCE/MEMORANDUM

DATE: June 15, 1995 FILE REF: 8300

TO: Rick Prorise - LC/5

FROM: Charles Hammer - LC/5, (608) 266-0911

SUBJECT: Evaluation of Impact to the Wastewater and Water Resources programs of Legislation to Require All Wisconsin Environmental Quality Standards to be "No More Stringent than Federal Standards"

You have asked that I coordinate for you the implications of the above-referenced legislation to the programs administered by the Bureaus of Wastewater Management and Water Resources Management. I have concluded that the implications could be minor to major, depending on how such legislation reads.

You have already analyzed in your May 17, 1995 memorandum the implications for all Department environmental quality programs of not changing the existing legislation or providing for consistency with federal requirements, but with exceptions. As you noted, for the wastewater management program these two scenarios merge since already existing is § 147.035, Wis. Stats., a provisions that limits the ability of the Department to adopt rules more stringent than federal requirements, subject to specific exceptions. The only remaining issue for the programs administered by the Bureau of Wastewater Management is the consequences of legislation which prohibits, without exception, the adoption of any standard that is more stringent than federal requirements.

Much of the Bureau of Water Resources Management's efforts are in support of issuance of WPDES permits by the Bureau of Wastewater Management. Consequently, the analysis of the May 17th memorandum applies equally to those activities. The Bureau does undertake other activities that could be affected by more restrictive legislation. The implication to those activities of such legislation will be discussed later in this memorandum.

To summarize, I understand your present request to be that I address the implications to the Wastewater and Water Resources programs of a requirement that Department standards not be more restrictive than federal regulations.

Wastewater Discharge Permitting

In your May 17th memorandum you discussed § 147.035, Wis. Stats. As you stated, that section already limits the Department with respect to the extent to which it can adopt rules under ch. 147, which are more stringent than federal requirements. Stated simply,

that section does two things. First, it allows the Department to adopt treatment technology-based effluent discharge standards in certain instances in which EPA has not adopted such standards. Second, it explicitly states that the requirement to impose controls no more specific than those of the federal government does not apply to water quality based effluent limitations. New legislation "federalizing" the state's program would presumably replace the language in § 147.035.

Removing the existing § 147.035 from the books and replacing it with a requirement that no standards be adopted more stringent than federal regulations would have one definite outcome and several other possible outcomes.

Treatment Technology-Based Effluent Standards

Presumably, any legislation would disallow the state from imposing any treatment technology-based effluent limitations which do not have a federal counterpart. Since most discharges which contain potentially toxic substances are controlled through water quality based effluent limitations, changes to the Department's ability to address toxics through treatment technology limitations is limited as an issue. There are, however, significant exceptions to this general proposition, and dioxin is one example.

PROS

Wisconsin standards would be consistent with federal regulations

There would be no need for the Department to go through the process of establishing and justifying standards that have no federal counterpart

CONS

EPA does not regulate discharges of bacteria and pathogens from sewage treatment plants. "Federalizing" legislation would mean disallowing disinfection of wastewater and inhibiting swimming and other body contact recreation in many parts of the state.

No federal counterparts exist for treatment technology limitations on discharges of nutrients such as nitrogen and phosphorus. Projected legislation would mean that greater amounts of nutrients would be discharged and increased algal nuisance conditions would be expected to occur. Water quality-based effluent limitations on nutrients have not yet been generated.

CONS

Dioxin discharges have been a major concern in the state. Treatment technology limitations have been applied to certain discharges to address dioxin. The projected legislation would likely preclude the continuation of this strategy.

A concern exists in this state over radium in sludge that is disposed on land. The state's rules address this issue, but the federal regulations do not. The proposed legislation would seem to preclude the Department from the application of such locally important regulations.

Water Quality Based Effluent Limitations

As noted, the existing § 147.035 explicitly states that the prohibitions against standards more stringent than federal requirements does not apply to water quality based effluents. If legislation were to be adopted that clearly disallows imposition of water quality based effluents in the absence of federal water quality based effluent limitations, the impact would be great.

Presently, the vast majority of effluent limitations dealing with toxics in discharges are in the form of water quality based effluent limitations. If the legislation were to preclude imposition of state-generated limitations when the federal government has failed to act, the implications are great. Inasmuch as the federal government has not adopted national water quality standards, it would be impossible to apply any water quality based effluent. The Environmental Protection Agency approves state water quality programs, it does not adopt standards.¹

¹Not only for the wastewater discharge program but for most environmental programs, the EPA does not administer solely through regulation. Much of what it does is in the form of "guidance." After adoption of guidance, EPA reviews a state's program and if that program comports with the intent of the guidance, it can be approved. This allows states to have different approaches to pollution control, so long as they all achieve the intent of the law as reflected in EPA guidance.

PROS

No water quality based effluent limitations would be cheaper for municipal and industrial dischargers

No water quality based effluent limitations in the present or the future would make long-term planning for expansion and increased discharges much easier

CON

The loss of every benefit that is associated with the application of water quality based effluent limitations

Other Wastewater-Discharge Related Programs

The above discussion addressed the impact of proposed legislation to the imposition of treatment technology based limitations and water quality based limitations to surface waters. Depending on the scope of legislation there could be significant other implication of legislation requiring "tracking" of federal requirements.

Examples of other state water pollution control programs that do not have specific federal counterparts include significant and popular programs.

Over \$2½ Billion of state and federal monies have been provided to local governments to for construction of wastewater treatment plants. To protect that investment, the state has adopted a plan review and approval program, a compliance maintenance program and an operator's certification program to assure that those investments are properly operated and maintained. None of these programs, all of which are widely accepted and endorsed, have federal counterparts.

Perhaps most important of all differences with the federal program is that the state's program applies to discharges to groundwater whereas the federal program does not. Over time, the state has had one-third to one-half of facilities needing to dispose of wastewater do so to groundwater disposal systems. The number has been decreasing over time due to the concern over the long-term implications of such discharges. A state program that only tracks federal Clean Water Act requirements would be unable to impose the controls on discharges to groundwater of the types that have been causing increased concerns.

Water Resources Management

As noted above, much of what the Water Resources program does related directly to protecting of water quality through the WPDES permit program administered by its

companion Bureau of Wastewater. However, it has significant other responsibilities that are somewhat independent from the discharge program.

The nonpoint pollution program is increasing in importance as the general public and specific interest groups become aware of the extent to which nonpoint pollution contributes to the quality of the water in the state. To date the approach to dealing with nonpoint pollution has largely been one of providing financial aid to those who volunteer to address nonpoint problems. That approach will likely continue to be the primary tool to address nonpoint pollution. However, the state legislature recently acknowledged that in certain circumstances, dealing with "critical sites" such as severe soil erosion it may be necessary to impose requirements that best management practices be implemented. No direct federal counterpart exists for this program. Similar circumstances exist with respect to other programs such as the requirement for larger urban areas to do meaningful area-wide water quality planning.

Observations Applicable to the State/Federal Relationship

In undertaking this assignment several observations were made by those people with whom I discussed the issue of state/federal rule-making. Most of what follows reflect observations of more than one individual.

The trend at the federal level is to create "guidance", rather than regulations. Consequently, with guidance there are no federal "requirements" against which a state's program can be compared.

When there are federal requirements, those requirements invariably mandate that the state requirements be no less stringent than the federal requirements. This means that legislation of the type envisioned essentially places the Department in the position of duplicating federal regulations. Duplicating federal regulations has many policy implications:

- Any federal mandate tailored to fit all states must be one that reflects the lowest common denominator. Environmental concerns that most or all citizens of Wisconsin would agree need to be addressed could not be addressed.
- A related consideration is there would be an inability of the state to address concerns that are either unique to the state or to the kind of ecosystem that exists in the upper midwest.
- Aside from the ecosystem, each state has its own unique problems due to its industries, businesses, agricultural uses and to its political-cultural history. Limiting the ability of the state to come up with unique regulations will

hinder its ability to address those considerations to the benefit of everyone. Examples of issues that citizens of this state want to address in their own way are manure management and other nonpoint pollution problems.

- Tracking federal regulations inhibits states from serving as experimental laboratories, trying out new ways of accomplishing goals everyone agrees should be achieved.

Finally, there was a universal concern over the time it would take to implement new federal initiatives. It often takes the EPA several years after Congress has passed a law for it to "interpret" that law in the form of federal regulations. Since most of the details appear in the regulations, rather than the statute itself, the state must await the EPA action before initiating their own legislative and rule-making efforts. Sometimes the state can go directly to rule adoption, but often legislation is necessary. That means the chronology and timing of events is often that first there is Congressional action, followed a year or much more later by EPA regulations. Then our Legislature must adopt authorizing legislation before the Department can initiate rule-making. It is not uncommon for that scenario to take four years or more.

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CORRESPONDENCE/MEMORANDUM

State of Wisconsin

DATE: June 15, 1995

FILE REF:

TO: Rick Prorise, LC/5

FROM: Milton Donald, LC/5, (608) 264-8991

SUBJECT: Pros and Cons of Proposals to "Federalize" Wisconsin's Water Supply Program

I. No Change Alternative

- Pro(s):
1. Allows state to be more restrictive if such action is deemed to be warranted and justifiable.
 2. Allows the state a degree of flexibility if conditions or circumstances within defined criteria warrant and justify more stringent standards.
- Con(s):
1. Creates potential of Wisconsin having more restrictive standards than neighboring states.

II. No More Stringent Than Federal Standards (With Exceptions)

- Pro(s):
1. Gives indication that federal standards are to be accepted unless conditions or circumstances within defined criteria warrant and justify more stringent standards.
 2. Allows the state a degree of flexibility if conditions or circumstances within defined criteria warrant and justify more stringent standards.
- Con(s):
1. Same as under "No Change" alternative.

III. No More Stringent Than Federal Standards (No Exceptions)

- Pro(s):
1. Makes Wisconsin standards consistent with federal standards.
 2. Eliminates need for Department staff and DNR Board to go through the process of establishing and justifying standards and requirements. ("They were established by EPA!").

3. Conforms to the position advocated by business and other regulated communities.
4. Creates the appearance of putting regulated entities on a level playing field (nationally).

Con(s):

1. Appears to be contrary to many states' criticism of federal standards, wherein they oppose the "one size fits all" concept. Opting to conform our drinking water standards to federal standards would clearly support the "one size fits all" concept.
2. Creates the potential of precluding the Department from providing the highest level of environmental protection to its residents. Federal standards are based on many considerations; including health effects, cost, technology and analytical capabilities. Thus, federal standards could be (and are often) swayed by circumstances which are not relevant to Wisconsin. This could result in the establishment of a standard which provides less health protection than is desirable. An example of this is a comparison between the federal and state MCLs for vinyl chloride. The federal standard is 2.0 ug/l, based primarily on the fact that analytical capabilities are limited by most national laboratories. Because the Wisconsin State Lab of Hygiene can detect this substance at a much lower level, the Wisconsin MCL is 0.2 ug/l. This results in the federal standard providing a cancer risk of 1 in 10,000; whereas the Wisconsin standard provides a cancer risk of 1 in 100,000.

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United States
Environmental Protection
Agency

Administration and
Resources Management
(3103)

Attachment X.

Office of Environmental Justice (OEJ)



Environmental Justice 1994 Annual Report

*Focusing on Environmental
Protection for All People*



From: Laura Olah, CSWAB. 608/643-3124.

To: MTP Members, Staff, Consultants
 Re: Proposed Munitions Rule.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
 REGION 5

Date: March 10, 1995
 Subject: Draft of Proposed Munitions Rule
 From: Carol Witt-Smith
 Region 5, RCRA Permitting
 To: Ken Shuster
 HQ, Military Munitions Rule Workgroup

Laura -
 Please note that these are comments on a March '95 version. But you will understand where our general issues are.

- Carol

Dear Ken,

I wanted to thank you for the opportunity to comment on the March 2nd draft. Since we only had 2 days to review the document to meet your deadline today, some of our comments may be generalized or not covering all the potential issues in relationship with our Region's sites. Both Bob Egan and Gale Hruska from RCRA Permitting assisted in this review.

There are a couple significant things I would like explained to the Subpart X workgroup contacts. Following are some of the big issues we see, and attached are more detailed comments.

1. Applicability to non-military sites

When we talked the last few months, we were under the opinion that this munitions rule would affect all munitions operations, public and military. Yet, the proposal only addresses military. Will we be expanding this new section later to address applicability to private or public ranges? We want to make sure we have consistency, and that the issues like the fisheries in Region 1 are addressed.

2. Emergency Response Experts

It appears from the definitions that all experts are people that either work for EOD or are trained in some way by DOD. Does the definition include city or town bomb squads or other emergency response teams? Please clarify in the definition.

-2-

3. Ranges

Many issues are outlined in the attachment, but I wanted to bring out a specific case of Jefferson Proving Grounds as an example. JPG while active did munitions testing and has some 20,000 acres possibly contaminated with UXO in testing ranges. While I can see that the actual testing should be exempt, the ranges should not go on without some sort of regulatory authority over them. The Army does not routinely track and pick up the munitions tested. Only certain ranges do that activity in order to further evaluate the munition tested. The Army only routinely clears roads, in order to move around between ranges. It was clear in a February 1995 tour of the range area, that the Army had no intent to track where materials landed or the intent to ever pick up the material for further use. In fact, there is one area next to a road where EOQ flagged UXO to show visitors that the UXO is a major problem and cannot be technically addressed since the problem is so enormous (every couple feet or less a UXO, even right next to the road). You would basically have to devegetate and strip layers of soil over the entire ranges areas to clean it up. Not to mention destroying habitats for species that include the endangered Indiana Bat. The base was listed for closure and the last round was shot in 1994. Region 5 informed the Army that the ranges would become SWMUs once the activity ceased in 1994, not when the base officially closes in September 1995, and the Army plans to walk away physically from the site with only a skeleton security crew left. USFWS is proposing to obtain the property for a wildlife refuge. They met with the Army this week, and it seems like the Army might not fulfill all its obligations for liability due to lack of funding. So, here we have a site that has UXO all over the place. The Army is against any internally monitoring, and may finally agree to monitoring the perimeter of the facility to assure no off-site migration (which we haven't discussed details of how many wells, etc.). We can't destroy important habitats, so we just about have to give in to the fact that all we can do is secure the site, and possibly address some hot spots, see if we can restore vegetation in some areas, and monitor for environmental impacts. These testing activities have been taking place since 1941, and "today" we are just discussing monitoring the ranges under corrective action and base closure. We need to avoid situations like JPG and require some routine monitoring to address these sites before they become disaster areas that are impossible or virtually impossible to cleanup. The Army seems to feel that there are no problems with these sites, but they never monitor them sufficiently to justify that. As we are just finding out with OB/OD areas, there are impacts to the environment that need to be monitored. Why are active ranges so different than some of the large OB/OD ranges that are regulated? Sure, they cover large acreage, but eventually when they "close" they'll have to set up monitoring then. Do a CAMU concept now on a 5 year schedule for installation of the monitoring system for the active ranges. Let's not wait 54 years to monitor these areas.

-3-

4. Storage Areas

This part of the rule needs some detail on how were supposed to regulated these areas. The rule does not address how a munition may be classified as a waste in the magazine, sent over for treatment by demolition, but when it gets there, facilities may do some demilitarization removing parts for OB versus OD, or parts sent to DRMO. What happens to these demil areas? Are they considered recycling areas, even though the "waste" munition is being prepared for detonation by being properly divided and packed? Please clarify.

Overall, as a regulator, the rule itself needs further detail. We can't enforce a preamble and rule needs to clear on what conditions we will apply.

Thank you for the opportunity to comment. We will be looking forward to the next revision, and would be happy to help you in any way to modify some of the language. If you have any questions regarding this matter, please contact me at (312) 886-6146.

cc: Gale Hruska, RPB
Bob Egan, RPB
Ken Tindall, CERCLA Base Closures
Jeff Gaines, HQ (for distribution to Subpart X Workgroup)
Hak Cho, RPB
George Hamper, RPB

Specific Comments

Comments on the actual rule

1. Page 1, Definitions, Emergency Response Expert
Does this include local bomb squads or fire departments that may respond to emergencies? How about EPA or State emergency response teams?
2. Page 1, Definitions, Explosives Emergency
Is there any need for a de minimus amount provision?
3. Page 2, Definitions, Military Munitions
 - a. What is the status of these munitions if they are produced by a private firm but have not yet been put under military control?
 - b. Where do flares and fireworks come in? As pyrotechnics?
 - c. Do we need to define non-military munitions?
4. Page 2, Definitions, Range
 - a. What about non-training gun clubs, where it is a sport?
 - b. Define better buffer zones. Do you mean the buffer area to the target area, or the buffer area to the facility which is not supposed to get munitions?
5. Page 3, 261.2(g)(1)(i)
Add "treatment". Do not limit this definition. It could include other thermal or chemical treatment of munitions such as thermal desorption or other Subpart X units. Also include detonation.
6. Page 3, 261.2(g)(1)(iv)
 - a. What about when munitions are shipped from one site to another, the second site being the point where the determination is made (e.g., outdated munitions shipped to a Depot where the decision is made on what is to be done)?
 - b. What about UXO if range is closed it is a solid waste. We shouldn't have to wait for military official to say so.
7. Page 4, 261.2(g)(3)(i)
 - a. Isn't something needed to prevent "sham" training uses (e.g., the practice of dumping liquids into holes in the ground, igniting them, and then calling it "fire-fighting training")? We need specific recordkeeping requirements in the rule. Don't assume the military will keep records that have the information we need

-2-

recorded to see if they are indeed training or not. And, add that EPA can inspect these records to assure compliance, or even have them certify it.

- b. A great deal of propellant is disposed in this manner. This doesn't seem stringent enough. Is the 100th time a troop destroys propellant in this manner still considered "training"?
8. Page 4, 261.2(g)(3)(i), (ii), and (iii)
What is there to insure that these activities are done in an environmentally responsible manner?
 9. Page 4, 261.2(g)(3)(iii)
 - a. Add the word "active" before "range".
 - b. On-range or roads only! Not on-installation. And, it doesn't mean when the range is inactive or closed.
 10. Page 4, 261.2(g)(4)
This needs to be better defined. What residues are included?
 11. Page 4, 261.2(g)(4)(i)
 - a. We must define "Closed", or change it to inactive for a certain time period (say 1 year or more), established as closed under the base closure program (last round shot), or other mechanisms to determine it is no longer active.
 - b. Closed is when they stop using it for training or testing. Dormant should have a time limit, say 1 year, otherwise alot of ranges may be called dormant, and sit for years so they don't have to be addressed. Its too easy to avoid regulations.
 - c. A range can be transferred without being closed (i.e., National Guard use even though the property is transferred to another agency.
 - d. DOD hasn't guaranteed 6 months cleanup. They don't want to get funds to take care of it.
 12. Pages 4 and 5, 261.2(g)(4)(ii)
 - a. Buffer zone areas for the property next to the fenceline shouldn't have munitions, they are supposed to be clean. Include those areas too, not just off-base.
 - b. How do you address areas like Lake Michigan used in the past as a training range?

-3-

- c. The rule states "it is expected that DOD will keep records". Why not require it? Be forceful. Otherwise we have no guarantees that they will keep the proper records.
 - d. What about past experience on recordkeeping? In the past DOD hasn't been keeping records at JPG. We should have specific conditions that make them track location, amount, and type.
 - e. Unless they "cleanup" the range and start over with tracking, this will be a huge and difficult job.
13. Page 6, 262(g)
- a. DOD should be required to report to the other agencies if the private industry or others have to. Why not let the State's work out what kind reporting on emergencies they want locally. And EPA just compare important issues for consistency. Reporting is good in order to establish if someone is getting too routine in their emergency response, and the area should be regulated under Subpart X as an OB/OD unit.
 - b. We need to add in tracking of the type of treatment and/or disposal. OB versus OD; methods on the ground, in a pan, etc; disposal of residuals, etc. We don't want to find them just hauling and storing it somewhere like in the Fisheries case.
 - c. Residuals definitely need to be addressed by DOD, since we require it of private companies. Especially if the EOD range would be exempt. At USNC the EOD range is a part of the bigger OD area that is regulated under Subpart X. EOD ranges should be regulated if they are used routinely. It is not clear in the rule how you are addressing EOD ranges.
14. Page 7, 263(b)
- Use the definition of contiguous property in corrective action, which explains how roads or rivers can cut across properties.
15. Page 8, 264(iv)
- a. What about on-site emergency responses?
 - b. Shouldn't the recordkeeping apply to non-military sites also?
 - c. Expand emergency response expert to include BATF members, bomb squads, etc.
 - d. Records should also include location of the response, and disposition, and a location contact (if available).
 - e. Define disposition. Does it include treatment and disposal of residuals?

-4-

16. Page 9, 264.1200

- a. Include other storage area. They might not all fit the definition of a magazine.
- b. The rule should discuss all the options, tanks, containers, containment buildings, and detail what would be required. A magazine might not be able to meet the container storage requirements for a permit.
- c. How are you applying when permitting is necessary? After all, if the waste is kept less than 90 days in storage it is only a generator accumulation area.
- d. Does the applicability apply to temporary storage area prior to treatment. Those types should be considered ancillary to the OB or OD unit.
- e. Does the apply to the demilitarization building that packs the explosives for the detonation range?

17. Page 10, 264.1201(d)

SOPs, will EPA review it, and will it be uniform across the country?

18. Page 11, 264.1202

The rule does not address what the monitoring conditions are for a range. These need to be defined due to the vast size of ranges (e.g., ground water flow direction may go 10 different ways on a range with streams or other ground water discharge areas).

19. Page 12, 265.1(c)(11)(D)(iv) and 270.1(c)(3)(iii)

- a. You need to add a section on other storage or handling, and closure of ranges (special details such as capping).
- b. Why record retention for military emergencies only? Why not non-military?

20. Page 13, 271

Will this be HSWA or something else? In some of our States we can't use omnibus, so how do we get the military to do these activities?

- end -

MILITARY TOXICS PROJECT

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PRESS RELEASE

FOR IMMEDIATE RELEASE: December 12, 1995
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CITIZENS' NETWORKS TESTIFIES THAT PROPOSED EPA MUNITIONS RULE FAILS TO FOLLOW PRESIDENTIAL EXECUTIVE ORDER ON ENVIRONMENTAL JUSTICE

Today, at the meeting of the National Environmental Justice Advisory Committee (NEJAC), the Military Toxics Project will testify that the EPA's proposed rule regulating munitions wastes does not follow the Presidential Executive Order on Environmental Justice — Order 12898 issued in February 1994, titled "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations."

Pursuant to the Federal Facilities Compliance Act of 1992 (Sec. 107), the Environmental Protection Agency is engaged in a rulemaking that directly affects the many communities in which present and former Department of Defense munitions ranges, as well as munitions storage, treatment, and disposal facilities, are located. In that legislation, Congress directed the EPA Administrator to promulgate regulations determining when military munitions become a hazardous waste. The law clearly states, "Any such regulations shall assure protection of human health and the environment." EPA published a proposed rule November 8, and it has pledged to promulgate the final version by October 31, 1996.

Cathy Hinds, the Maine-based Executive Director of the Military Toxics Project states, "Our preliminary review of problems associated with military munitions facilities, particularly impact ranges and burning areas, suggest that military munitions activities heavily impact many communities of color, other poor rural communities, and particularly the lands of native Americans, native Alaskans, and native Hawaiians." Below are some examples:

- A 2,500-acre portion of the land taken from the Oglala Sioux during World War II, at great hardship to the residents, remains in Air Force hands because the Air Force will not or cannot remove unexploded munitions. The military also appears unwilling to investigate and remove munitions contamination on the other 300,000 acres already returned to the Sioux nation.
- After World War II, the military retained control of the culturally significant Makua Valley, in Hawai'i, against the wishes of the Hawaiian government, because it said it could

not make the Valley safe. In Waikane Valley, on the far side of Oahu, the military actually condemned (repossessed with minimal compensation) culturally significant land from a munitions impact range previously returned to a Native Hawaiian family because it said it could not afford to remediate it.

* At Fort Ord, California, the military opposition to external regulatory oversight of the former impact range is likely to expose the nearby population, in the largely African-American community of Seaside, to explosive and other environmental hazards.

* At the Sierra Army Depot, in northern California, the Army's open burning and open detonation of munitions wastes and waste munitions creates environmental and public health hazards on Pyramid Lake Paiute land. A large share of that activity was moved there after residents of the San Jose area forced the severe restriction of similar activities there.

"Unfortunately, in no place in the extensive preamble accompanying the proposed rule does EPA mention Environmental Justice. Once again, Environmental Justice has been segregated from a mainline EPA activity affecting communities of color," declares Nikki Fortunato Bas, the San Francisco-based Associate Director of the Military Toxics Project. "This is a serious oversight in itself, and we believe it runs counter to the Environmental Justice Executive Order, as well as EPA's Environmental Justice Strategy."

The Military Toxics Project is calling upon the National Environmental Justice Advisory Council to urge that EPA, in its promulgation of the final regulations, to fully study and consider the environmental justice impact of the munitions rule. Are communities of color or other low-income communities disproportionately impacted by pollution and explosive hazards from munitions facilities? Do the military's policies and practices on munitions threaten the relationship of native peoples to culturally and historically significant land?

The Military Toxics Project (MTP) is a national network of grassroots community groups, veterans, active military personnel, environmental justice networks, and labor - all working together toward preventative solutions to Department of Defense pollution. MTP's Conventional Munitions Network is a campaign made up of representatives from about 25 communities which are home to military installations with munitions impact ranges, open burning or detonation, and other munitions-related environmental issues.

~~DRAFT~~
December 13, 1995

PASS ED

NEJAC

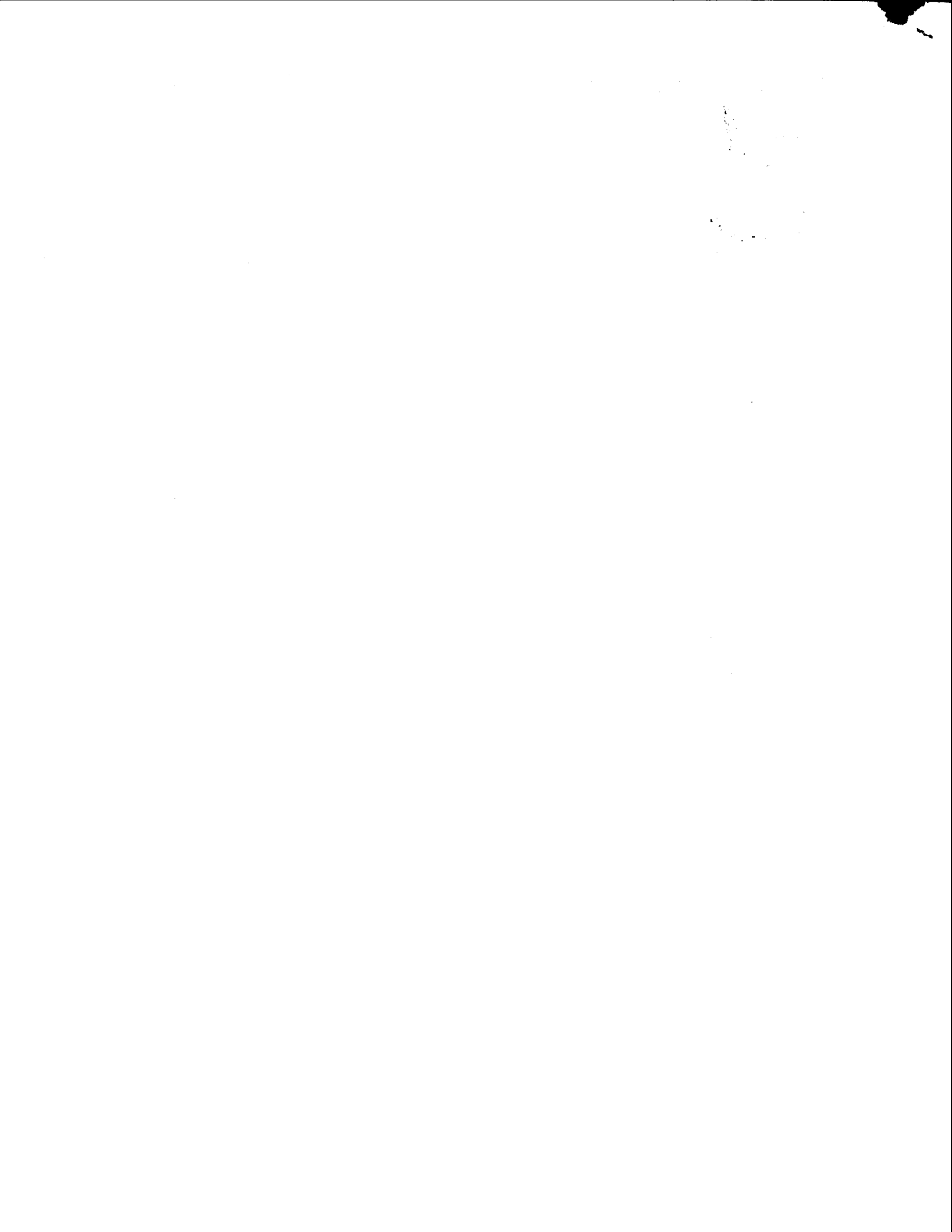
Motion from the Waste and Facility Siting Subcommittee

The National Environmental Justice Advisory Committee has been advised that the EPA's proposed rule, 40 CFR Part 260, et al. Military Munitions Rule (60 FR 216, November 8, 1995, pp: 56468-95) does not address Environmental Justice issues relating to human health and environment as required under Executive Order 12898, Sections 2-2 and 6-606.

It is the sense of NEJAC that the issues covered under the proposed rule will have significant impact on minority communities and low-income populations, including substantial numbers of Native Americans on Tribal Lands.

Accordingly, NEJAC urges EPA, in its promulgation of the final regulations, to require the DOD and appropriate State agencies to take into consideration environmental justice issues which may impact on the communities affected by the application of the Military Munitions Rule.

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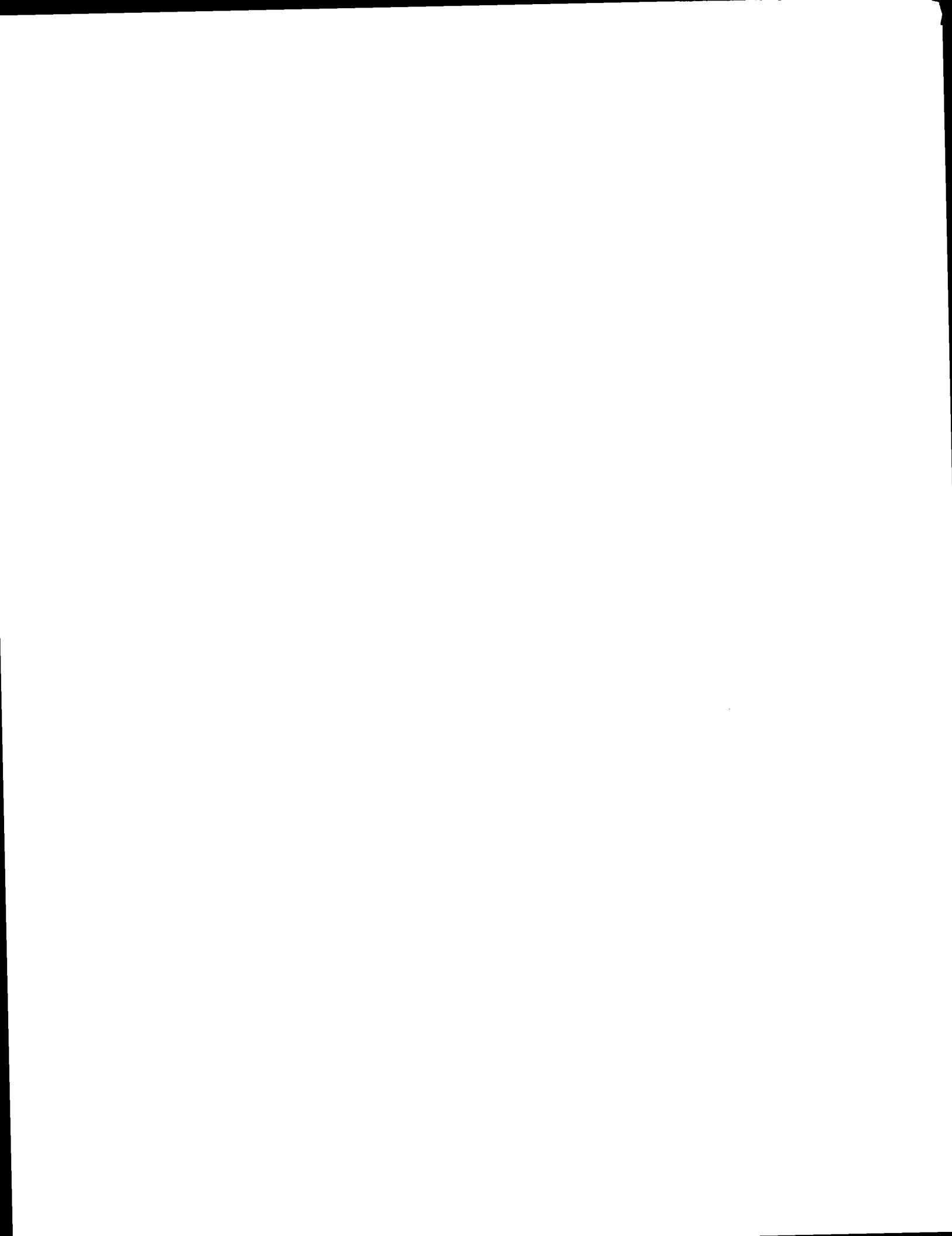
Synopses of Federal Demonstrations of Innovative Site Remediation Technologies

Second Edition



Prepared by the

**Member Agencies of the
Federal Remediation Technologies Roundtable**





Aerated Static Pile Composting Explosives (TNT, RDX, HMX) in Lagoon Sediments

Technology Description

Composting is a process by which organic materials are biodegraded by microorganisms, resulting in the production of organic and inorganic by-products and energy in the form of heat. This heat is trapped within the compost matrix, leading to the self-heating phenomenon known as composting. Composting is initiated by mixing biodegradable organic matter (explosives in this study), with organic carbon sources and bulking agents, which are added to enhance the porosity of the mixture to be composted.

In "static pile" composting, an aeration/heat removal system is utilized to increase process control over the composting system. The aeration/heat removal system typically takes the form of a network of perforated pipe underlying the compost pile. The pipe is attached to a mechanical blower and air is periodically drawn or forced through the compost to effect aeration and heat removal.

The composting test facilities were constructed of concrete test pads with runoff collection systems and sumps, covered by a roof to protect the compost piles from weather and to minimize the amount of moisture collected in the sump. Bulking agents and carbon sources consisted of horse manure, alfalfa, straw, fertilizer, and horse feed. Baled straw was used to contain the pile contents, and was arranged in a ring around the perimeter of each pile. Sawdust and hardwood mulch were used to construct the pile bases, provide additional bulking material, and insulate the piles. After mixing, the compost was transported to the composting pads. Each compost pile contained a system of pipes connected to a blower, as described above. A cross-sectional schematic diagram of a compost pile is provided.

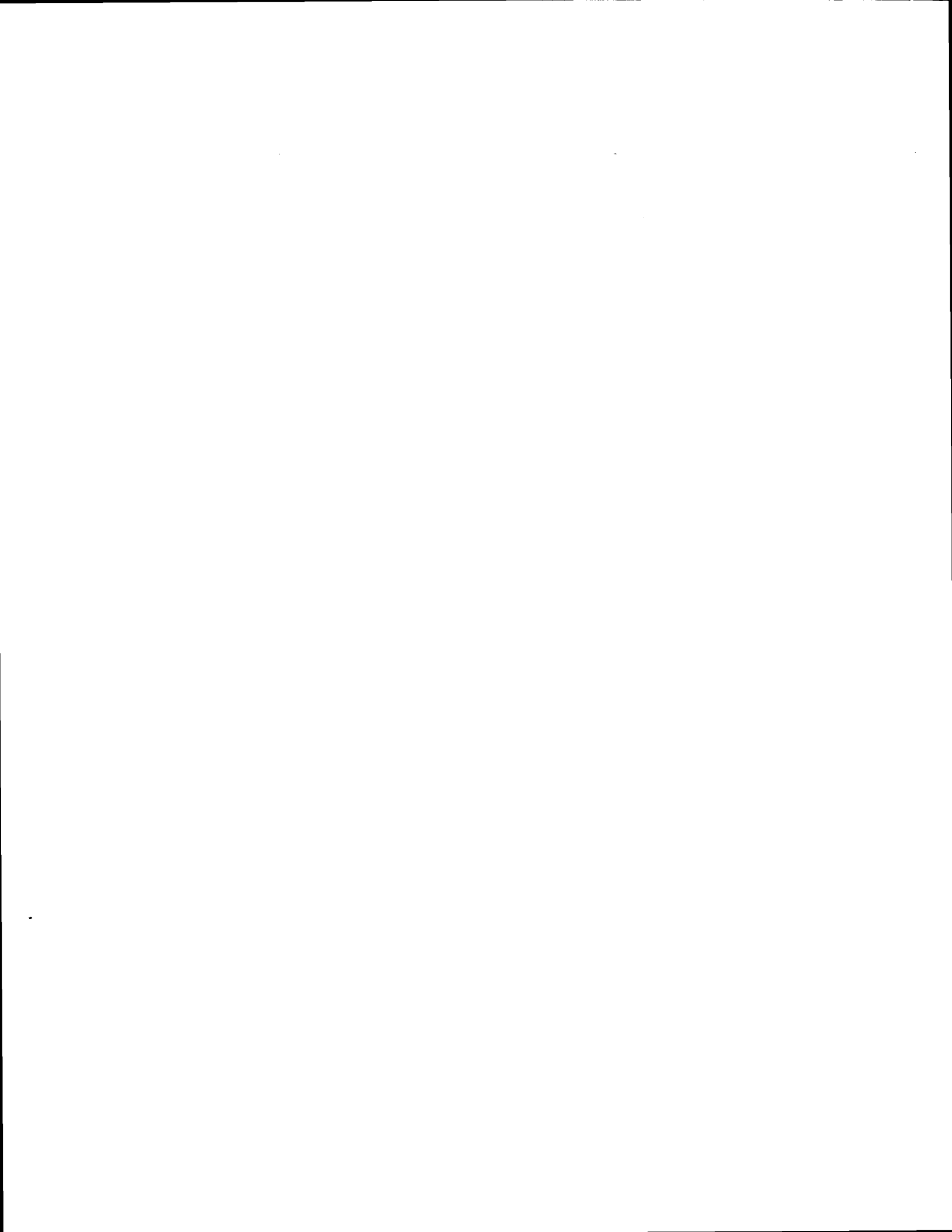
Technology Performance

The primary objective of this study was to evaluate the utility of aerated static pile composting as a technology for remediating soils and sediments contaminated with the explosives TNT, HMX, RDX, and tetryl.

Secondary objectives included evaluating the efficacy of thermophilic (55°C) versus mesophilic (35°C) composting, evaluating different materials handling and process control strategies, and determining transformation products when Standard Analytical Reference Materials (SARMs) were available.

Temperature was the primary test variable investigated. The temperature of one set of compost piles was kept within the mesophilic range; the temperature of the second set of piles was kept in the thermophilic range. The initial concentration of explosives in test sediments collected from the lagoon was 17,000 mg/kg. Phase I (piles 1 and 2) was conducted with a mixture of lagoon sediments, sawdust, wood chips, and a straw/manure mixture. Based on data received from phase I, phase II (piles 3 and 4) added alfalfa and horse feed to the compost mixture to increase the concentration of biodegradable organic carbon in the compost mixture. After 153 days of composting, the solvent-extractable total explosives were reduced to 376 mg/kg and 74 mg/kg in the mesophilic and thermophilic piles, respectively. The mean percent reductions of extractable TNT, RDX and HMX were 99.6, 94.8, and 86.9 weight-percent in the mesophilic piles, and 99.9, 99.1, and 95.6 weight-percent in the thermophilic piles.

The results of this field demonstration indicate that composting is a feasible technology for



decontaminating explosives-contaminated soils and sediments. Further investigation is warranted for optimizing the materials balance and soil loading rate for mixtures to be composted, minimizing bulking agent used, and developing a design and operation management plan for a full-scale composting facility. In addition, the compost residue should be subjected to a toxicity evaluation and more extensively analyzed to determine the final fates of HMX, RDX, TNT, and tetryl.

Remediation Costs

Cost information is not available.

General Site Information

This field-scale demonstration project was conducted at the Louisiana Army Ammunitions Plant (LAAP). Compost piles were constructed and tested at LAAP between December 1987 and April 1988. Phase I piles were tested for 33 days; phase II piles were tested for 153 days. Approximately 21 cubic yards of sediment was excavated from Pink Water Lagoon No. 4 for use in this study.

LAAP was built to load and pack ordinance for the U.S. Army. Explosives have never been manufactured at the facility, but are brought in and utilized in loading, assembling, and packing lines. Initially, the area where the field demonstration was conducted was used as a burning grounds to dispose of out-of-specification ordnance. These burning pits were converted to lagoons in the mid-1940s. The lagoons were used to dispose of wastewater generated during wash down of the munitions loading lines. Equipment used to load munitions was washed with water, and the resulting wastewater contained high concentrations of suspended explosives ("pink water"). Pink water was transported to the unlined lagoons and dumped into individual lagoons via a concrete spillway. Suspended explosives settled to the bottom of the lagoons. Over the period of approximately 30 years during which pink water was disposed of in the lagoons, high concentrations of explosives

accumulated in the upper sediment. The highest concentrations (300,000 to 600,000 mg/kg) accumulated near the spillways. In October 1984, the pink water lagoon site at LAPP was proposed for inclusion on the National Priority List (NPL).

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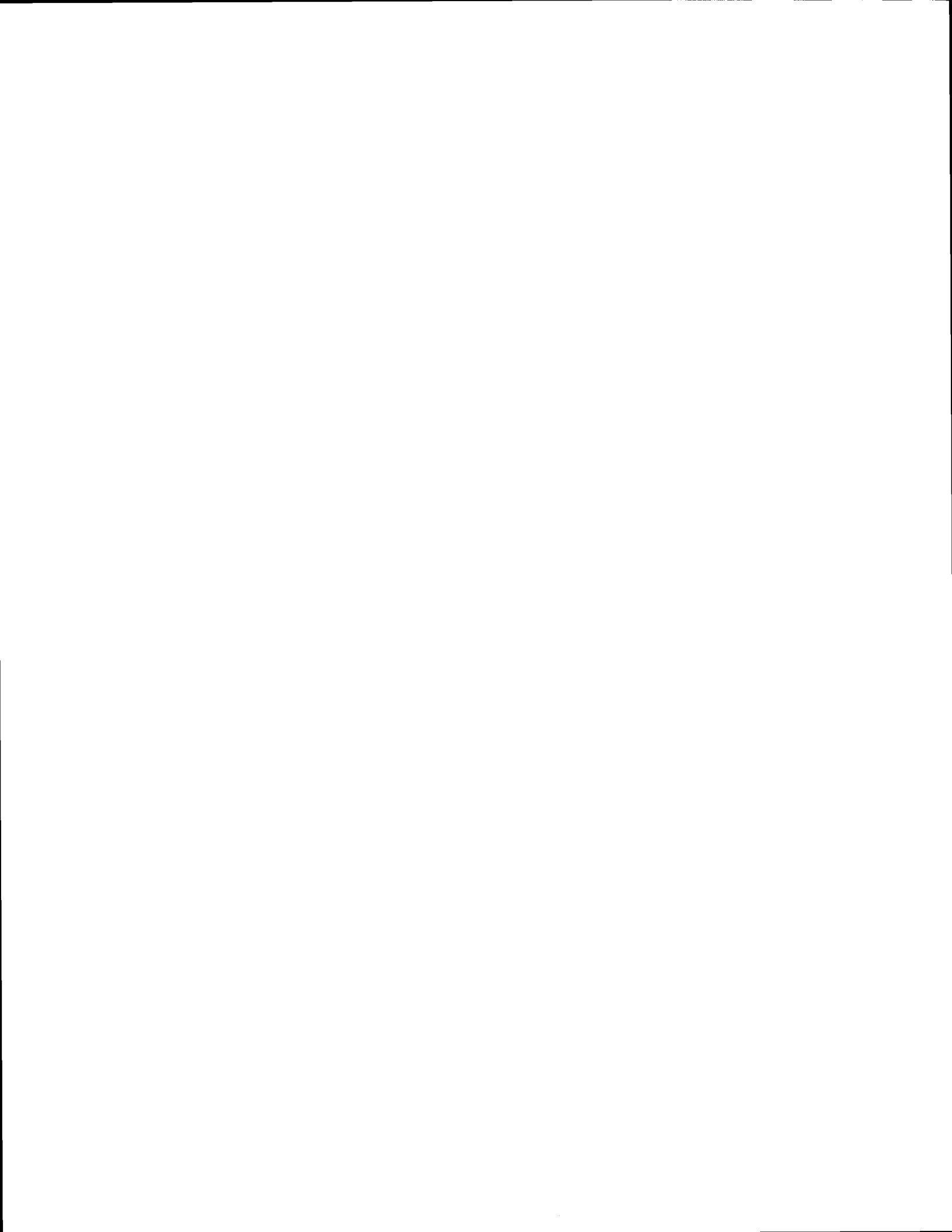
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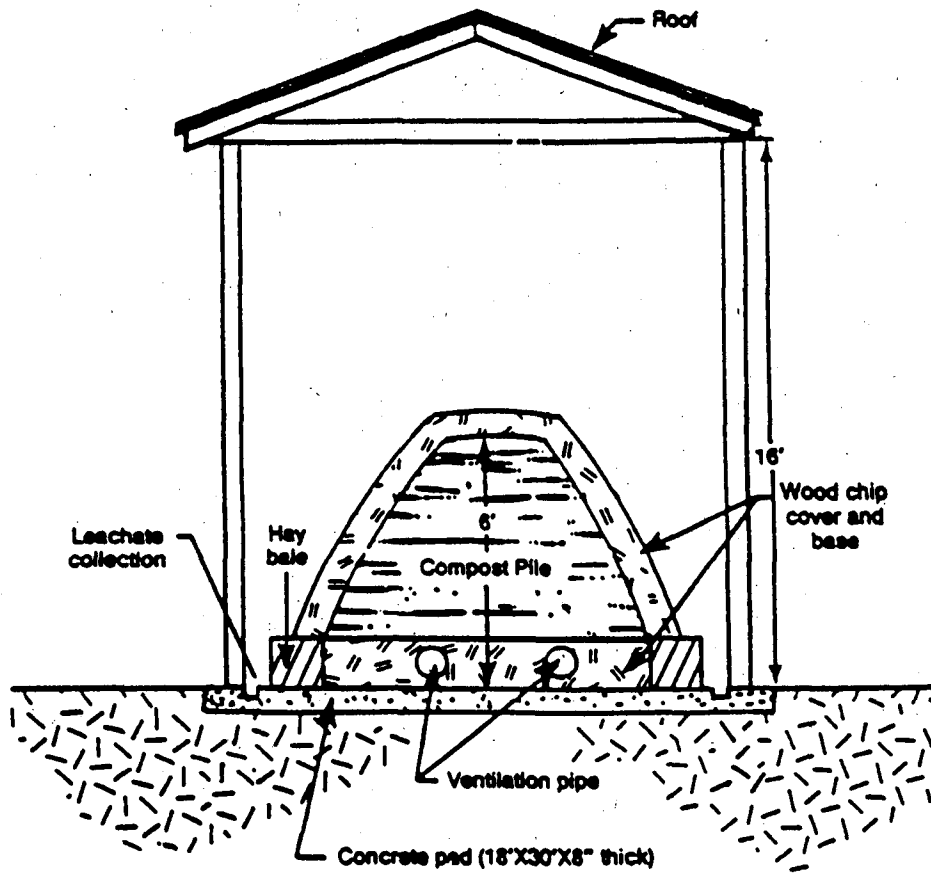
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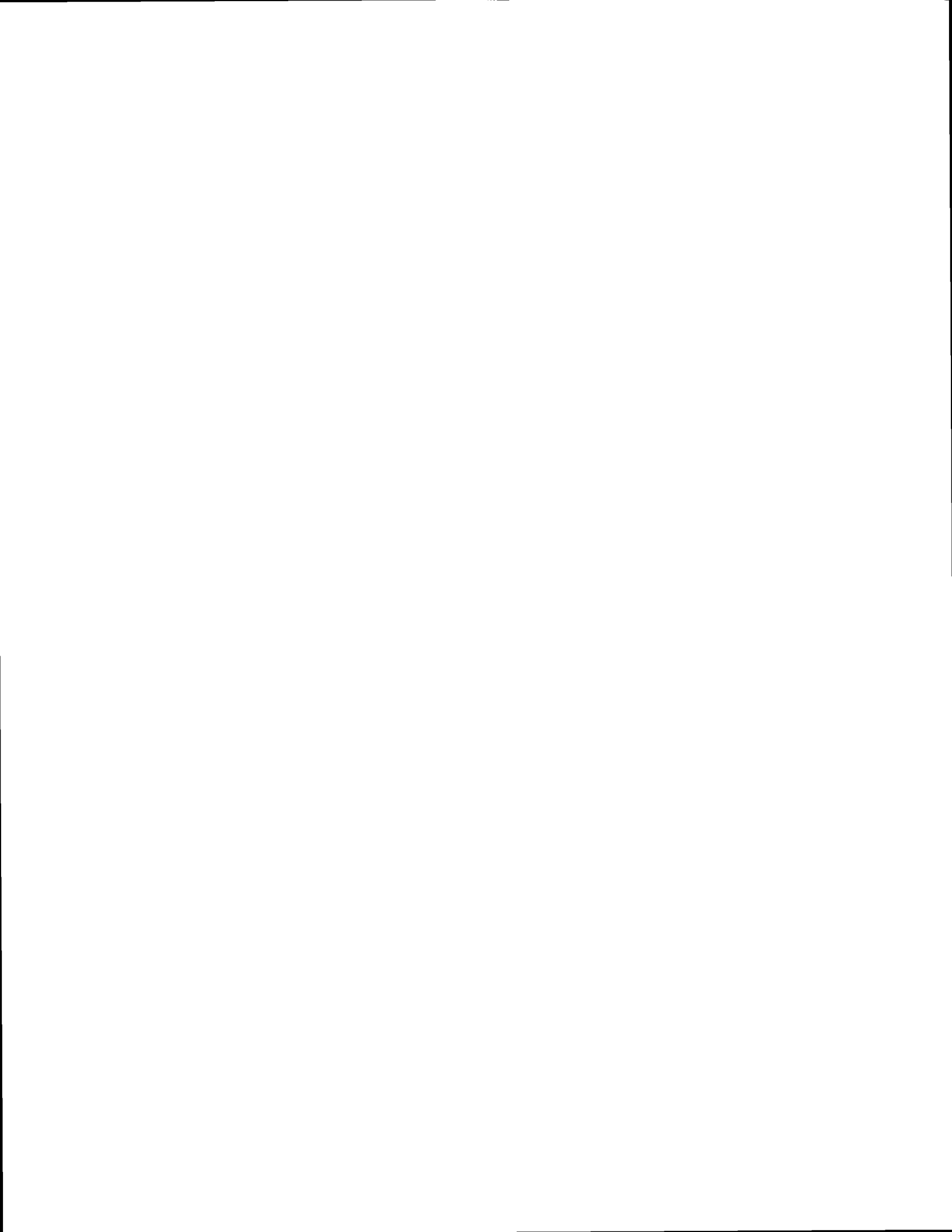
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Aerated Static Pile Composting Test Facility





Aerated Static Pile Composting Propellants (Nitrocellulose) in Soil and Sediments

Technology Description

Composting is a process by which organic materials are biodegraded by microorganisms, resulting in the production of organic and inorganic byproducts and energy in the form of heat. This heat is trapped within the compost matrix, leading to the self-heating phenomenon known as composting. Composting is initiated by mixing biodegradable organic matter (nitrocellulose (NC) in this study), with organic carbon sources and bulking agents, which are added to enhance the porosity of the mixture to be composted.

In "static pile" composting, an aeration/heat removal system is utilized to increase process control over the composting system. The aeration/heat removal system typically takes the form of a network of perforated pipe underlying the compost pile. The pipe is attached to a mechanical blower and air is periodically drawn or forced through the compost to effect aeration and heat removal. The primary objective of hazardous materials composting is to convert hazardous substances into innocuous products for ultimate disposal, such as land application.

The composting test facilities were constructed of concrete test pads with runoff collection systems and sumps, covered by a roof to protect the compost piles from weather and to minimize the amount of moisture collected in the sump. Bulking agents and carbon sources consisted of a cow manure slurry, alfalfa, straw, and horse feed. Baled straw was used to contain the pile contents, and was arranged in a ring around the perimeter of each pile. Sawdust and hardwood mulch were used to construct the pile bases, provide additional bulking material, and insulate the piles. After mixing, the compost was transported to the composting pads. Each compost pile contained a system of perforated

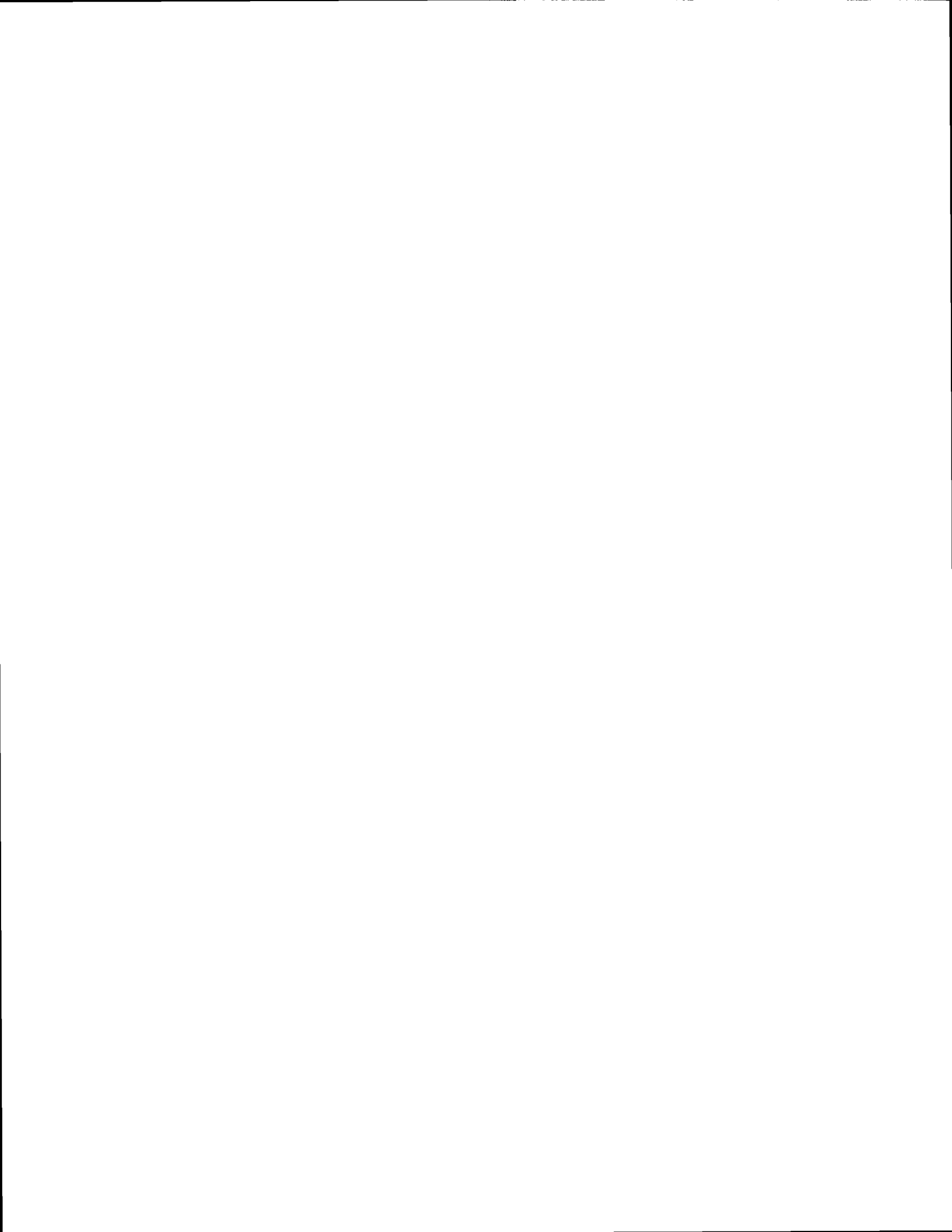
and non-perforated pipes connected to a blower. The blowers were used to pull air through the compost piles to promote aeration and remove excess heat. A cross-sectional schematic diagram of a compost pile is provided.

Technology Performance

The primary objective of this study was to evaluate the utility of aerated static pile composting as a technology for NC fine (out-of-specification NC) remediation and destruction of soils contaminated with NC. Secondary objectives included evaluating the efficacy of thermophilic (55°C) versus mesophilic (35°C) composting, determining a maximum soil loading rate, and comparing different process control and material handling strategies.

The test variable in compost piles 1 and 2 (phase I) was temperature. The temperature of pile 1 was kept within the mesophilic range, and the temperature of pile 2 was kept in the thermophilic range. The concentration of NC in test soils collected from the dredge basin were 18,800 mg/kg for phase I tests. After mixing, total NC concentration in pile 1 was 3,670 mg/kg, and concentration in pile 2 was 3,608 mg/kg. After 152 days of the study, mean total NC concentrations were 651 mg/kg and 54 mg/kg, respectively. Information concerning the effect of temperature on the NC concentration was inconclusive, however, because there were apparent discrepancies in the starting data gathered for pile 1.

The test variable in piles 3 and 4 (phase II) was the degree of soil loading within each pile. The initial soil loading was increased from 19 percent in phase I to 22 percent in pile 3, and 32.5 percent in pile 4. The concentration of NC in tests soils collected for phase II was 17,027



mg/kg. After mixing, the concentration of NC in pile 3 was 7,907 mg/kg, and 13,086 mg/kg in pile 4. After 112 days of the study, total mean concentrations of NC were 30 mg/kg and 16 mg/kg, respectively. Both piles showed greater than 99.5 percent reduction of NC from the starting point of the test. These results suggest that successful composting will likely occur at sediment loading rates of up to 50 percent or exceeding 50 weight-percent.

The results of this field demonstration indicate that composting is a feasible technology for reducing the extractable NC concentration in contaminated soils. In addition, this study provides tentative evidence indicating that NC can be degraded when incorporated into a mixture to be composted at a high concentration.

Remediation Costs

Cost information is not available.

General Site Information

This field-scale demonstration project was conducted at the Badger Army Ammunitions Plant (BAAP) in Sauk County, Wisconsin. Four compost piles were constructed at BAAP during the period from April 1988 to January 1989. The first set of compost piles was tested

for 151 days; the second set was tested for 112 days. Approximately 13 cubic yards of test soils were excavated from Dredge Spoil Basin No. 1 for use in this study.

Constructed in 1942, the plant operated intermittently over a 33-year period, producing single- and double-base propellants for rocket, cannon, and small arms ammunition. During the plant's period of active operation, various chemical materials were produced, and the associated wastes and manufacturing byproducts were disposed on site. The wastes included acids, nitroglycerin, and nitrocellulose (NC). As a result of the disposal practices, contamination of soils, the underlying aquifer, and, to some extent, surface waters has occurred.

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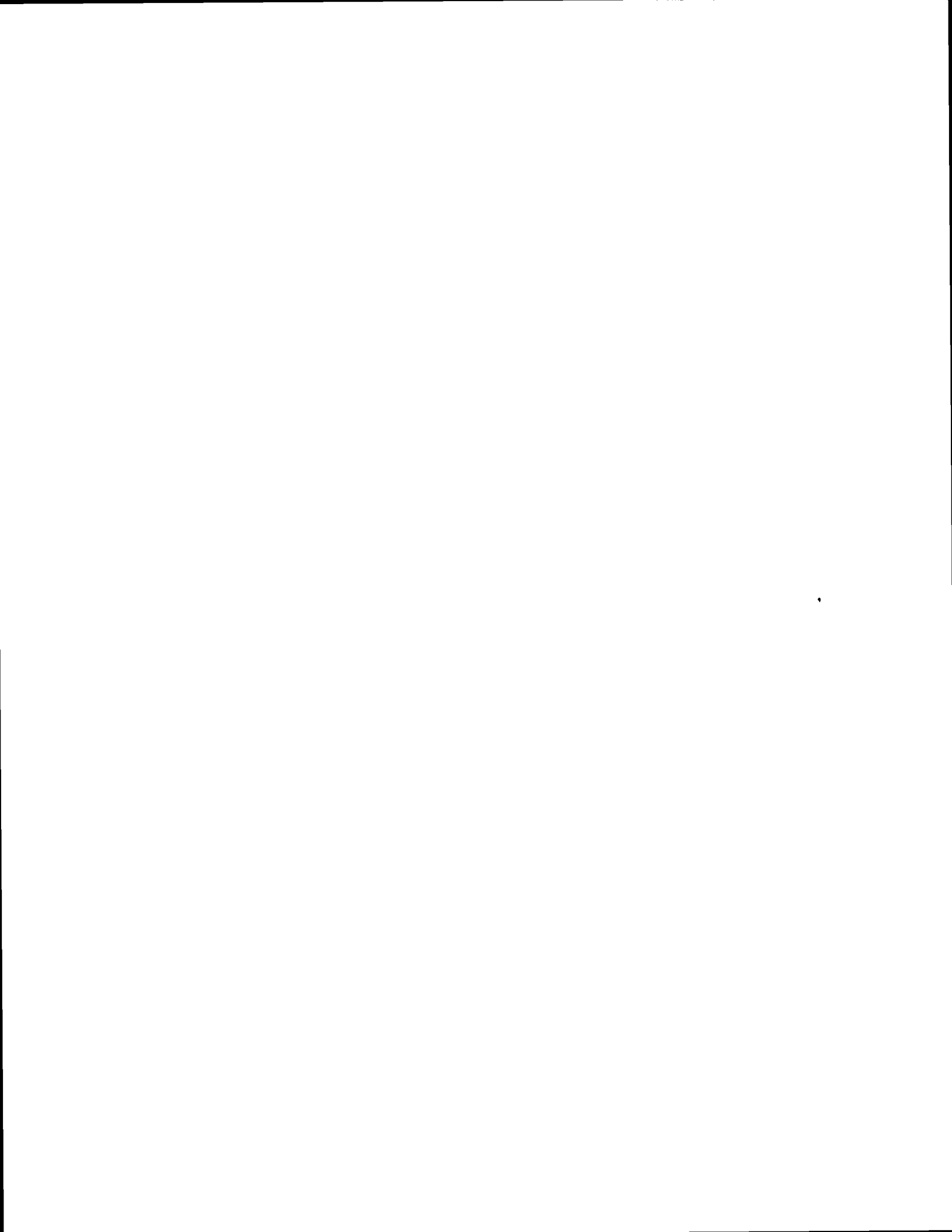
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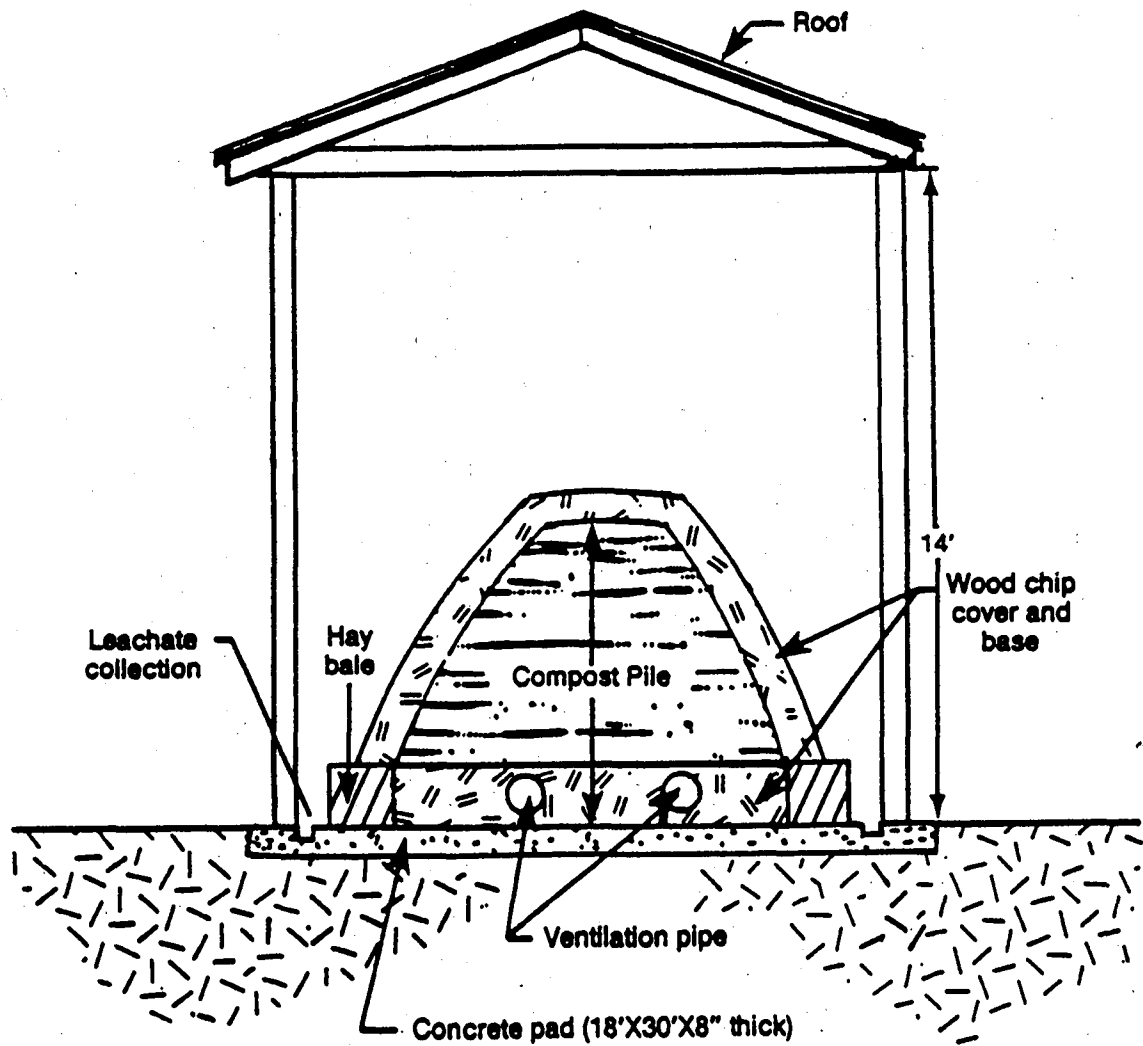
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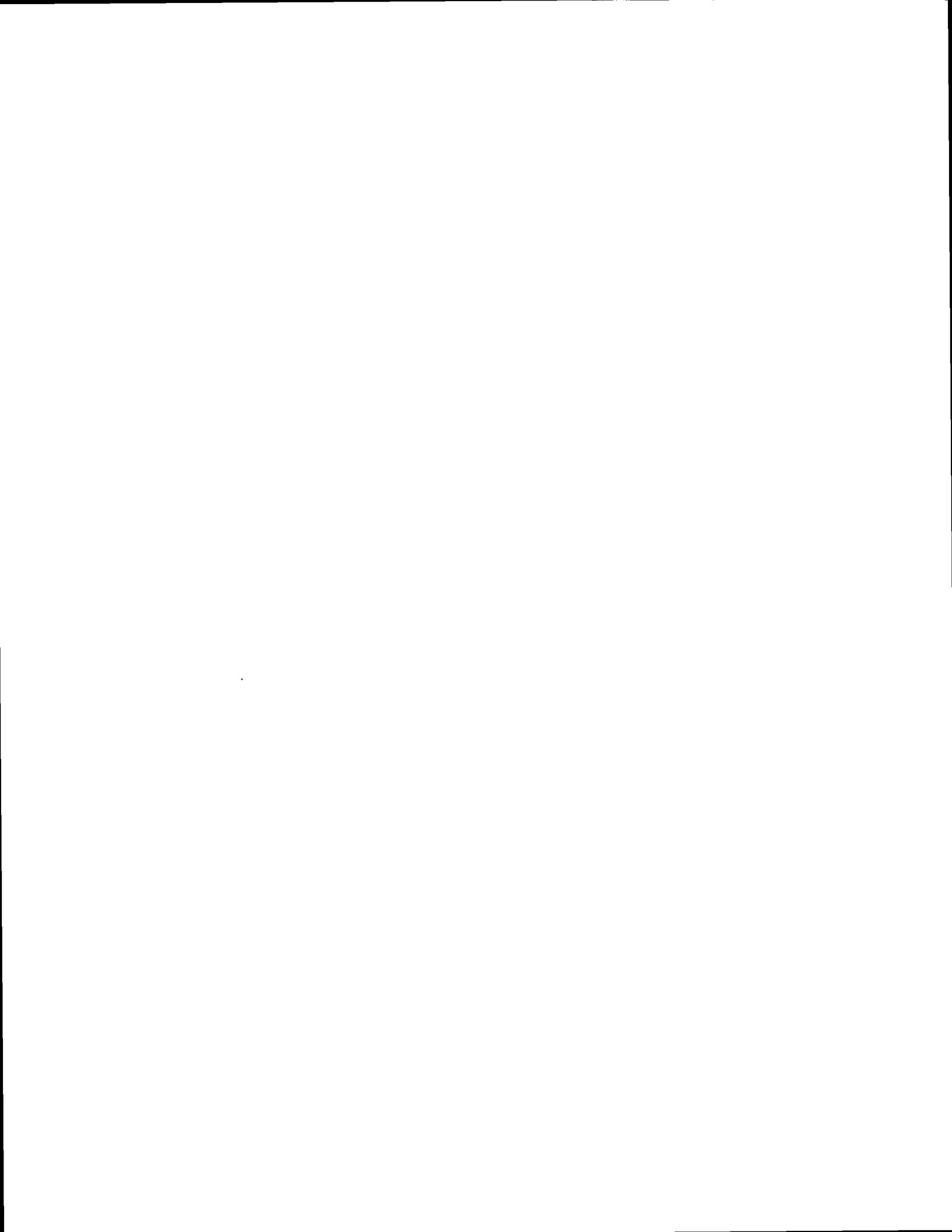
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Aerated Static Pile Composting Test Facility





Aerobic Composting Optimization Explosives (TNT, RDX, HMX) in Contaminated Soil and Sediment

Technology Description

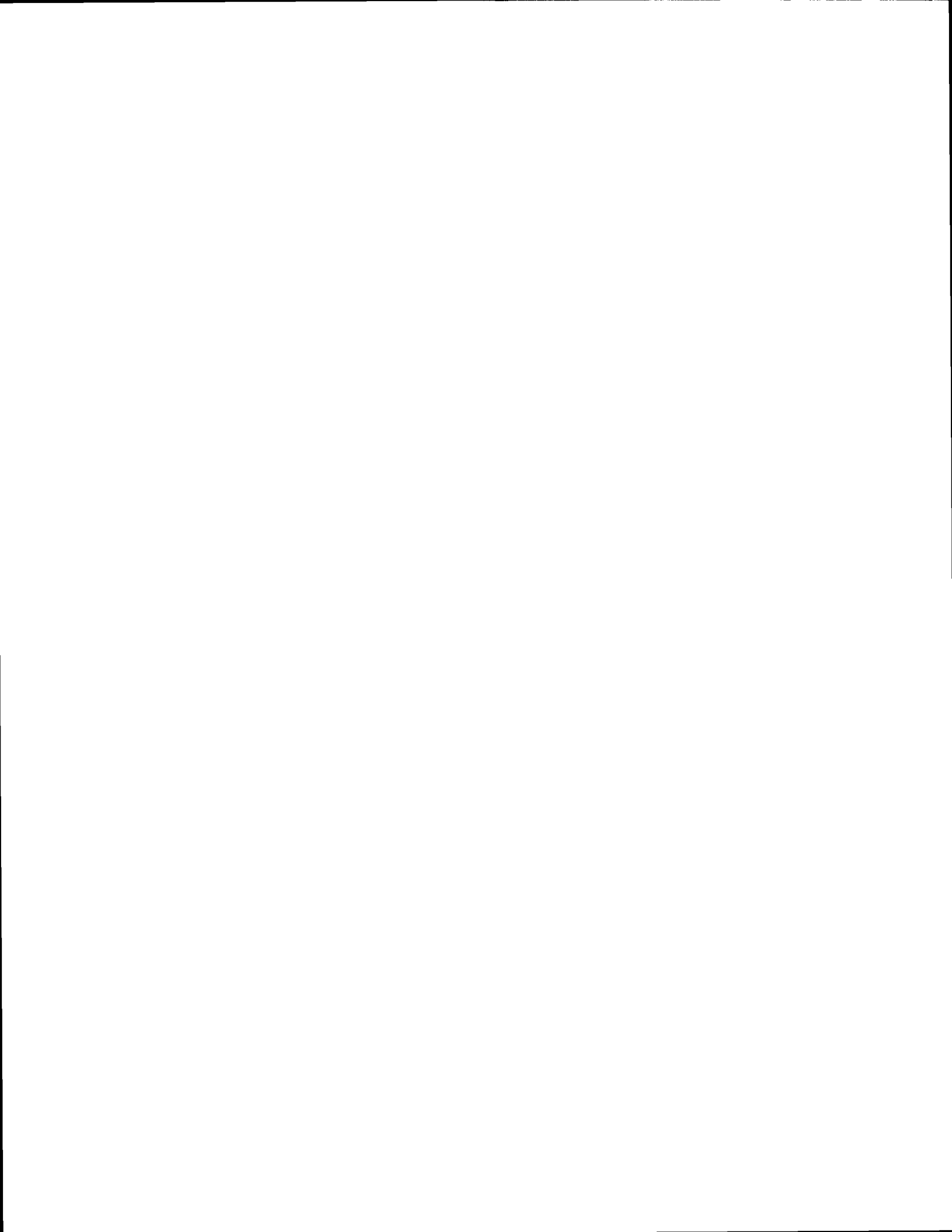
Composting is a controlled biological process by which biodegradable materials are converted by microorganisms to innocuous, stabilized by-products. In most cases, this is achieved by the use of indigenous microorganisms. Explosives-contaminated soils are excavated and mixed with bulking agents, such as wood chips, and organic amendments, such as animal, fruit, and vegetative wastes. Maximum degradation efficiency is controlled by maintaining moisture content, pH, oxygenation, temperature, and the carbon-to-nitrogen ratio. There are three process designs used in composting: aerated static piles, windrowing, and mechanically agitated in-vessel composting. This technology requires substantial space to conduct the composting operation and results in a volumetric increase in material due to the addition of amendment material.

The composting demonstration at Louisiana Army Ammunition Plant (LAAP) demonstrated that aerobic, thermophilic composting is able to reduce the concentration of explosives (TNT, RDX, and HMX) and associated toxicity to acceptable health-based clean-up levels. However, an economic analysis determined that full-scale implementation of composting of explosives-contaminated soils using previously investigated design parameters was not economically competitive with incineration. An optimization field demonstration was initiated at a National Priority List (NPL) site at Umatilla Depot Activity, Hermiston, Oregon, to investigate several process design parameters that would make this technology more cost effective. In addition, extensive chemical characterization and toxicity studies were conducted on the final composted product.

The primary objective of this study was to increase the quantity of soil processed in a composting treatment system per unit of time. Since soil throughput is dependent on the rates of degradation and the percent soil loading, the key variables investigated in the study were amendment mixture composition and percent contaminated soil loading. In addition, two technologies were evaluated: aerated static pile and mechanically agitated in-vessel composting systems.

Amendment selection was based on adiabatic testing using a combination of fifteen readily available agricultural wastes. The amendments selected and their approximate costs are provided in Table 1. Percent soil loading was investigated using seven 3-cubic-yard aerated static pile systems which were constructed from fiberglass to model actual static pile conditions. Different soil amendment ratios and amendment mixture compositions were investigated using a special 7-cubic-yard pilot-scale mechanically agitated in-vessel (MAIV) system constructed according to rigorous explosive safety standards. The MAIV system uses rotating augurs attached to the rotating cover to mix the compost.

The static pile systems and the MAIV system were housed in greenhouses to protect them from the environment and prevent the spreading of contaminated dust. A computer-based data acquisition and control system was used to monitor and regulate the environment in each of the compost systems. Temperatures were kept from exceeding 55°C using forced aeration and the moisture content was maintained at between 45 and 50 percent. Compost samples were taken at various time intervals, homogenized and split into two fractions. One fraction was analyzed for the presence of TNT, RDX, and HMX, while the other was tested for toxicity.



Since the implementation of this technology will be based on its ability to meet health-based clean-up criteria, the resultant composted material was subjected to chemical characterization and toxicological evaluation.

Technology Performance

The study confirmed the LAAP composting study results which indicated that composting can effectively treat TNT-, RDX-, and HMX-contaminated matrices. The study indicated that both static pile and MAIV composting technological approaches are effective in degrading explosives. The percent reduction of explosives observed in the tests are provided in Table 2. Other major findings include the following:

- In the static pile tests, the majority of the degradation occurred in the first 44 days, while the majority of the degradation occurred in the first 10 days in the MAIV tests;
- The amendment composition is an important parameter in achieving maximum reduction of RDX and HMX; the maximum loading level for both appears to be 30 volume percent;
- Mixing is important in achieving rapid and extensive destruction of explosives (A pilot-scale composting windrow demonstration has been initiated as a result of this finding and is scheduled for completion in FY92);
- Chemical characterization and toxicity testing concluded that composting can effectively reduce the concentrations of explosives and bacterial mutagenicity in contaminated soil and can reduce the aquatic toxicity of leachate compounds.

Additional studies are being sponsored to determine the long-term effectiveness of composting and the nature of the binding of the biotransformation products.

Remediation Costs

Costs will vary with the amount of soil to be treated, availability of amendments, type of process design employed, and time allowed to remediate the site. Costs for composting 8,000 tons of explosives-contaminated soils are estimated to be 50 percent less expensive than incinerating the same amount of soil.

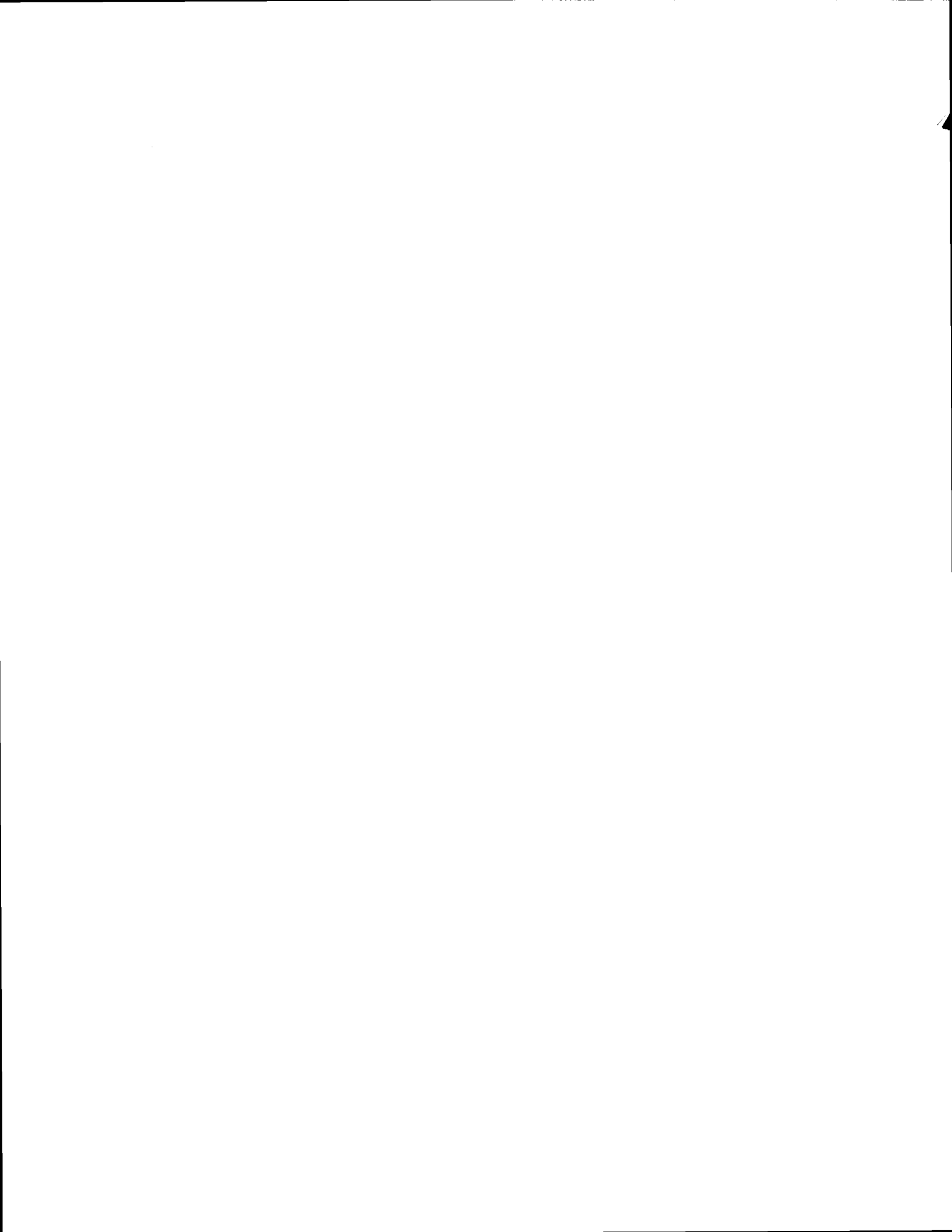
General Site Information

Umatilla Depot Activity in Hermiston, Oregon, was selected as the site for this demonstration. Between 1950 and 1965, it was the site of a facility for recovering explosives from unserviceable munitions. The process resulted in large quantities of explosives-contaminated water which was discharged into unlined settling basins. These washout lagoons were placed on the NPL in 1987 because of the presence of explosives in the water table aquifer. Hand-excavated soils from these lagoons were used in this demonstration.

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Soil Slurry-Sequencing Batch Bioreactor Explosives (TNT, RDX, HMX) in Soil

Technology Description

In this treatment process, explosives-contaminated soils and water are biologically treated in a tank or reactor. This treatment may be applied to soils contaminated with TNT, RDX, HMX, and other potential wastes associated with explosives. Contaminated soils are excavated and pre-screened to remove large rocks and debris. During the *Fill* period, the soils are mixed with water to produce a water-based slurry (typically 10-40 percent solids by weight) and pumped into the reactors. The reactors are designed and instrumented with various process controls. After the *Fill*, a chemical feed system will deliver required amounts of co-substrate, nutrients, nitrate, and Ph adjusting chemicals.

During the *React* period which follows, the mixers remain on and the microbial consortium degrades contaminants. When oxygen is serving as the exogenous electron acceptor, the aeration and mixing system is used to suspend the slurry. When nitrate is the electron acceptor, only the mixing system is used. In either case, the co-substrate serves as the primary carbon source. The time provided for the *React* cycle is dictated by the rate at which the explosive are degraded.

The mixed, treated slurry is then removed from the reactor in the *Draw* cycle and dewatered. Process water is recycled to the extent possible.

Operation of the Soil Slurry-Sequencing Batch Bioreactor depends on three factors:

- Enhancement of appropriate microbial consortia;

- Operations under appropriate conditions with a suitable electron acceptor; and
- Daily replacement of a volume of soil to provide new soil for microbial processing.

This treatment technology is best suited for sites contaminated with small volumes of contaminated soil where incineration would be cost prohibitive.

Technology Performance

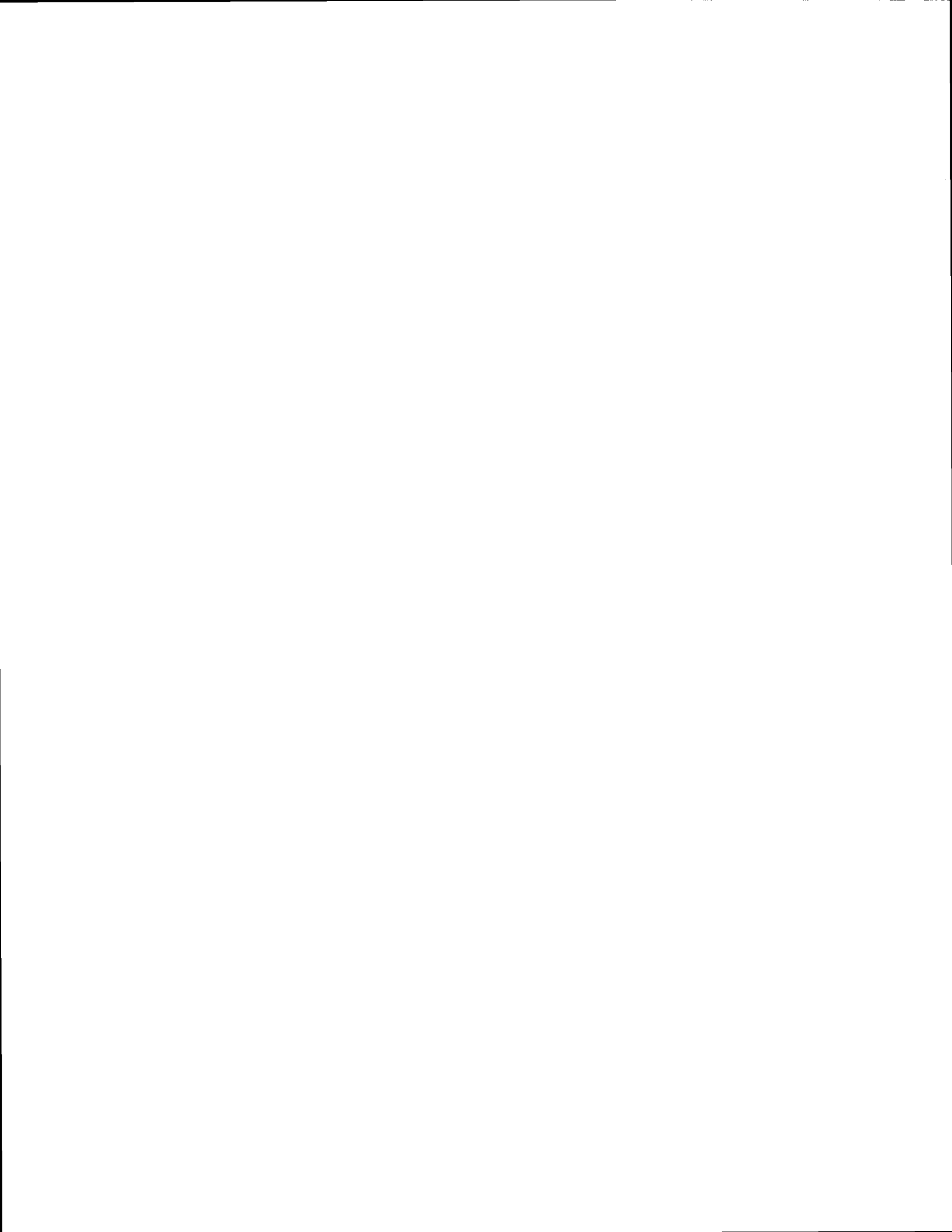
Previous bench-scale studies using soils contaminated with explosives from Joliet Army Ammunition Plant (JAAP) demonstrated the feasibility of this technology. Using microbial consortia isolated from JAAP, bench-scale studies showed that microbial degradation of contaminated soils could be accomplished with electron acceptors under aerobic and anoxic conditions with malate as a co-substrate. Aerobic reactors reduced TNT concentrations from about 1,300 mg/kg to less than 10 mg/kg in 15 days. Anoxic reactors achieved the same kind of reduction but at a slower rate. The same study indicated that this technology was the most suitable reactor system for full-scale implementation. A pilot-scale field demonstration using the technology is scheduled to begin during FY 1992.

Remediation Costs

No cost information is available.

General Site Information

Joliet Army Ammunition Plant is located in Joliet, Illinois. JAAP is a government-owned,



contractor-operated installation currently maintained in a non-producing, standby condition. JAAP is divided into two major functional areas: a load-assemble-pack (LAP) area and a manufacturing area. The LAP area contains munitions filling and assembly lines, storage magazines, and a demilitarization area. The LAP was placed on the National Priorities List in 1989. Soils from Group 61 in the LAP area will be used in the demonstration project.

Group 61 was constructed in 1941 to support World War II efforts and has been the site of demilitarization operations for various munitions. During these operations, steam was used to remove the explosives from munitions. The solids in the contaminated process water were settled out in a sump and the overflow water was discharged into a 10-acre ridge and furrow system (evaporating pond). The primary explosive contaminant is 2,4,6-TNT with concentrations ranging from 20-14,400 mg/kg.

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SUBJECT: Defining Munitions as Hazardous Waste

The Federal Facilities Compliance Act (FFCA) contains language that instructs the EPA Administrator, within six months, "identify when military munitions become hazardous wastes for the purposes of Subtitle C" and "provide for the safe transportation and storage of such wastes." Within 24 months the Administrator shall promulgate such regulations, after public notice and comment. Subtitle C of the Solid Waste Disposal Act relates to the safe development, handling, use, transportation, and disposal of military munitions. These particular provisions apply to CHEMICAL weapons as well as conventional munitions.

TRAINING. DOD considers the open burning of waste PEP (propellant, explosive, and pyrotechnic) materials associated with troop-training activities to be "an integral part of the training mission," not hazardous waste treatment. DOD agrees that these activities should be conducted "so as not to endanger public health or the environment," but DOD opposes outside regulation.

Unfortunately, the open burning of munitions wastes does release toxic substances into the environment. The Boston University study of Camp Edwards, Massachusetts, for example, suggests that the open burning of excess artillery propellant caused cancer in neighboring communities. Furthermore, fire-training activity, in which any and all ignitable substances were burned in pits or even open flat areas, has created major cleanup problems at numerous military bases across the country. (This activity was primarily used to dispose of waste solvents and fuels, but it probably included some PEP materials as well.)

troop-training activity may qualify as both TRAINING AND WASTE DISPOSAL. The fact that troops are learning something does not mean that there is no need to protect the public and the environment from extremely hazardous substances. Furthermore, since the troops that burn artillery propellant bags or participate in fire-training exercises are essentially being trained in methods of waste disposal, regulation of that activity as waste disposal should improve their training. That is, they are more likely to learn environmentally sensitive methods of disposal, not only for future training, but for actual battlefield use.

Defining excess propellant as waste subject to external regulation does not necessarily mean that all open burning will be halted. Perhaps the armed services can prove that this training is absolutely required for battlefield safety. But regulation would give representatives of neighboring communities the opportunity to influence the location, timing, amount, technology, and other conditions of disposal.

3. FIRING AND BOMBING RANGES. One of the greatest problems with military munitions testing and practice is that there is no clear requirement that ranges be cleaned, even after closure.

firing of shells and dropping of bombs should be considered hazardous waste generation. The military recognizes that unexploded munitions pose an explosive threat. In the long run, they also pose a toxic threat - particularly in areas where they are concentrated - because they consist of toxic substances. Furthermore, exploding munitions release a variety of toxic byproducts into the environment.

The long-term toxic impact of modern munitions has barely been studied. subjecting used munitions to hazardous waste laws would accelerate such research.

Regulation of ranges would not necessarily prevent continued firing and bombing. In many situations, however, it would encourage more careful practices, including: A) better record-keeping; B) monitoring of toxic migration; and C) increased substitution of relatively benign practice rounds.

As with industrial facilities, regulation should require the development of closure plans - that is, determination of how the property will be remediated when activity halts. This should not only encourage sounder training and proving practices, but it should increase the likelihood of eventual cleanup.

Most important, there should be clear, externally regulated standards for restoring munitions ranges. It will not always be feasible to return land to pre-range conditions, but remediation requirements in general are flexible and there is no reason why munitions cleanup requirements should not also recognize physical, environmental, and technological limitations.

4. TRANSPORTATION AND STORAGE. In general, the military's attitude toward the safe handling and transportation of munitions shows a healthy respect for the dangers involved. would like to see a consistent analysis of the risks of movement and storage. At some locations, the military argues that safety requires transportation of explosive threats, while at others, it uses the risk to insist upon on-site disposal.

EXECUTIVE SUMMARY

UPPER CAPE CANCER INCIDENCE STUDY

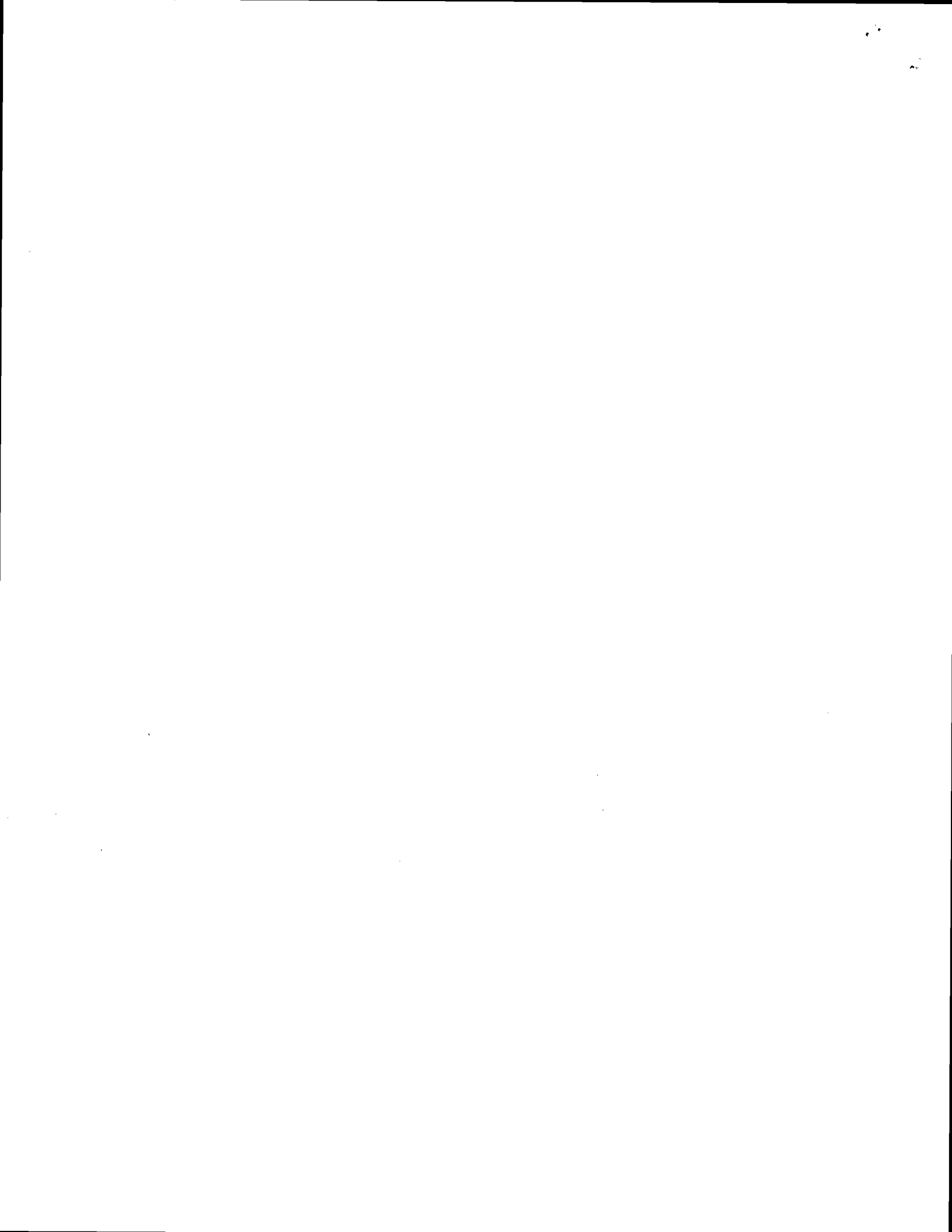
On December 23, 1987 the Massachusetts Department of Public Health issued a Request for Proposals to respond to the following three important public health issues affecting the Upper Cape (here defined as Barnstable, Bourne, Falmouth, Mashpee, and Sandwich).

First, apparent elevations in cancer incidence and mortality were observed for certain kinds of cancer as compared to state-wide averages and the nearby Lower Cape region. In particular, consistently elevated mortality rates were seen for lung cancer and leukemia for the towns of Falmouth and Bourne. In addition, since the inception of the Massachusetts Cancer Registry in 1982, statistically significant excesses were seen in the incidence of cancers of the breast, colon/rectum, lung and blood forming organs and statistically unstable increases were seen for cancers of the pancreas, kidney, and bladder in at least one of the Upper Cape towns.

Second, there were many known or suspected environmental hazards affecting the Upper Cape. These included both groundwater and air contaminants from a variety of sources including the Massachusetts Military Reservation.

Third, there was substantial concern among organized elements of the general public who pressed forcefully and persistently for an in-depth evaluation of the relationship between the environmental hazards and cancer rates noted above.

On December 9, 1988 the Commonwealth of Massachusetts contracted with the Boston University School of Public Health to conduct an epidemiologic study in the Upper Cape region on the relationship between environmental factors and cancer occurrence. This report describes the results of a set of population-based case-control studies that evaluated the relationship between exposures to known or

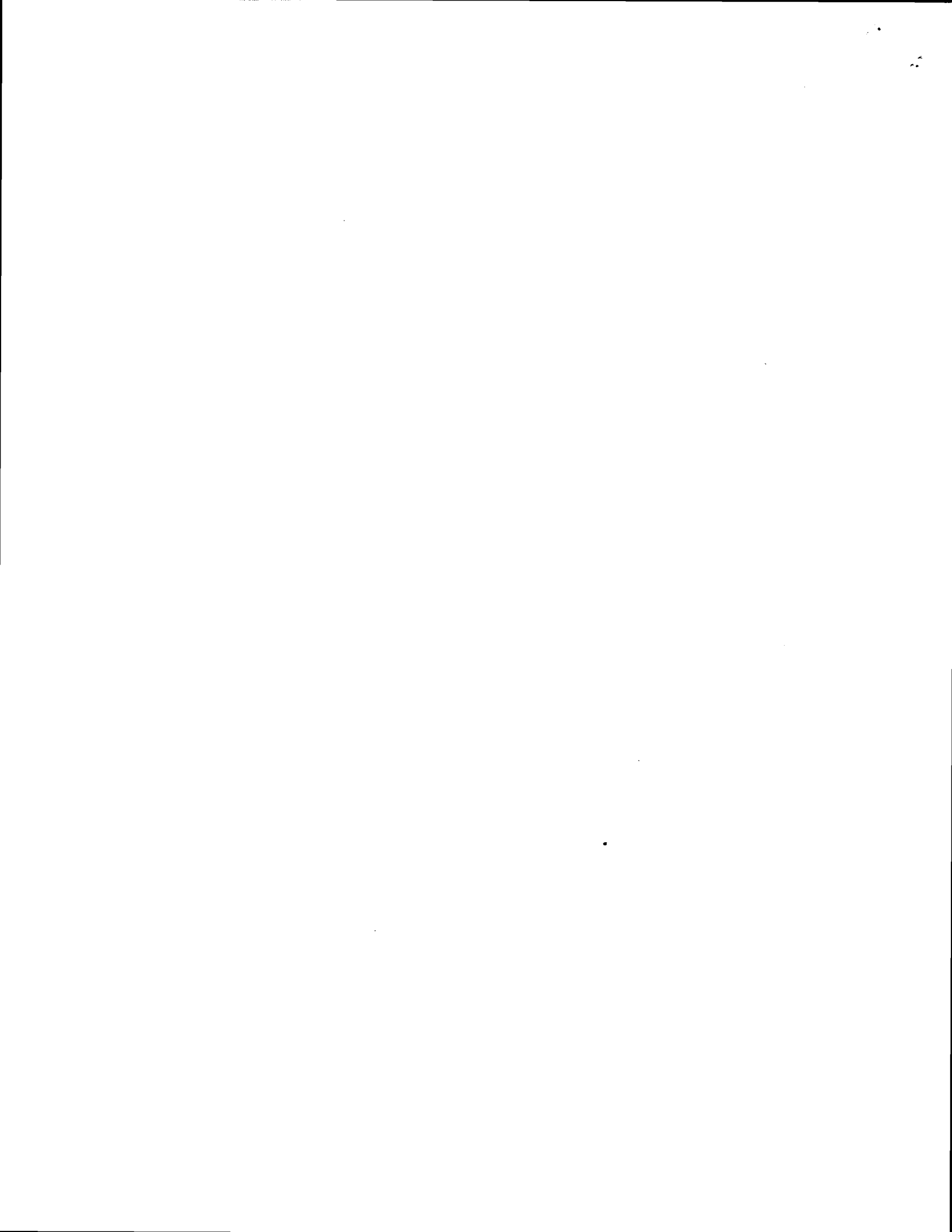


suspected environmental hazards and nine types of cancer. Cases consisted of newly diagnosed cancers in the years 1983-1986 among permanent Upper Cape residents. The main environmental exposures considered were air and water pollution associated with the Massachusetts Military Reservation (MMR), Canal Electric Plant, Barnstable Airport, and other sources, perchloroethylene in water distribution system pipes, radiofrequency radiation from PAVEPAWS, electric and magnetic fields from 115 Kv transmission lines and substations, and possible exposure to pesticides among residents who lived near cranberry bogs.

The study cases consisted of incident cancer of the lung (N=251), breast (N=265), colon/rectum (N=315), bladder (N=62), kidney (N=35), pancreas (N=37), leukemia (N=36), brain (N=37), and liver (N=4) as reported to the Massachusetts Cancer Registry in the years 1983 to 1986. Since many cases were deceased by the start of the study, both living and deceased Upper Cape residents were selected as controls (N=1,285). Living controls aged 64 and under were selected using random digit dialing to sample all telephone subscribers in these towns. Living controls aged 65 and over were selected randomly from lists of the elderly population provided by the Health Care Financing Administration (HCFA). Deceased controls were selected randomly from all death certificates of Upper Cape residents who had died since 1983.

Trained interviewers queried all subjects or their next-of-kin either by telephone or in person to obtain a demographic, occupational and residential history and information on potential confounding variables such as smoking. Overall, approximately 81% of cases and 79% of controls were interviewed. The majority of the environmental exposure data was collected independently of the interview and linked to the study subjects using the residential histories.

Each exposure was examined separately in relation to all cancers combined and to the individual cancer sites. Most exposures were categorized as dichotomous

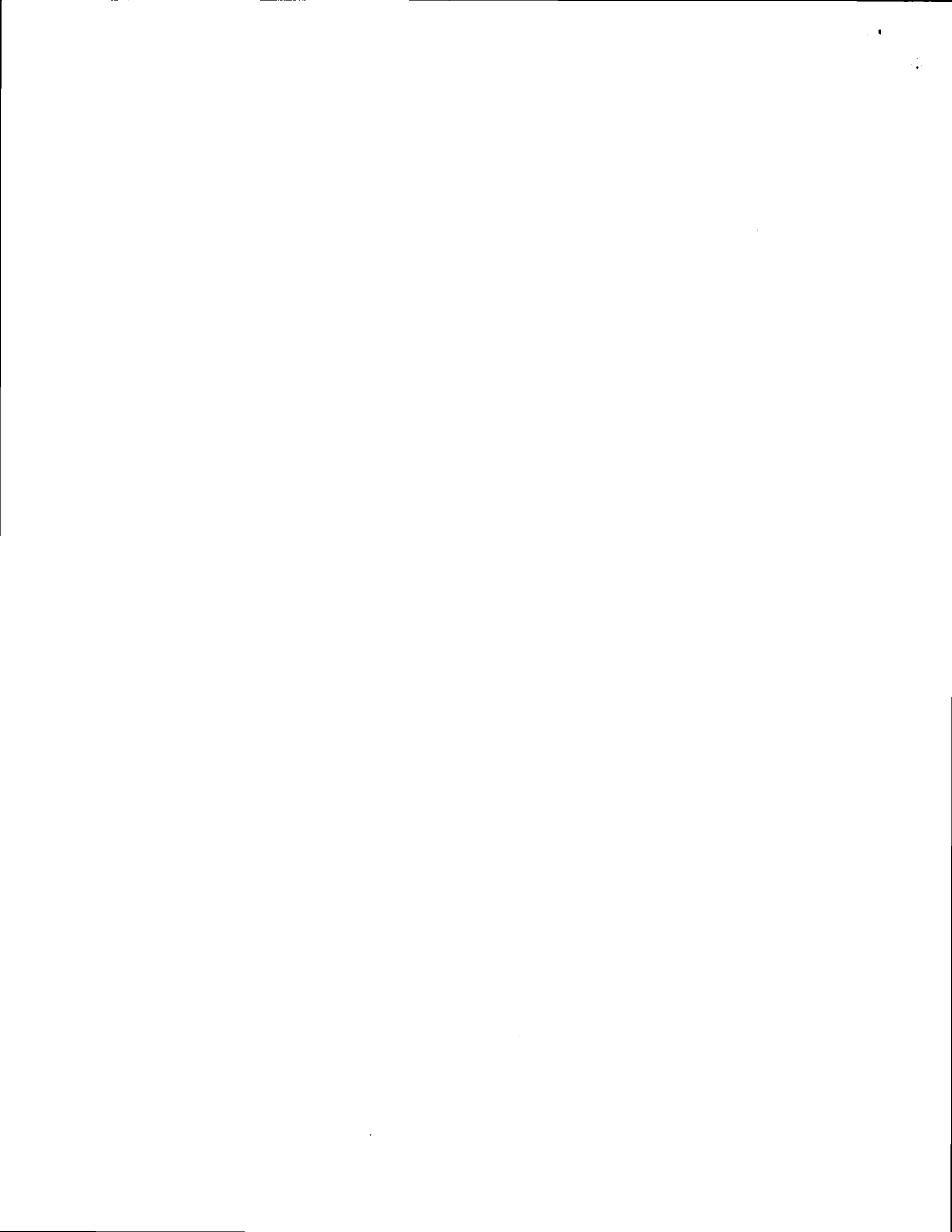


variables (i.e. ever vs. never exposed) with further subdivisions according to distance, cumulative duration, and direction. An exposure metric was also developed that took account of distance, direction and duration in a single number. Some exposures were examined as continuous variables (e.g. estimated ground level concentrations from the Canal Electric Plant).

The strength of the relationship between a particular exposure and cancer site was measured by the odds ratio (an estimate of relative risk). P-values and 95% confidence intervals were used to assess the statistical "significance", or stability, of the odds ratios. Most analyses were conducted with and without latency to account for the possibility that the exposures under study could be either cancer initiators or a combination of both initiators and promoters. Multiple logistic regression models were used to control for potential confounding variables. Sex, age, vital status at interview, and, depending on the cancer site, other potential confounders were controlled. The other confounders consisted of well-known relatively strong risk factors for the particular cancer including a history of work in jobs associated with cancer risk.

The overall findings are as follows. Few study subjects had potential exposure to drinking water contaminants from groundwater plumes emanating from various sites on or off the MMR. These plumes, including the Ashumet Valley plume, do not appear to account for much, if any, of the cancer burden to the population to this time. We cannot say what the health effects might be to the small number of people currently exposed or to others if and when the plumes extend to cause additional exposures.

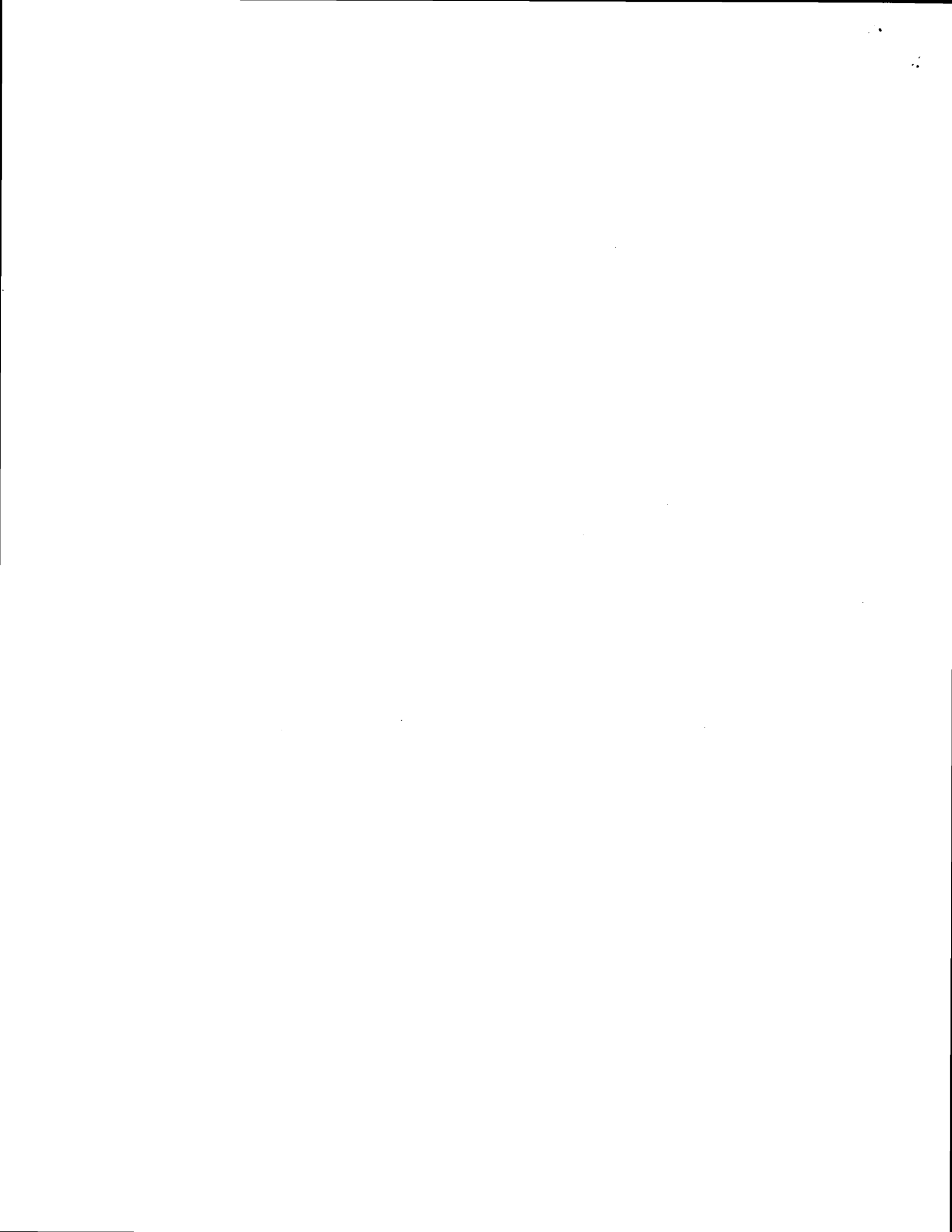
The results suggested approximate two-fold elevations in the risk of brain cancer among those who ever had a residence supplied with public water on the Upper Cape, particularly from the Barnstable Water Co., but these findings cannot be considered conclusive because of several limitations of the data. The limitations



include the lack of details regarding the historical pattern of water contamination in the area and the pattern of water use among the subjects, the large number of subjects dropped from these analyses because of missing data, and the almost complete overlap between exposure to the Barnstable Water Co. and Barnstable Airport for which an elevation in brain cancer risk was also seen. The overlap makes it impossible to separate the association with the Barnstable Water Co. from that of the airport. In fact, these exposures may merely be markers for still other exposures in the Hyannis area or characteristics of Hyannis residents that are associated with brain cancer. Taking all of these things into account, we believe that it would be prudent to study all current public drinking water supplies on the Upper Cape, particularly the Barnstable Water Co., and identify and eliminate any currently contaminated sources.

We examined another public drinking water exposure, perchlorethylene (PCE) from the water distribution pipes, in relation to leukemia and bladder and kidney cancer. There was nearly a two-fold increase in the risk of leukemia (whether or not the latent period was considered) and bladder cancer (when the latent period was ignored) among those supplied with water from pipes that leached PCE. These risk estimates were not statistically stable, a reflection of small numbers, but the increases are biologically plausible and, in the case of leukemia, appear to exhibit a dose-response relationship. For these reasons, we believe that our results are consistent with a hazard of PCE contamination in some of the distribution systems of the Upper Cape. We recommend continued vigilance to minimize population exposure to this contaminant.

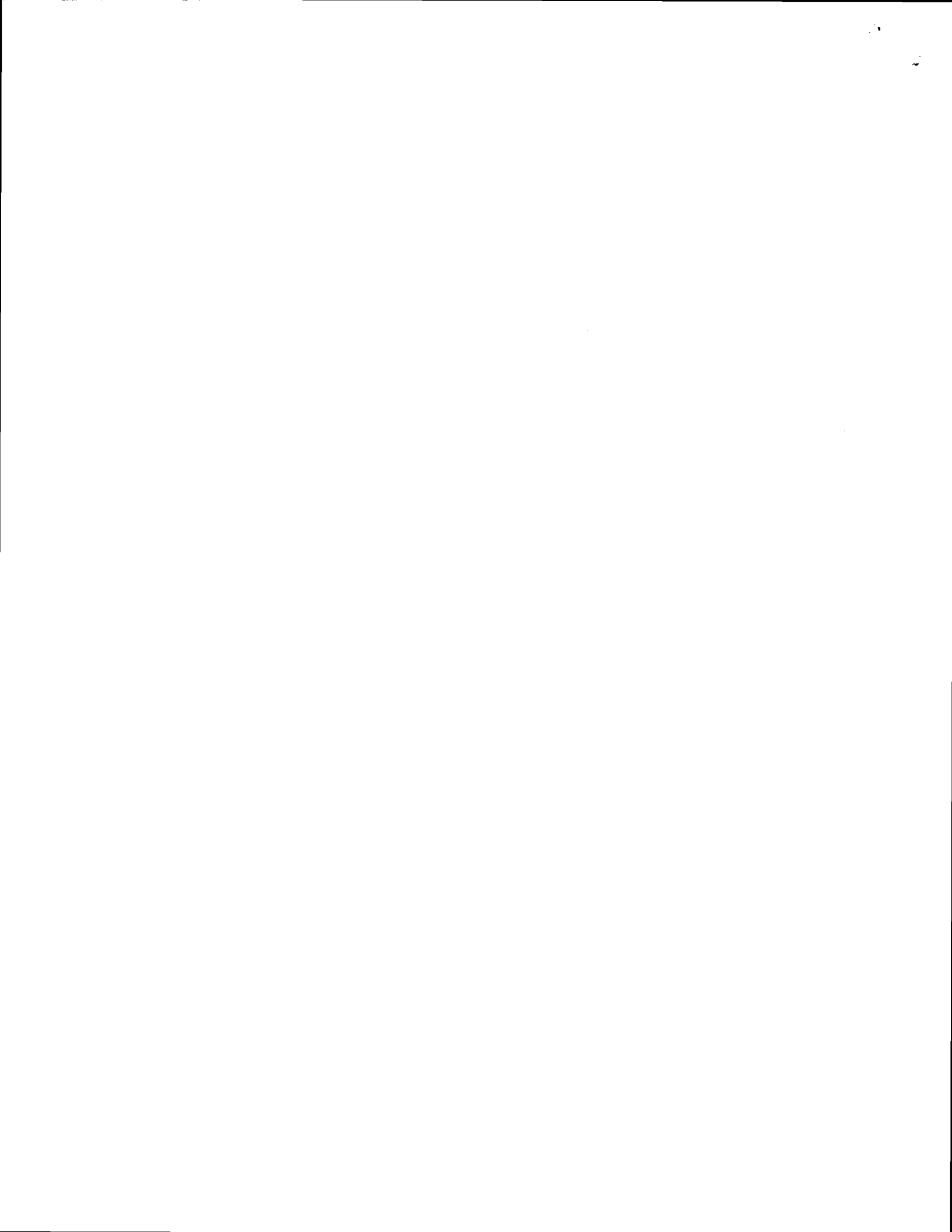
Among residents located near the gun and mortar positions on the MMR we found associations between possible airborne exposures and the risk of lung and breast cancer. Subjects who lived closer to the gun and mortar positions had a modest increase in the risk of lung cancer (relative risks were 1.75 for those within 2



km of the sites while it dropped to 1.05 for those 2 km to 3 km). Likewise, there was an increased risk of breast cancer among subjects who lived closer to the sites (relative risks were 1.92 for those within 2 km and 1.25 for those 2 km to 3 km). Among residents exposed for more than 20 years, we also found increases in the risk of lung and breast cancer (relative risks were 2.48 for lung cancer and 2.15 for breast cancer when the latent period was taken into account). These results were not statistically stable, probably because few subjects were exposed for long periods of time or lived close to the sites. No meaningful elevations were seen for the other cancer sites.

These results are of concern since 2,4-dinitrotoluene, a constituent of the propellants used on the MMR, has been rated a probable human carcinogen by the U.S. Environmental Protection Agency. Given the strength of the association, the presence of dose-response relationships, and information from the scientific literature, we believe that the association between proximity to the gun and mortar positions and lung cancer may be real. The association with breast cancer is less plausible and so we give this finding considerably less weight; however, we do not think that it should be entirely dismissed. The results suggest that the practice of propellant bag burning should not take place so close to populated areas.

Results from analyses that examined potential exposure to air contaminants from the MMR and Barnstable Airport runways also suggested an association with brain cancer. When considering exposures without latency, there appeared to be an increase in the risk of brain cancer associated with residence within 3 km of the MMR runways. The association was evident only when subjects who ever lived within 3 km were compared to those who never lived within that distance, but not when the exposure metric was used. The relative risk was fairly strong (adjusted relative risk was 3.98) and statistically stable ($p=.02$).



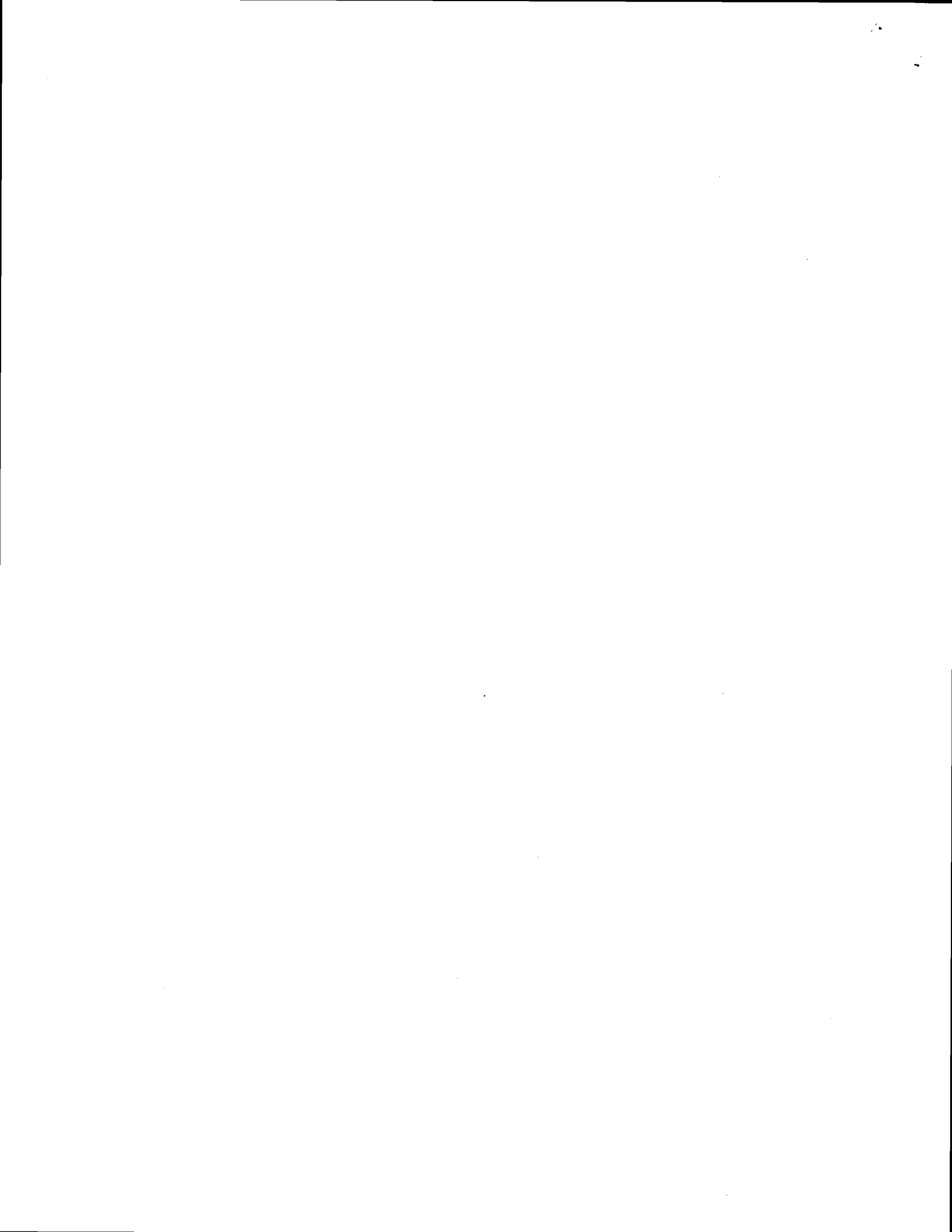
While an association was also seen between brain cancer and the Barnstable Airport runways (adjusted relative risks were 1.62 with latency and 1.50 without latency), it was completely confounded with exposure to water of the Barnstable Water Co. As with the MMR runways, the elevated risk occurred with use of the ever/never comparison but not with use of the exposure metric.

While brain cancer was associated with both facilities, the confounding between the airport and the water company make the latter association difficult to interpret. Since a potential hazard has not been ruled out, we believe that further study is warranted. A first step might be an examination of brain cancer rates in other Massachusetts cities and town with similar facilities. In the meantime, the air quality around the MMR and Barnstable Airport should be studied, both with regard to current state and federal regulations, and non-regulated contaminants.

To gauge the global effect of the MMR considered as one large site, we examined residence near the MMR base border in several different ways. We found an increased risk of lung and breast cancer among subjects exposed for more than 20 years, with exposure defined as living within 3 km of the border and with latency taken into account. However, it appears that these increased risks merely reflected the increased risks associated with the gun and mortar positions and that there was no independent association with the border itself.

Few subjects ever resided on the MMR itself. For such residents, we could not assess most cancer risks because of small numbers. There appeared to be some increase in the risk of colorectal cancer in the adjusted analyses whether or not the latent period was considered. Since a potential confounding factor, physical activity level, remained uncontrolled, it is not clear what the meaning of the association might be.

The results of analyses examining the MMR and Barnstable Fire Training Areas, the MMR AVGAS dump site, and the MMR UTES/BOMARC site were



inconsistent and do not support associations with these sites. For the remaining MMR sites including the Railroad Fuel Pumping Station (FS2), Johns Pond Road Dump Site (FS3), Storm Drains, and Non-Destructive Inspection Laboratory, there were too few exposed subjects within an appropriate distance to provide meaningful results. While it is unlikely that these sites contributed to the elevated cancer rates on the Upper Cape, we cannot say what the health effects would be if more people had been exposed.

While no association was seen for PAVEPAWS, the available exposure data were inadequate. We strongly recommend that systematic power density measurements be taken throughout the area scanned by PAVEPAWS so that useful exposure data will be available for future analyses of its potential health impact.

There was also no apparent relation between emissions from the Canal Electric Power Plant and any cancer site, whether or not the latent period was considered. This was not unexpected since the EPA dispersion model for the plant indicated that ground level concentrations were low and uniformly spread throughout the study area.

Possible pesticide exposure associated with living near cranberry bogs was also examined. When the latent period was considered, a statistically stable 2.4-fold increase in the unadjusted risk of brain cancer was seen among individuals who ever lived within a half mile of a bog. The risk remained elevated when subjects with other relevant exposures were excluded. However, an inverse dose-response relationship was seen with duration and distance. There were also no apparent trends with cumulative bog acreage or calendar time, nor was there an increased risk when latency was ignored and the exposure metric was used. The findings were similar when confounders were controlled. No meaningful associations were seen for the other cancer sites.



While the results lack internal consistency, the strength and stability of the overall association and its consistency with numerous studies in the scientific literature lead us to put additional weight on the observation. Since our study leaves many questions unanswered, we recommend that a larger, more detailed investigation be performed on the relationship between cranberry bog cultivation and brain cancer in Massachusetts. In the meantime, the various methods used to apply pesticides should be reexamined with an eye towards keeping population exposure to a minimum. In particular, the adequacy of the current buffer zones should be evaluated.

Electric and magnetic fields from transmission lines and substations were also studied. Exposure was defined as living within 500 feet of these structures. There was a modest unstable increase in the risk of lung cancer associated with the transmission lines and substations (adjusted relative risks were 1.57 and 2.78, respectively). There were also unstable increases in the risk of bladder cancer associated with transmission lines (adjusted relative risk was 2.57) and breast cancer associated with substations (adjusted relative risk 1.69) but not transmission lines (adjusted relative risk 1.23). These results suggest that extremely low frequency electromagnetic fields might be biologically active and confirm the necessity for continued investigation and attention.

Associations were also seen between brain cancer and ever swimming in Johns Pond; and leukemia and ever swimming in local ponds (other than Johns and Ashumet Ponds), and ever eating fish from local ponds. A more detailed inquiry revealed that many different ponds were involved in the leukemia associations with no apparent pattern and so we give these findings very little weight. In addition, while more brain cancer cases than controls stated that they ever swam in Johns Pond, when we asked about the frequency of swimming we found that the exposed controls actually swam there more often. Since these results

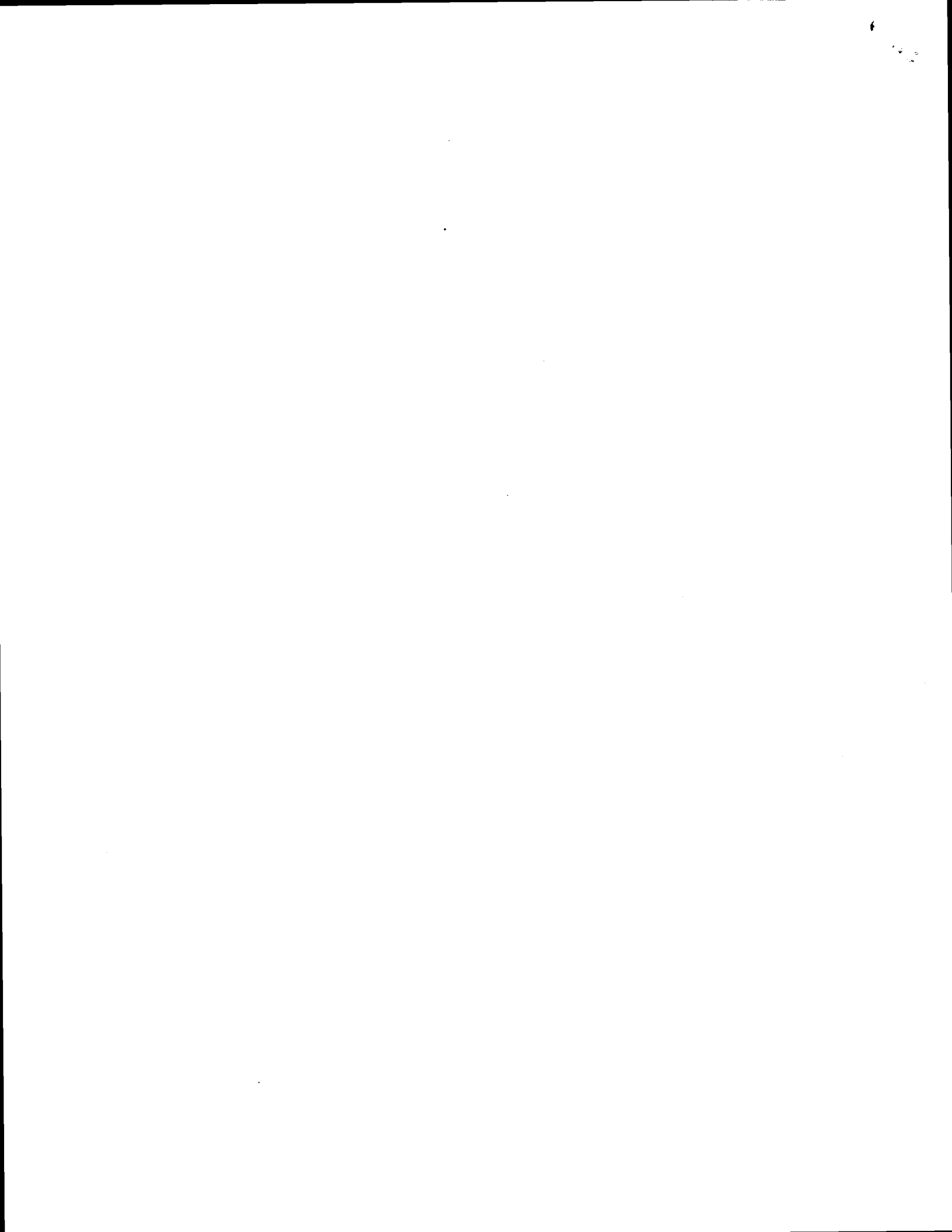


lack internal consistency, in the absence of external confirmatory data it is difficult to determine if these results implicate the pond itself as a source of brain cancer. However, we are aware that a plume from the MMR is in close proximity to Johns Pond and so we recommend that the pond water be thoroughly tested and the precise relationship between the plume and pond be determined.

Finally, examination of the length and calendar years of residence revealed that, with the exception of leukemia, cases and controls had similar lengths of residence and moved to the Upper Cape at similar rates. A larger proportion of leukemia cases than controls moved to the study area in the 1940s (35.3% vs. 23.2%) and their length of residence was, on average, two years longer than controls. These differences were not statistically stable. Thus, cancer risk, with the possible exception of leukemia, was not generally related to how long or when a person resided on the Upper Cape, and cases and controls appear to have contributed similarly to the population growth in the area. These results do not contradict the risk increases seen among subjects exposed for more than 20 years previously described, since the latter focused on a small subset of long term residents who lived near particular exposure sites.

In interpreting these results one should keep in mind the limitations of the epidemiologic method in general and this study in particular. The main problems in this study stem from exposure misclassification and low statistical power, both of which tend to make it more difficult to see any real associations. While confounding, selection and observation bias are problems inherent in epidemiologic research, we think that they are less likely explanations for the findings.

In summary, this inquiry was begun because of concern about the generally increased cancer rates in the Upper Cape region along with the presence of known or suspected environmental hazards. After an extensive review of the environmental factors it is clear that there was ample cause for concern. While it



was understood that an epidemiologic study would be unlikely to identify all the causes of the cancer in the region, it was hoped that a thorough investigation would narrow the large area of uncertainty surrounding possible environmental associations. Our results suggest that there is some association with environmental factors, although our study was unable to estimate its magnitude. On the basis of the results obtained, however, and bearing in mind the limitations of the study, it does not appear that we have explained more than a small part of the cancer increase in the region. Thus, either some factors other than those we investigated may be responsible, or some methodological limitation of the study, most likely the unavoidable exposure misclassification, made it undetectable (or perhaps a combination of both). It is possible that further analyses and the addition of more cases from subsequent years of the Cancer Registry would clarify and resolve some of these remaining issues.



Cancer rates rose in '89

Oct 13 '92

Cape Cod Times

Analysis shows Upper Cape trend continuing

By GWENN FRISS
STAFF WRITER

The Upper Cape's cancer problem continued in 1989, with women 58 percent more likely to contract the disease than their counterparts in the rest of the state, according to unofficial figures computed by a local activist.

The cancer rate for Upper Cape men in 1989 was 21 percent above late average. Overall, the Upper Cape rate was 39 percent above average in 1988 and 38 percent above average in 1989.

Since the state began compiling cancer statistics in 1982, rates in

the five-town area — Barnstable, Bourne, Falmouth, Mashpee and Sandwich — have been above the state average.

From 1982 to 1989, the Upper Cape's cancer rate was 23 percent above state average: There were 29 percent more cases of cancer in Upper Cape women than expected; the cancer rate for men was 17 percent higher than normal.

Women in Falmouth were 79 percent more likely to contract cancer in 1989 than women in the rest of the state.

"From 1982 to 1989, we're talking about 900 extra cases on the Upper Cape. It's just a terrible, ter-

rible tragedy, whatever the cause," said Joel Feigenbaum of Sandwich. "If a hurricane caused this kind of destruction, it would be worldwide news."

Since cancer is more likely to strike the elderly, the number of cases that would be expected in a community is figured based on the total number of cases in the state and the age of people living there.

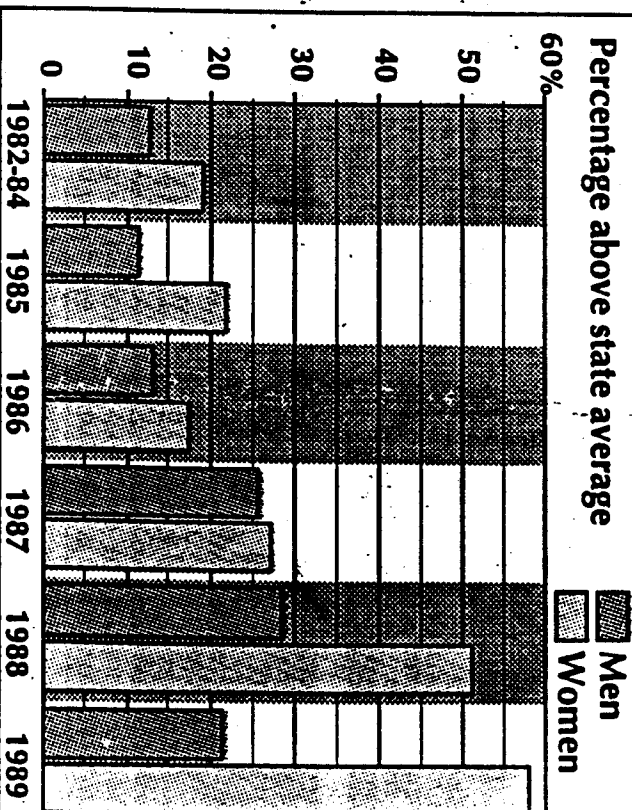
By town, the 1989 cancer rate in Falmouth was 55 percent above state average, up from 34 percent above state average in 1988; in Barnstable, 44 percent above aver-

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See over

UPPER CAPE CANCER RATES 1982-1989

Percentage above state average



Source: Joel Feigenbaum

Staff chart by JAMES WARREN

CANCER

Continued from A-1

age, up from 43 percent in 1988; in Mashpee, 34 percent above average, down from 47 percent in 1988; in Bourne, 22 percent above average, down from 48 percent in 1988; in Sandwich, 2 percent below state average, down from 14 percent above state average.

Feigenbaum, a mathematics professor at Cape Cod Community College who holds a doctorate in theoretical physics, calculated the rates using census figures and the number of cancer cases reported to the state cancer registry.

A founder of the Upper Cape Concerned Citizens, Feigenbaum has pushed state officials to study the cancer rates and possible links to pollution at the Massachusetts Military Reservation, the 21,000-acre military base on the Upper Cape. Dozens of hazardous-waste dumping sites have been identified on the base, which is now a federal Superfund site.

The Massachusetts Cancer Registry, part of the state Department of Public Health, has not yet calculated each community's 1989 rates.

They will be released sometime in the coming year, in a book reporting 1982-89 rates for the state, a department spokesman said.

Feigenbaum, who spent weeks seeking the proper census information and producing dozens of charts comparing the 1989 rates to those of previous years, is angry that state officials are not pushing to get those cancer rates out faster.

But state public health officials say a single year's data reveals little, other than to support the trend developing over the past seven years.

"I would expect that the 1989 numbers would show the same thing, that there is still an excess cancer situation on the Upper Cape. And I would predict it is the same things we saw before — especially increases in lung and prostate cancer," said Robert Knorr, deputy chief of the Massachusetts Department of Public Health's assessment department.

"The more data you have, the more stable your numbers are," Knorr said. "We're able to get a better idea of the true cancer rate. But you're not going to see a big change overnight unless there's human error (in collecting data) or

some statistical fluke. That's not the way the disease works."

According to Feigenbaum's calculations, from 1988 to 1989 the region's excess lung cancer rate increased 9 points among women — from 32 percent above average to 41 percent above average — and 11 points among men, from 6 percent above average to 17 percent above average.

Prostate cancer decreased slightly in that time, from 46 percent elevation to 41 percent.

Most cancers develop over 20 years or more; while leukemia can show up in five years, lung cancer takes two decades or more after the person is exposed to carcinogens.

Therefore, Feigenbaum argues that rising cancer rates in the 1980s point to environmental factors in the mid- to late 1960s — when activities at the Upper Cape military base, then an active Air Force base, were at their peak.

Traditionally, men have been more likely to get cancer than women, because, in the past, they were more likely to smoke or be exposed to hazardous chemicals in the workplace.

With \$500,000 from the state,

Boston University's School of Public Health studied the life, work and residential histories of a group of Upper Cape cancer patients and compared them to a similar group that did not get cancer.

The study, released early this year, found that people were somewhat more likely to get cancer if they lived near air base runways or cranberry bogs; swam in Johns Pond (which has since tested clean for chemicals); or lived near positions where heavy guns are fired on the base.

Several follow-up efforts were launched. Public health officials want to test-burn artillery propellant to ensure that no carcinogens are released. The Ashumet Valley Property Owners Association in Falmouth says a test on the Upper Cape is needed to answer the question conclusively.

But pressure from several other community groups — including the Alliance for Base Cleanup, Responsible Environmental Protection for Sandwich and the Association for the Preservation of Cape Cod — has caused officials to seek an isolated site off-Cape for the burn.

the minimum safe distance requirements for open burning/open detonation facilities subject to the December 10 final rule.

In the preamble to the final rule on 40 CFR Part 264, Subpart X permitting requirements for miscellaneous units, the Agency stated on page 40052, third column, first paragraph, that the appropriate applicable portions of 40 CFR Part 265, Subpart P, including the minimum safe distance requirements, would be incorporated into the final RCRA permits granted to open burning/open detonation facilities covered by Subpart X. However, the basis for development of the tables in Subpart P of Part 265 is disposal of military explosives (Department of Defense's Army regulation AR-385-65 Ammunition and Explosive Safety Standard, Chapter 5). These tables do not necessarily apply to the open burning or open detonation of commercial explosives at Subpart X facilities. A permit may be issued with shorter distance provisions (e.g., based on the American Table of Distances for Commercial Explosives) as long as the Part 264 Subpart X environmental performance standards for protection of human health and the environment are met.

List of Subjects

40 CFR Part 144

Administrative practice and procedures, Hazardous materials, Waste treatment and disposal.

40 CFR Part 260

Administrative practice and procedures, Confidential business information, Hazardous materials, Waste treatment and disposal.

40 CFR Part 264

Hazardous materials, Packaging and containers, Reporting requirements, Security measures, Surety bonds, Waste treatment and disposal.

40 CFR Part 270

Administrative practice and procedures, Reporting and recordkeeping requirements, Hazardous materials, Waste treatment and disposal, Water supply, Confidential business information.

Robert L. Duprey,

Acting Assistant Administrator, Office of Solid Waste and Emergency Response.

Dated: June 12, 1989.

[FR Doc. 89-14826 Filed 6-21-89; 8:45 am]

BILLING CODE 6900-60-01

FEDERAL COMMUNICATIONS COMMISSION

47 CFR Part 1

[MM Docket No. 89-526; RM-8122; FCC 89-128]

Radio Broadcasting Services; Modification of FM and TV Authorizations To Specify a New Community of License

AGENCY: Federal Communications Commission.

ACTION: Final rule.

SUMMARY: This action adopts a procedure whereby an FM or television licensee or permittee may request modification of its authorization to a mutually exclusive allotment in a different community of license during the course of a rule making proceeding to amend the FM or television table of allotments, without risking loss of its existing authorization to competing applicants. The current procedure discourages changes in communities of license, even though a change may be beneficial to the community and to the licensee. This action will permit beneficial changes, resulting in a fairer, more equitable, and more efficient distribution of services.

EFFECTIVE DATE: July 31, 1989.

ADDRESS: Federal Communications Commission, Washington, DC 20554.

FOR FURTHER INFORMATION CONTACT: Michael Ruger, Mass Media Bureau, (202) 632-6302.

SUPPLEMENTARY INFORMATION: This is a summary of the Commission's *Report and Order*, MM Docket No. 88-526, adopted April 28, 1989, and released June 15, 1989. The full text of this Commission decision is available for inspection during normal business hours in the FCC Dockets Branch (Room 230), 1919 M Street, NW., Washington, DC. The complete text of this decision may also be purchased from the Commission's copy contractors, International Transcription Service, (202) 857-3800, 2100 M Street, NW., Suite 140, Washington, DC 20037.

Summary of Report and Order

1. The Commission amended § 1.420 of its Rules to establish a new procedure whereby FM and television licensees and permittees may request modification of their authorizations to a mutually exclusive allotment in a different community of license during the course of a rule making proceeding to amend the FM or television tables of allotments, §§ 73.202(b) and 73.606(b) of the Rules, respectively. The Commission

will approve a modification so long as adoption of the proposed allotment plan would result in a net service benefit for the communities involved as compared to the existing state of allotments for the communities involved.

2. This proceeding was commenced in response to a petition for rule making filed by Christian Voice of Central Ohio ("petitioner"), an FM licensee. Petitioner proposed that the Commission amend its rules to permit FM licensees to upgrade facilities on higher class adjacent or co-channel frequencies, without entertaining competing expressions of interest or competing applications for the amended allotment, even if the upgrade would require modification of the licensee's community of license. In response to the petition, the Commission issued a Notice of Proposed Rule Making, 53 FR 50045 (Dec. 13, 1988), proposing to amend § 1.420 of the Commission's rules to provide a procedure whereby a licensee or permittee may petition the Commission for an amendment to the FM or television tables, and modification of its license accordingly, without placing its existing authorization at risk.

3. Comments filed in response to the Notice were predominantly favorable. Commenters noted that the present policy deters beneficial upgrades that would require a change in the community of license, and that the new procedure would enhance a licensee's flexibility in choosing and modifying facilities. Others noted that the proposal is consistent with earlier Commission actions to modify policies that frustrate the advancement of proposals that would serve the public interest, such as the *Report and Order* in MM Docket No. 85-313, *Modification of FM Broadcast Licenses to Higher Class Co-Channel or Adjacent Channels*, 51 FR 20290 (June 4, 1986). While one party suggested that the proposal might be contrary to the requirements of *Ashbacker Radio Corp. v. U.S.*, 326 U.S. 327 (1945), a number of commenters and reply commenters refuted that view. One commenter supported application of the proposal to intraband commercial/noncommercial channel exchanges, but another disapproved, fearing that intraband swaps could lead to loss of noncommercial service in some areas. Several commenters argued that the procedure could be abused by a licensee seeking to abandon its original community of license in order to serve a larger market without offering any tangible benefits to the new community. One commenter claimed the procedure is unnecessary for the television service, as a television station cannot obtain a

small amount of marine traffic at the bridge is a significant cause of the traffic problems, and that the marine traffic moves quickly through the bridge whenever it is opened, and it is the lift mechanism itself that causes the delays. He also requested that a public hearing be held.

Economic Assessment and Certification

These proposed temporary regulations are considered to be non-major under Executive Order 12291 on Federal Regulation, and non-significant under the Department of Transportation regulatory policies and procedures (44 FR 11034; February 26, 1979). The economic impact of this temporary regulation is expected to be so minimal that a full regulatory evaluation is unnecessary. The intent of this temporary regulation is to collect information to assess how the regulations would accommodate vehicular traffic to and from Bath Iron Works and local parks in the summer when tourist traffic is at its peak. The draw will continue to open on signal for inbound commercial fishing vessels. Since the economic impact of this proposal is expected to be minimal the Coast Guard certifies that, if adopted, it will not have a significant economic impact on a substantial number of small entities.

Federalism Implication Assessment

This action has been analyzed under the principles and criteria in Executive Order 12612, and it has been determined that this proposed rule does not have sufficient federalism implications to warrant preparation of a Federalism assessment.

List of Subjects in 33 CFR Part 117

Bridges.

Temporary Regulations

In consideration of the foregoing, Part 117 of Title 33, Code of Federal Regulations is amended as follows:

PART 117—DRAWBRIDGE OPERATION REGULATIONS

1. The authority citation for Part 117 continues to read as follows:

Authority: 33 U.S.C. 499; 49 CFR 1.46; 33 CFR 1.05-1(g).

2. Section 117.525(a) is revised for the period of June 1, 1989 through July 30, 1989:

§ 117.525 Kannebec River.

(a) The draw of the Carlton highway-railroad bridge, mile 14.0 between Bath and Woolwich shall open as follows:

(1) On signal as soon as possible at all times for vessels owned or operated by the United States Government, State and local vessels used for public safety, vessels in distress, and inbound loaded commercial fishing vessels.

(2) Year-round the draw need not open from 6:30 a.m. to 7:30 a.m. and from 3:45 p.m. to 5:30 p.m., Monday to Friday excluding holidays except for vessels noted in paragraph (a)(1) of this section.

(3) From 1 June through 30 September: (i) On signal at all times for commercial vessels except as noted in paragraph (a)(2) of this section; (ii) For recreational vessels on signal except that from 6 a.m. to 6 p.m. openings only at 10 a.m. and 2 p.m.

(4) From 15 April through 30 May and 1 October through 15 November open on signal: (i) From 3 a.m. to 7 p.m., except as noted in paragraph (a)(2) of this section; (ii) From 7 p.m. to 3 a.m. if four hours notice is given.

(5) From 15 February through 14 April and 16 November through 15 December at all times on signal, if at least 4 hours notice is given.

(6) From 16 December through 14 February open on signal, except as noted in paragraph (a)(2) of this section, if 24 hours notice is given.

Dated: June 13, 1989.

R.L. Rybacki,

Rear Admiral, U.S. Coast Guard, Commander, First Coast Guard District.

[FR Doc. 89-14746 Filed 6-21-89; 8:45 am]

BILLING CODE 4910-14-01

33 CFR Part 165

[CGD7 89-21]

Security Zone; Port Canaveral Harbor, Cape Canaveral, FL; Correction

AGENCY: Coast Guard, DOT.

ACTION: Final rule; correction.

SUMMARY: The Coast Guard is clarifying the zone described in the final rule which appeared in the Federal Register on October 3, 1988 [53 FR 38718].

FOR FURTHER INFORMATION CONTACT: Lieutenant Commander H. Henderson, Tel: (904) 791-2646, between 7:30 a.m. and 4:00 p.m., Monday through Friday, except Federal holidays.

SUPPLEMENTARY INFORMATION: The Coast Guard published the final rule on October 3, 1988 [53 FR 38718] which established a security zone at Cape Canaveral, Florida. The final rule

improperly described the security zone which is clarified by this notice.

The following clarification is made in CGD7 87-38, the Regulations implementing the security zone at Cape Canaveral, Florida published in the Federal Register on October 3, 1988 [53 FR 38718].

1. On page 38718, third column, paragraph (a) of § 165.705 is correctly added to read as follows:

§ 165.705 Port Canaveral Harbor, Cape Canaveral, Florida.

(a) Security Zone A—East (Trident) Basin, Port Canaveral Harbor, at Cape Canaveral Air Force Station, Brevard County, Florida. All waters of the East Basin north of latitude 28°24'36"N.

Dated: May 2, 1989.

R. J. O'pezio,

Captain, U.S. Coast Guard, Captain of the Port, Jacksonville, Florida.

[FR Doc. 89-14746 Filed 6-21-89; 8:45 am]

BILLING CODE 4910-14-01

ENVIRONMENTAL PROTECTION AGENCY F-89-SXCC-FFFFF

40 CFR Parts 144, 260, 264, and 270 (FRL-9886-3)

Hazardous Waste Miscellaneous Units; Standards Applicable to Owners and Operators; Correction

AGENCY: Environmental Protection Agency.

ACTION: Final rule; correction.

SUMMARY: This notice corrects the preamble discussion of a final rule under the Resource Conservation and Recovery Act (RCRA) that appeared in the Federal Register of Thursday, December 10, 1987, 52 FR 46946; and that discussed distance requirements for open burning/open detonation facilities.

FOR FURTHER INFORMATION CONTACT: The RCRA/Superfund Hotline at (800) 424-9346 (toll free) or (202) 382-3000 in Washington, DC, or Chester J. Oszman, Jr., Office of Solid Waste (OS-343), U.S. Environmental Protection Agency, Washington, DC 20460, (202) 382-4500.

SUPPLEMENTARY INFORMATION: On December 10, 1987 (52 FR 46946-46965), EPA promulgated a new set of standards applicable to miscellaneous waste management units. The final rule was effective on January 11, 1989. Today, EPA is correcting one portion of the accompanying preamble by clarifying

file db 90 All Purpose Pack

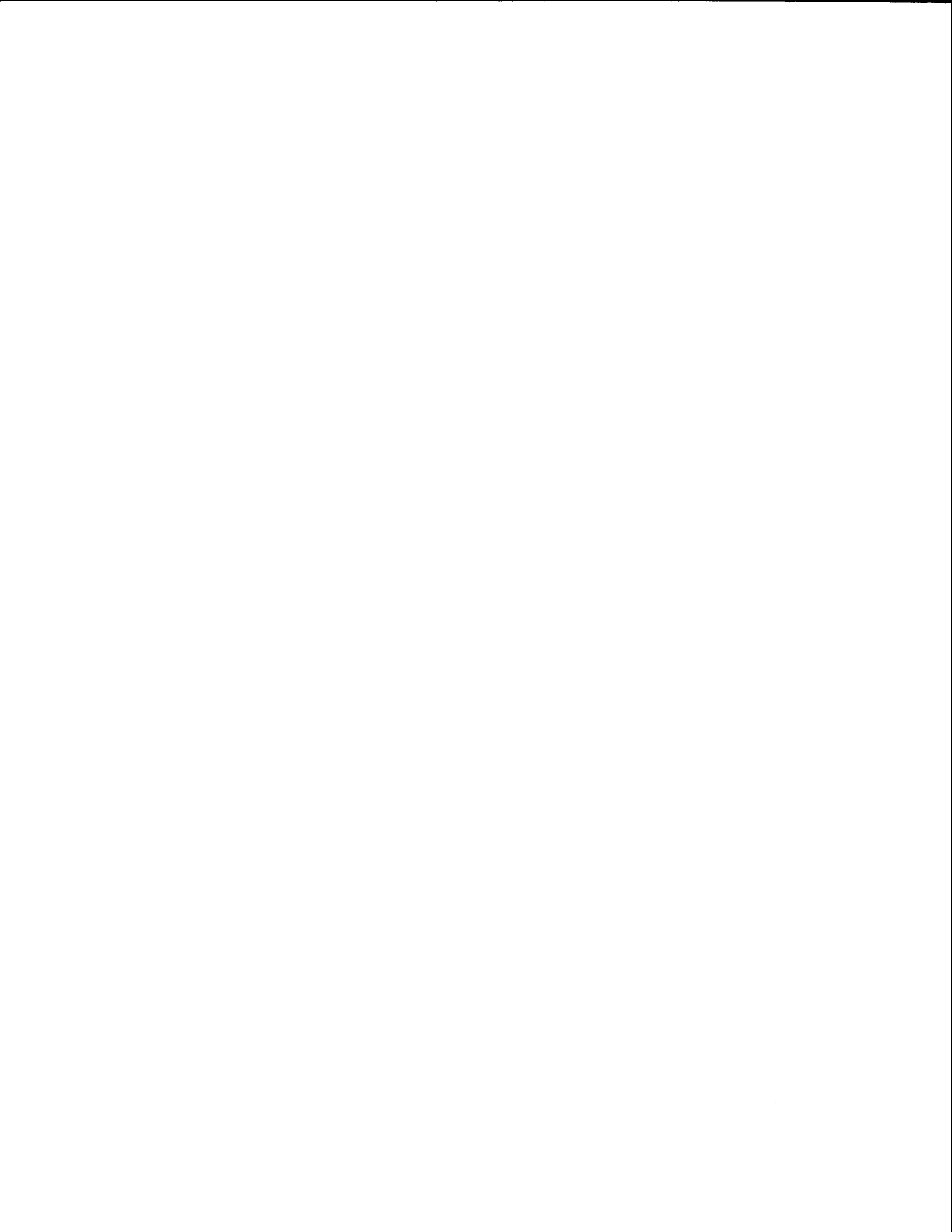
Air Force Bases Restricting Shipment of Off-Site Waste Munitions¹

Bases

- Arnold AFB, TN
- Barksdale AFB, LA
- Beale AFB, CA
- Cannon AFB, NM
- Dyess AFB, TX
- Holloman AFB, NM
- K.I. Sawyer AFB, MI
- Moody AFB, GA
- Nellis AFB, NV

¹ The AF has a total of 23 open burning/open detonation thermal treatment units. These are either permitted under the Resource Conservation and Recovery Act or are operating under interim status. The listed bases -- 39% of the total -- are restricted from accepting off-site waste munitions. The restrictions may be either self-imposed or required by their regulatory agency.

Page 172



8/11/95

Dear Cathy-

I thought you and others at MTP would be interested in enclosed letter from Chief of Monitoring and Enforcement Section of HazMat. & Waste Management Division to Commanding General at Ft. Carson regarding open burning of excess propellant.

I brought up open burning issue at RAB meeting 8/10 and as usual ~~and~~ any discussion was shut down by military co-chair. Issues around open burning were one of 13 violations identified in compliance order from 11/94 and I have been trying to get the subject on the agenda since ever first RAB meeting but have met ~~with~~ with much resistance. This letter was given to me by the HazMat + Waste Mgmt. Division rep. to the RAB after the meeting on 8/10 when I questioned him further on the status of open burning at Ft. Carson. Apparently the State is trying to be aggressive in terms of applying RCRA to open burning but Ft. Carson is resisting - as would be expected.

It may be a good test case. I just hope that the proposed rule and the CO State legislature don't cause the Division to back off.

Also - in spite of being told repeatedly that munitions rulemaking ~~was~~ not part of

RAB agenda, I brought it up again at 8/10 meeting hoping to generate some interest and concern - a few people requested copies of proposed rule including Ft. Carson rep. - unfortunately it only provides the military with additional ammo to support their case.

Looking forward to hearing what Steering Committee has to say about strategy. Would like to be able to create some noise here in Colorado but I'm afraid it won't come from our RAB members.

Hope your summoner was good. Thanks for last mailing via Bill Salzman.

Bill Salzman,
719-389-0644

Juxan Gordon
Alternatives 2000
Ft. Carson RAB
1603 Cheyenne Blvd
Colo Spg. CO
80906

STATE OF COLORADO

Roy Romer, Governor
Patti Shwayder, Acting Executive Director

Dedicated to protecting and improving the health and environment of the people of Colorado

HAZARDOUS MATERIALS AND WASTE MANAGEMENT DIVISION

4300 Cherry Creek Dr. S. 222 S. 6th Street, Room 232
Denver, Colorado 80222-1530 Grand Junction, Colorado 81501-2768
Phone (303) 692-3300 Phone (303) 248-7164
Fax (303) 759-5355 Fax (303) 248-7198

July 18, 1995



Colorado Department
of Public Health
and Environment

CERTIFIED MAIL # _____
RETURN RECEIPT REQUESTED

Major General Thomas A. Schwartz
Commanding General
Fort Carson & 5th Infantry Division (Mech)
Fort Carson, Colorado 80913-5001

Re: May 12, 1995 letter from Thomas L. Warren, Director, Environmental Compliance and Management (DECAM) responding to RCRA 3007 request for information; second RCRA 3007 request for information; state permitting of hazardous waste management activities at Range 1, Ft. Carson, Colorado; letter from Mr. Thomas L. Warren dated June 11, 1995

Dear General Schwartz:

On April 5, 1995, the Department issued an information request to Fort Carson pursuant to § 3007 of RCRA, 42 U.S.C. §§ 6901-6992, regarding the March 8, 1995 open burning/open detonation of excess artillery or mortar propellant on a newly constructed concrete burn pad at Range 1. That burning took place after much communication between our program and Fort Carson's environmental staff regarding ways that such burning of excess propellant could be done in a legal and environmentally sound manner.

Fort Carson personnel first discussed the issue of building a concrete burn pad at Range 1 during an inspection on January 20, 1994. The burn pad was described further in a proposal conveyed in a letter from Mr. Warren dated February 4, 1994. A March 24, 1994, reply from Gary Baughman of the Hazardous Waste Control Program specifically states that construction and use of a new burn pad would require a permit. At an April 18, 1994 meeting with Messrs. Warren, Noyes, and Reisinger, we discussed use of a temporary metal burn pan as a means of conducting the burning that did not require getting a permit and could be done under the Range 1's interim status. Gary Baughman's letter of May 24, 1994, described our understanding that Fort Carson would use such a device. During a July 7, 1994, meeting, Mr. Sealander and Mr. Noyes again raised the idea of a permanent concrete pad. Department staff said to submit any plans for a concrete pad for our review as it would require application for a permit.

At a February 28, 1995 meeting, Fort Carson personnel told us that the concrete pad had been constructed and that Fort Carson wanted to use it for burning of excess propellant. We told the Fort Carson staff that it could not be used without first receiving a permit. During a meeting on

March 3, 1995, Hazardous Waste Control Program staff specifically told Messrs. Sealander, Noyes, and Henderson that Fort Carson was not to burn excess propellant on the concrete burn pad until Fort Carson obtained a hazardous waste permit from the Department. Mr. Warren's letter of March 20, 1995, which notified the Department of the use of the new burn pad, acknowledges that we told Fort Carson personnel that a permit was required and, in fact, that Fort Carson personnel told the Department representatives that the new pad would not be used until a permit or other approval was received from the Department. After these repeated explicit directions to not use the new burn pad without first receiving a hazardous waste permit, Fort Carson used the pad for destruction of excess propellant on March 8, 1995. The Department's 3007 request was designed to gain information regarding the facts surrounding that unauthorized use of the concrete burn pad.

The 3007 request for information required a response on or before April 27, 1995. On May 16, 1995, nineteen days after a response was due, we received a letter from Mr. Thomas L. Warren (DECAM) stating that the U.S. Army was refusing to respond to the 3007 request for information. A failure to respond, including a failure to respond in a timely fashion, or a failure to adequately justify a failure to respond is a violation of § 3007 of RCRA and subject to an enforcement action by the Department. Mr. Warren's letter was not a timely response to the Department's 3007 request for information nor was it an adequate justification of the U.S. Army's failure to respond.

The U.S. Army's refusal to respond to the Department's 3007 request for information was apparently based upon the position that the burning of the excess propellant in question was part of a training exercise and that the excess propellant was used for an intended purpose, and therefore not a solid waste subject to regulation under RCRA or Colorado's authorized hazardous waste program. Pursuant to the Colorado Hazardous Waste Regulations, 6 CCR 1007-3, specifically § 261.2(f), the U.S. Army has the burden of providing documentation that a material it is handling is not a solid waste. However, the U.S. Army failed to provide any documentation or justification for its position regarding the Department's 3007 request for information.

In fact, the U.S. Army's present position is inconsistent with the U.S. Army's prior position, and documents filed with the Department, regarding the burning of excess propellant in the unlined trenches on Range 1. The U.S. Army has applied for, and received, interim status to burn excess propellant in the unlined trenches; has applied for a permit to burn excess propellant in the unlined trenches; and has filed numerous reports, including certifications by U.S. Army and civilian personnel, evidencing that the burning of excess propellant in the unlined trenches was the management of hazardous waste.

The U.S. Army claims that the same activity at the concrete burn area, which it previously certified was the management of hazardous waste, is now no longer hazardous waste management and does not require a permit. The Army apparently also believes that it is not required to respond to the Department's 3007 request for information. The Department disagrees. Not only is a response to the 3007 request required, but the Army's claim regarding the burning of excess

- conducting the alleged training; the names of the individuals allegedly trained; and copies of the U.S. Army's orders related to such training;
- 4) The dates and amounts of all excess propellant burned in the unlined trenches on Range 1 since January 1, 1995;
 - 5) If the U.S. Army claims that said burning in the unlined trenches was training of U.S. Army personnel, a copy of the U.S. Army's training plan for field destruction or disposal of excess propellant; copies of all U.S. Army training manuals for field destruction or disposal of excess propellant; the names of the individuals conducting the alleged training; the names of the individuals allegedly trained; and copies of the U.S. Army's orders related to such training;
 - 6) The dates, amounts and locations of all excess propellant burned at Ft. Carson since January 1, 1995, other than propellant burned at the concrete burn area or the unlined trenches on Range 1;
 - 7) If the U.S. Army claims that said burning at locations other than the concrete burn area or the unlined trenches on Range 1 was training of U.S. Army personnel, a copy of the U.S. Army's training plan for field destruction or disposal of excess propellant; copies of all U.S. Army training manuals for field destruction or disposal of excess propellant; the names of the individuals conducting the alleged training; the names of the individuals allegedly trained; and copies of the U.S. Army's orders related to such training;
 - 8) The amounts and locations of all excess propellant presently stored at Ft. Carson;
 - 9) The dates, amounts and present location of all excess propellant transported off Ft. Carson for destruction or disposal since January 1, 1995.

Also, regarding the U.S. Army's pending application for a RCRA permit for the treatment or disposal of hazardous waste in the unlined trenches on Range 1, please advise the Department in writing within seven days of receipt of this letter, whether the U.S. Army intends on proceeding with its permit application or whether the permit application is being withdrawn. Please be advised that pursuant to the Colorado Hazardous Waste Regulations, 6 CCR 1007-3, specifically §§ 100.20(c)(1) and 265.112(d)(3)(ii), upon withdrawal of the permit application, interim status will terminate and the U.S. Army will be required to file its closure plan for the unlined trenches within fifteen days.

Further, regarding the U.S. Army's pending application for a RCRA permit for the storage of hazardous waste at Ft. Carson, please be advised that the Department will be reviewing the application to determine what, if any, impacts the U.S. Army's change in position concerning the burning of excess propellant might have on storage of hazardous waste at Ft. Carson.

propellant has drawn the veracity of its prior certifications into question. The Department takes the filing of false certifications seriously and will be continuing its investigation into the matter.

Regarding the Department's April 5, 1995 3007 request for information, the U.S. Army shall file, **within twenty (20) days of receipt of this letter**, an adequate response to the request, including specific responses to the three numbered items in the request and specific documentation regarding the U.S. Army's position that the burning of excess propellant on March 8, 1995 fell within the "use for its intended purpose" exception to the definition of a solid waste. This specific documentation shall include, but not be limited to, the following:

- 1) A copy of the U.S. Army's training plan for field destruction or disposal of excess propellant at Fort Carson;
- 2) Copies of all U.S. Army training manuals for field destruction or disposal of excess propellant;
- 3) Copies of all U.S. Army's orders regarding the alleged training on March 8, 1995;
- 4) The name(s) of the individual(s) conducting the alleged training on March 8, 1995;
- 5) The name(s) of the individual(s) allegedly trained on March 8, 1995; and
- 6) The amount of excess propellant burned as part of the alleged March 8, 1995 training.

The filing of the response will not in any way resolve or relieve the U.S. Army of its obligation to have adequately responded to the Department's April 5, 1995 request within the original twenty-day period.

Further, pursuant to § 3007 of RCRA and § 25-15-301, C.R.S., the Department requests that the following information be submitted to the Department within twenty calendar days of receipt of this letter:

- 1) Copies of all U.S. Army orders regarding training in the destruction or disposal of excess propellant at Fort Carson between January 1, 1993 and the present;
- 2) The dates and amounts of all excess propellant burned at the concrete burn area located on Range 1 since March 8, 1995;
- 3) If the U.S. Army claims that said burning at the concrete burn area was training of U.S. Army personnel, a copy of the U.S. Army's training plan for field destruction or disposal of excess propellant; copies of all U.S. Army training manuals for field destruction or disposal of excess propellant; the names of the individuals

Major General Thomas A. Schwartz
Page 5

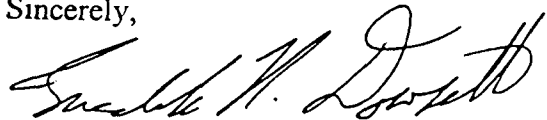
This letter does not in any way impact the burning of excess propellant in the unlined trenches on Range 1 in accordance with the terms of the U.S. Army's interim status. This letter, however, does not in any way acknowledge that the burning of excess propellant falls within the "use for intended purpose" exception to the definition of a solid waste or give Ft. Carson permission to burn any excess propellant at the concrete burn pad on Range 1 or any other area on Ft. Carson, except for the burning of excess propellant at the unlined trenches on Range 1 in accordance with the U.S. Army's interim status.

Mr. Warren's letter dated July 11, 1995, said that Fort Carson would start using the new burn area again on July 24, 1995. Mr. Warren's letter also requested comments on plans to remediate the unlined trenches at Range 1. Since receipt of these plans on February 16, 1995, Fort Carson has not described how destruction of waste propellant would be done in compliance with the law since the trenches would not be available for such purposes. Mr. Warren's letter implies that Fort Carson would destroy all excess propellants on the concrete pad. We advise you that the use of the concrete burn pad for hazardous waste treatment without first receiving a permit is illegal. Also, any treatment of hazardous wastes at the unlined trenches that is not either open burning or open detonation requires either an approval for a change to interim status or a permit. Fort Carson has not made such requests.

I have described efforts that the Department has made to inform Fort Carson of legal and environmentally sound ways to destroy excess propellant at the interim status area at Range 1. Fort Carson has not availed itself of those options. I urge you to take steps to ensure that Fort Carson does not continue to violate hazardous waste laws and repeat such violations as documented in Compliance Order No. 94-11-18-01 issued in November of last year. We fear that the pattern of violation of hazardous waste laws will continue unless you give this matter your personal attention.

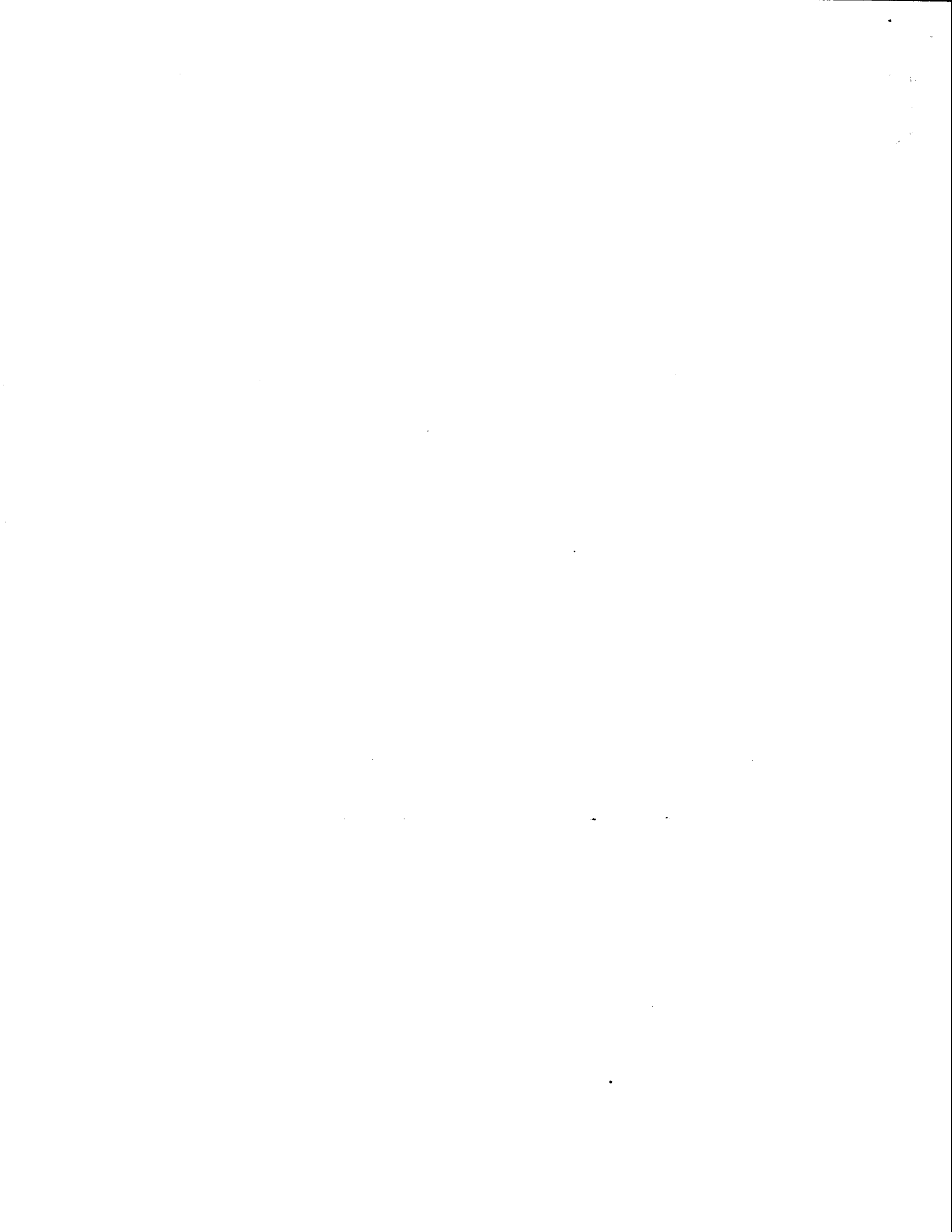
Should you have any questions regarding this letter please feel free to contact me at (303) 692-3342, or you may have your legal counsel contact our legal counsel, Timothy J. Monahan, at (303) 866-5110.

Sincerely,



Frederick R. Dowsett, Chief
Monitoring and Enforcement Section
Hazardous Materials and Waste Management Division

cc: Thomas L. Warren, DECAM, Ft. Carson
David Sealander, DECAM, Ft. Carson
Thomas G. Burns, U.S. EPA, Region VIII
Timothy J. Monahan, AGO



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Please see **BUSH** /A-10

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3-7-92

Cancer fear leads base to stop shelling

By **GWENN FRISS**
STAFF WRITER

CAMP EDWARDS — Although battlefield practice resumes at the Upper Cape military base this weekend, the artillery shells suspected of causing cancer will remain idle for the time being.

In artillery training, soldiers use a specified number of bags of propellant — the explosive charge that hurls the shell — then burn the rest as they would on the battlefield to keep it out of enemy hands.

Protested by the Upper Cape Concerned Citizens activist group for several years, the practice drew wide attention in January when Boston University's cancer study showed an increased risk of lung and breast cancer for people living near gun positions. The BU researchers recommended that propellant bags containing the cancer-causing chemical 2,4-dinitrotoluene not be burned near populated areas.

Earlier this month, the Association for the Preservation of Cape Cod and the Barnstable Assembly of Delegates called for a ban pend-

ing further study of the health risks.

National Guard and state officials said yesterday artillery use will be halted until later this spring when an air quality test will determine what goes into the air when propellant bags are burned.

Richard Hugus, a member of the Falmouth Alliance for Base Cleanup, said, "We don't need more studies. They should just put a stop to it."

In the meantime, mortars will be fired.

"Our concern is not as great, because mortar propellant does not contain 2,4-DNT or any other known carcinogen we're aware of," said James Begley, an environmental engineer for the Massachusetts Department of Environmental Protection.

"But one thing we know is when people hear those mortars fired this weekend, everything they've heard about the cancer study and 2,4-DNT will be on their minds. We want them to know that the bags in question will not be being burned," he said.

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HEADQUARTERS
U.S. ARMY ARMAMENT,
MUNITIONS AND CHEMICAL COMMAND

FINAL REPORT

DEVELOPMENT OF
METHODOLOGY AND TECHNOLOGY
FOR
IDENTIFYING AND QUANTIFYING
EMISSION PRODUCTS
FROM
OPEN BURNING AND OPEN DETONATION
THERMAL TREATMENT METHODS.

BANGBOX TEST SERIES

*VOLUME 2
TEST DEVELOPMENT*

JANUARY 1992

Maintenance Management Division
Demilitarization and Technology Branch
Rock Island, Illinois 61299-6000
DSN: 793-3980/5534
Commercial: 309-782-3980/5534



REPORT DOCUMENTATION PAGE

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2a. SECURITY CLASSIFICATION AUTHORITY N/A		3. DISTRIBUTION / AVAILABILITY OF REPORT Unlimited	
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4. PERFORMING ORGANIZATION REPORT NUMBER(S)		5. MONITORING ORGANIZATION REPORT NUMBER(S)	
6a. NAME OF PERFORMING ORGANIZATION Andrulic Research Corporation Salt Lake City Office	6b. OFFICE SYMBOL (If applicable)	7a. NAME OF MONITORING ORGANIZATION STEDP-MT-TM-A Dugway Proving Ground	
6c. ADDRESS (City, State, and ZIP Code) 4600 East-West Highway, Suite 900 Bethesda MD 20814		7b. ADDRESS (City, State, and ZIP Code) Dugway, Utah 84022-5000	
8a. NAME OF FUNDING / SPONSORING ORGANIZATION U.S. Army Armament Munitions and Chemical Command	8b. OFFICE SYMBOL (If applicable) AMSMC-DSM-D	9. PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER Contract DAAD09-87-D-0008	
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		PROGRAM ELEMENT NO.	PROJECT NO.
11. TITLE (Include Security Classification) Development of Methodology and Technology for Identifying and Quantifying Emission Products from Open Burning and Open Detonation Thermal Treatment Methods. BangBox Test Series - Volume-2, Test Development.			
12. PERSONAL AUTHOR(S) Mr. MacDonald Johnson			
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FIELD	GROUP	SUB-GROUP	
19. ABSTRACT (Continue on reverse if necessary and identify by block number) The report covers in detail the test and the supporting data, and analyses used to answer the objectives. The supporting data and analyses are provided for the test development, selection of equipment and procedures, determination of BangBox volume, aerosol homogeneity, and the detonation products of TNT, the burn products of double-base propellant and composite propellant, and the detonation products of foam-attenuated TNT. All trials were accomplished in an air supported building (BangBox). Sampling was accomplished with real time instruments for CO ₂ , CO, NO _x , O ₃ , and SO ₂ ; canister samplers for SF ₆ , CO ₂ , CO, and volatile hydrocarbons; Quartz fiber filters with backup XAD-2™ resin cartridges for semivolatile organics, and various instruments for size and mass of particulates. For each analyte measured an emission factor was calculated by the concentration times volume of the building and by the carbon balance method. The carbon balance method is based on the conservation of carbon in the detonation or burn and thus becomes the trace (Cont'd on reverse)			
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**HEADQUARTERS
U.S. ARMY ARMAMENT,
MUNITIONS AND CHEMICAL COMMAND**

FINAL REPORT

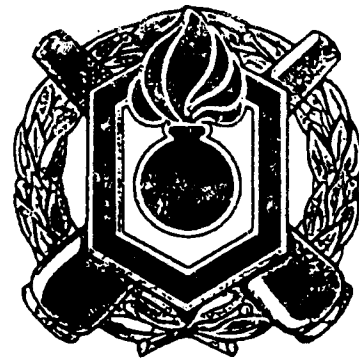
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BANGBOX TEST SERIES

**VOLUME 1
TEST SUMMARY**

JANUARY 1992

Maintenance Management Division
Demilitarization and Technology Branch
Rock Island, Illinois 61299-6000
DSN: 793-3980/5534
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REPORT DOCUMENTATION PAGE

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6c. ADDRESS (City, State, and ZIP Code) 4600 East-West Highway, Suite 900 Bethesda MD 20814		7a. NAME OF MONITORING ORGANIZATION STEDP-MT-TM-A Dugway Proving Ground	
7b. ADDRESS (City, State, and ZIP Code) Dugway, Utah 84022-5000		8a. NAME OF FUNDING/SPONSORING ORGANIZATION U.S. Army Armament, Munitions and Chemical Command	
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		TASK NO.	WORK UNIT ACCESSION NO.
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FIELD	GROUP	SUB-GROUP	
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20. DISTRIBUTION/AVAILABILITY OF ABSTRACT <input type="checkbox"/> UNCLASSIFIED/UNLIMITED <input type="checkbox"/> SAME AS RPT <input type="checkbox"/> DTIC USERS		21. ABSTRACT SECURITY CLASSIFICATION UNCLASSIFIED	
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MUNITIONS AND CHEMICAL COMMAND

FINAL REPORT

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OPEN BURNING AND OPEN DETONATION
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BANGBOX TEST SERIES

VOLUME 3
QUALITY ASSURANCE AND QUALITY CONTROL

JANUARY 1992

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Demilitarization and Technology Branch
Rock Island, Illinois 61299-6000
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		PROGRAM ELEMENT NO.	PROJECT NO.	TASK NO.
11. TITLE (Include Security Classification) Development of Methodology and Technology for Identifying and Quantifying Emission Products from Open Burning and Open Detonation Thermal Treatment Methods. BangBox Test Series - Volume 3, Quality Assurance.				
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19. ABSTRACT (Continue on reverse if necessary and identify by block number) The 1989 BangBox test validated technologies and methodologies proposed for identifying and quantifying emissions resulting from the open burning (OB) of propellants and open detonation (OD) of explosives. This test also provided the first credible data on combustion products resulting from OB/OD treatment procedures. The vigorous quality assurance/quality control (QA/QC) program established well before the first trial was continued through the reporting phase. Major elements of the QA/QC program were a quality assurance program plan (QAPP), letters of instruction (LOI) covering all technical aspects of the testing program, a sample identification and tracking system, test monitoring by the scientific support contractor, visits to the test site and assay laboratories by an independent QA contractor, assays by different laboratories using different instruments (gas chromatograph/mass spectrometer and supercritical fluid chromatograph/mass spectrometer), equipment audits by the U.S. Environmental Protection Agency's Atmospheric Research and Exposure Assessment Laboratory (AREAL), assay of samples spiked by the AREAL, and cooperative assistance from the U.S. Army Toxic and Hazardous Material Agency, and the U.S. Army Environmental Hygiene Agency. (Cont'd on reverse).				
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VOLUME II

U.S. ARMY ARMAMENT,
MUNITIONS AND CHEMICAL COMMAND
STUDY ON
DEMILITARIZATION
ALTERNATIVES TO
OPEN BURNING/OPEN DETONATION
(OB/OD)
TECHNOLOGY COMPILATIONS

JUNE 1990


U.S. Army Defense Ammunition Center and School
Evaluation Division
Savanna, Illinois 61074-9639
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Alternative

Technologies

for the
Destruction of
Chemical Agents
and Munitions

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This report has been reviewed by a group other than the authors according to procedures approved by a Report Review Committee consisting of members of the National Academy of Sciences, the National Academy of Engineering, and the Institute of Medicine.

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Providing news and resources to the Movement for Environmental Justice -- July 11, 1990

Incinerator Ash--Part 1 LEAD POISONING EPIDEMIC IN CHILDREN

Lead is a soft, gray metal that humans have used for 4,000 years because it is easy to mine and easy to shape into useful objects. Unfortunately, lead is also toxic. It is now thought that the Roman empire collapsed partly because Roman nobility failed to appreciate the toxicity of lead; they drank wine from lead-lined goblets, they caught rainwater in lead-lined cisterns, and they transported their drinking water through lead pipes. Examination of the remains of ancient Romans reveals damaging levels of lead in their bones.¹

At very low levels, lead is poisonous to the central nervous system, causing mental retardation and learning disabilities. It causes sterility (which probably decimated Roman nobility), it stunts physical growth in children, it causes high blood pressure, it causes hearing loss, and it "probably" causes cancer, according to U.S. Environmental Protection Agency (EPA). In high enough concentrations, lead causes brain seizures and death, but such high exposures are rare. Lower, more insidious exposures are very common. Children are particularly susceptible to damage from lead.

Lead offers no dietary benefits to humans or animals. Therefore, the American Academy of Pediatrics recommends that the only desirable amount of lead in humans is zero. This is hard to achieve in a society that injects 44,000 tons of lead into the atmosphere each year.² It is now recognized that lead injected into the atmosphere settles out onto the soil and contact with soil is the chief means by which children ingest lead. Young children regularly put their hands in their mouths and whatever's on their hands ends up in their stomachs. If there's lead in soil anywhere near where children play, outdoor dust and indoor house dust become contaminated with lead and the children end up ingesting lead from their hands. This has now been confirmed and reconfirmed by medical studies.

Since the 1970s, awareness of lead contamination has been growing. As a result, in the 1970s, the federal government dramatically reduced the allowable use of lead in gasoline (from 2 grams per gallon to 0.1 grams per gallon) and outlawed lead

entirely for use in indoor paint.

However, even these measures have not solved the lead problem because lead does not degrade or go away. Once lead is mined out of the earth and put into commercial use, it becomes a permanent part of the environment, until slow, natural forces of soil erosion bury it again. It has been estimated that the "half life" for lead in the environment is between 1000 and 2000 years. This means that lead introduced into the atmosphere, or buried in a shallow grave such as a landfill, today will remain accessible to humans for 10,000 to 20,000 years. For this reason, lead introduced into the environment is cumulative--the problem grows larger each year as the nation's soils become more contaminated.

According to the federal Centers for Disease Control (CDC) in Atlanta, the major source of lead in the environment used to be lead smelters and automobiles. Now these sources have been overshadowed by a new major contributor of lead to the environment: municipal solid waste incinerators. While Congress has put the brakes on lead in gasoline, the incinerator industry has been expanding incinerators spew lead into the air in large quantities, and incinerator ash buried in the ground introduces additional massive amounts of lead into the nation's soils.

For example, a consultant funded by an incineration company recently estimated that, by the year 2000, the U.S. will be producing 17 million tons of incinerator ash each year.³ Incinerator ash contains an average of about 3000 ppm [parts per million] of lead, so 17 million tons of ash contains 102 million pounds (51,000 tons) of lead. Note that 51,000 tons is greater than all the lead now being put into the atmosphere by all sources in America today (44,000 tons). This means that municipal solid waste incineration promises to more than double the amount of lead entering American soils each year.

How much is too much?

In the field of toxicology (the science of poisons), the traditional view says that all poisons have a threshold--some amount above which people get sick and below which people are not harmed. Now, however, a consensus has developed among medical specialists who have studied the effects of lead on children; these physicians now agree that

there is no threshold for lead damage. Any amount of lead interferes with a child's normal patterns of growth (physical and mental). *This recognition is turning the old way of setting standards on its ear.*

Lead is measured in the bloodstream, usually as micrograms per deciliter ($\mu\text{g}/\text{dl}$). [A microgram is one millionth of a gram, and there are 28 grams in one ounce; a deciliter is 100 milliliters, or a tenth of a liter; a liter is about a quart.]

Throughout the 1980s, the amount of lead in blood considered "safe" has declined steadily. Doctors used to define "lead poisoning" as $50 \mu\text{g}/\text{dl}$; then they dropped it to $30 \mu\text{g}/\text{dl}$. But starting in the late 1970s, medical study after medical study has revealed that infants with less than $10 \mu\text{g}/\text{dl}$ show neurobehavioral abnormalities. Children with only 5 to $7 \mu\text{g}/\text{dl}$ show hearing damage, damage to the central nervous system and stunted growth--they are shorter, lighter, and have smaller girth in the chest. Furthermore, these impairments in infants have been shown to be *permanent*. Once poisoned, the children's nervous systems never recover. Basically, their IQ has been reduced, and they will live with this disadvantage for the rest of their lives.

Reduced intelligence (a 5 to 10-point reduction in IQ, and other subtle damage) is measurable in young children with $10 \mu\text{g}/\text{dl}$ to $15 \mu\text{g}/\text{dl}$ lead in blood. The U.S. National Center for Health Statistics in 1984 revealed that *88% of American children under 6 years old have blood lead levels of $10 \mu\text{g}/\text{dl}$ or higher. The average in American children under 6 years old today is $16 \mu\text{g}/\text{dl}$.* As Dr. Ellen Silbergeld, a lead specialist with Environmental Defense Fund (EDF) has written,⁴ "Clearly, an epidemic of excessive lead exposure exists in the United States." Under such circumstances, with lead levels in our children already dangerously and unac-

ceptably high, and with soils known to be the most important source of the problem, it seems entirely inappropriate--morally wrong--to be doubling the amount of lead injected into the nation's soils via an expanded solid waste incineration industry. For the sake of our children's health, we should be going the other way, shutting down existing incinerators, even if taxpayers have to sacrifice to do it. Which is more important, our children's health or our pocketbooks? This seems an easy choice.

¹ Much has been written on this subject. See, for example, S.C. Gilfillan, "Lead Poisoning and the Fall of Rome," *Journal of Occupational Medicine*, Vol. 8 (February, 1965), pgs. 53-60.

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⁴ Except as noted above in footnotes 1-3, all of our information is taken from a technical paper titled "Establishing a Health Based Standard for Lead in Residential Soils," by Patrick L. Reagan and Ellen K. Silbergeld, Ph.D., to be published later this year as part of the annual series, *Trace Substances in Environmental Health*, issued by the University of Missouri Press in Columbia, MO. For \$16.00, we can mail you this 43-page manuscript.

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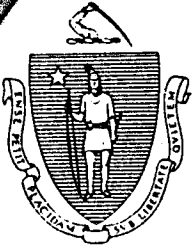
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August 20, 1992

Dr. Robert Knorr
Massachusetts Dept. of Public Health
150 Tremont Street
Boston, MA 02111

Re: Propellant Bag Burning, Massachusetts Military
Reservation, Barnstable County, Massachusetts

Dear Dr. Knorr:

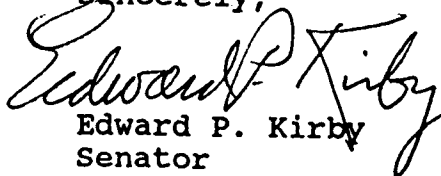
I have been advised that artillery propellant bag burning at the Massachusetts Military Reservation has been indefinitely postponed by the Department of Public Health until the minutes of the August 5, 1992 meeting pursuant to this topic have been fully examined by the DPH and the Army National Guard. I fully support this action and hope that it will lead to abolition of propellant bag burning at the military reservation altogether.

Elevated cases of lung cancer in residents living near Camp Edwards have been verified by the Upper Cape Boston University cancer study and the EPA considers DNT, a major propellant ingredient, to be a cancer causing agent. This entire matter has gone far beyond what was considered in the past to be routine actions on the part of the National Guard. Any further burning of bags on the reservation will only put the health of adjacent residents at risk and further jeopardize attempts by the National Guard to exist in accord with their Upper Cape neighbors. I realize the need for proper military training in propellant burning, but agree with those who have advocated burning less hazardous substances for these exercises.

Dr. Robert Knorr
August 20, 1992
Page 2

In the strongest possible terms, I urge you to work with the Massachusetts National Guard to establish a safe and feasible method of disposing of the leftover propellant increments that result from training at the Massachusetts Military Reservation.

Sincerely,


Edward P. Kirby
Senator

EPK:rm

cc:

Donald M. Lavimoniere, MMA
Richard Hugus, Alliance for Base Cleanup
Susan Nickerson, APCC
Robert Parady, Chmn. Bourne Board of
Selectmen
Christopher Whelan, Sandwich Exec. Secretary
Senator Henri S. Rauschenbach
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Demilitarization drives new recovery, treatment technology

The U.S. Government's plans to scale down the military has posed some tremendous challenges to the U.S. Dept. of Defense and the U.S. Dept. of Energy (DOD and DOE; Washington, D.C.). Both agencies are squeezed between the need to process huge quantities of explosives, rocket propellant, nuclear and chemical weapons, and environmental regulations forbidding such traditional approaches as burning and dumping. In response, alternatives to incineration and detonation are being developed, including techniques that can recover materials for military reuse and commercial sale. According to Lawrence Livermore National Laboratory (LLNL; Livermore, Calif.), which is developing recycling technology, 4-5 billion tons of high explosives, pyrotechnics and rocket fuel are sold in the U.S. each year.

Nuclear disarmament treaties have made weapons dismantling the primary activity at DOE's Pantex plant, near Amarillo, Tex., which will take apart some 2,000 weapons/yr over the next 10 years. Methods for recovering individual components are being developed by the laboratories that built them.

A much broader problem, recycling tons of old propellant from thousands of rockets, is the main objective of a five-year, \$62-million cleanup development program that ends in fiscal 1995. Over the next 10 years, roughly 100 million pounds of propellant must be recovered. Rocket propellant falls into two basic categories: class 1.3, for fire-hazards, and 1.1, for explosives. Currently, class 1.3 propellant—ammonium perchlorate (AP) with a polymer binder and aluminum powder—is washed from rocket motors by high-pressure waterjets, creating huge volumes of aqueous waste. Class 1.1 propellant—a mixture including HMX and RDX high explosives (nitramine compounds)—is disposed of by burning or blowing up the missiles.

Several recycling technologies (CE, Nov., 1991, pp 43-44E) are now in the prototype stage of development. A key issue for 1.3 material is whether it can be recovered in a form pure enough to reuse as propellant. In one recovery

process, being developed with the two major rocket builders, Gencorp. Aerojet (Sacramento, Calif.) and Thiokol Corp. (Brigham City, Utah), conventional techniques are first used to wash out propellant, from which AP is precipitated out. A test firing of reclaimed material was scheduled to take place in a Minuteman rocket motor in late July.

Another process, which separates and recovers 1 ton/d of either 1.3 or 1.1 propellant, will be piloted during the first half of next year by Hercules Aerospace Co. (Magna, Utah), under a \$10.7-million U.S. Army contract. Developed at the Army Missile Command's (Micom) Redstone Arsenal (Huntsville, Ala.), the process uses liquid ammonia to leach propellant from rockets at ambient temperature and about 115 psig, says William Melvin, a research chemist at Micom. The propellant is dissolved, undissolved solids are filtered, then the propellant is recovered by evaporating the ammonia.

For material that cannot be recovered, the final resort may be a "contained burn" now being developed in a Navy-sponsored program. Summarizing the process, the nozzle is first removed from a rocket, which is then fired inside a chamber. So far, rocket motors up to 200 lb have been test fired at the Weapons Div. of the Naval Air Warfare Center (China Lake, Calif.).

To destroy both 1.3 and 1.1 propellant, supercritical water oxidation (SWO) is also being tested on a scale of a few liters. A unit able to handle 250 lb/d is scheduled to start up in the spring of 1995, says Jimmy Cornette, chief of the Environmental Research Div. at the Air Force Armstrong Laboratory (Tyndall AFB, Fla.). The contractor is General Atomics (GA; San Diego, Calif.). GA is also developing a technique that uses liquid nitrogen to erode propellant from rocket motors, to avoid aqueous waste. The resulting crumbled propellant could be destroyed by SWO or fed to the Micom process.

The nuclear challenge

The structure of nuclear weapons makes it very difficult to recover their components. Typically, the weapons consist of a plutonium core or pit, surrounded by high explosives that initiate

the nuclear reaction. Electronic components are packaged separately.

Explosive, held together by a polymer binder, is in 10-to-30-lb cylindrical pieces that fit around the core. The first problem is breaking up these pieces without causing sparks or friction heat that might trigger an explosion, says Richard Hatfield, manager of LLNL's high-explosive lead laboratory program. LLNL plans to use high-velocity fluid jets to cut the cylinders into pieces of 1/2-in. or less, then dissolve the explosive in solvent to separate it from the binder.

At DOE's Pantex plant, microbes will be used to clean up RDX-contaminated water. At present, the RDX is adsorbed from water onto activated carbon, which is burned. In the new method, developed by the University of California at Los Angeles (UCLA), RDX is adsorbed by four carbon-packed columns, in series, then desorbed by an equal mixture of water and ethanol at 80° C. The liquid is fed through two packed columns containing microbes that degrade the RDX into nitrate and CO₂, says Mike Stenstrom, chairman of UCLA's Civil and Environmental Engineering Dept. UCLA will shortly deliver a 5 gal/min. pilot plant to Pantex.

Several processes for recovering valuable metals from the electronics packages in nuclear weapons, and at the same time vitrifying hazardous metals and destroying organics, are being tested by DOE's Sandia National Laboratories (Albuquerque, N.M.). All start by breaking the epoxy-encapsulated assemblies into small pieces. Then, in one method, the material is added to a bath of molten glass at 850-1,100°C. Heavy metals, such as lead and cadmium, are vitrified, while precious ones like gold, platinum and palladium remain in the metallic phase and may be recovered. By controlling the oxidation and reduction potential, copper and nickel recovery may also be possible, says Dale Blankenship, a senior member of the technical staff in the Weapons Waste Management Technology Dept. In another method, the material is subjected to a plasma torch at 10,000-12,000°F, to partition the hazardous metals into a nonleachable slag, and recover precious metals in an ingot.

HUMAN HEALTH EFFECTS of SPECIFIC CHEMICALS
Present at Stresau Laboratories, Spooner, Wisconsin

Antimony Sulfide (S_3Sb_2): Antimony is a chemical element that is normally used as an alloy with lead and other metals to increase their hardness, mechanical strength, corrosion resistance, and electrochemical stability. As an alloy, antimony is used in ammunition and cable sheathing. Antimony compounds are also used as fire retardants, vulcanizing agents, ammunition primers and fireworks. Antimony sulfide is a stable complex of antimony formed in the presence of sulfur. The OSHA TWA (time weighted average) standard for antimony sulfide is $0.5 (Sb) \text{ mg/m}^3$. Oral or inhalation exposure to antimony can cause anemia, intestinal disorders (stomach pain, vomiting or diarrhea) and heart problems (altered electrocardiograms).

Barium Chromate: Barium chromate is an insoluble chromate compound used as an activator and dipolarizer in fused salt batteries. Excessive exposure to chromate compounds can cause kidney damage and possibly birth defects. Inhalation of chromate dusts can cause ulceration and eventually perforation of the nasal septum, respiratory disorders such as asthma and lung cancer.

Barium Nitrate: Barium nitrate is an oxidizing compound. A lethal oral dose of barium nitrate in rats is 355 mg/kg. Poisoning from ingestion can result in gastroenteritis, muscular paralysis, decreased pulse rate, and ventricular fibrillation. The OSHA TWA (time weighted average) standard for barium nitrate is 0.5 mg (Ba)/m^3 .

Boron: Boron is one of a group of elements, such as lead and arsenic that affect the Central Nervous System.

Charcoal: Flammable solid. Health effects have not been well studied.

Cyclotetramethylenetetranitramine (HMX): Humans may be exposed in HMX by inhalation and dermal absorption when it is manufactured or incorporated into munitions at load, assembly, and pack facilities. There are no carcinogenicity studies found in the literature, therefore HMX is classified as an EPA group D (not classifiable as to human carcinogenicity). HMX is an explosive polynitramine that has been used to implode fissionable material nuclear devices to achieve critical mass, and as a components in plastic-bonded explosives, solid-fuel rocket propellants and in military munitions.

Cyclotrimethylenetrinitramine (RDX): Convulsions, fever dizziness, vomiting, neuromuscular irritability, and gastrointestinal symptoms. Classified as an EPA Group C (possible human carcinogen) contaminant. Used as high-impact explosives and rat poison. Non-carcinogenic (non-cancerous) effects in humans are convulsion, unconsciousness, amnesia. Animal studies demonstrated weight loss, testicular atrophy, vomiting, prostrate inflammation and kidney toxicity.

Ethyl Centralite: Persons affected by ethyl acetate had been exposed to vapors. The commonest change in the blood picture was the finding of immature neutrophils (shift to the left); in other cases there was a reduction in number of blood platelets and a macrocytic anemia.

No. 1 Fuel Oil: No. 1 fuel oil, the most widely used class of fuel oils, includes kerosene and JP-5 jet fuel. Exposure can occur by drinking contaminated water, by breathing vapors, or by skin contact. Breathing kerosene or JP-5 vapors can cause nausea, elevations in blood pressure, eye irritations, and nervous system effects that include headaches, light-headedness, anorexia, poor coordination, and difficulty concentrating. Long-term exposure can also cause kidney damage and blood clotting disorders.

Graphite: The OSHA TWA (time weighted average) standard for graphite is 15 mppcf (millions of particles per cubic foot). Toxicity information is limited.

Hexafluoropropylene: Hexafluoropropylene is a non-flammable gas. The 4 hour LC_{50} for hexafluoropropylene by inhalation exposure in the mouse is 750 ppm.

Hexanitrostilbene: No information available.

Lead: Lead enters the body through inhalation of the dusts, fumes, mists or vapors; by ingestion; or through the skin in the case of organic compounds of lead, as lead tetraethyl. When heated, lead compounds emit highly toxic fumes. Lead is a cumulative poison. Critical effects included neurotoxicity and kidney damage; lead is highly toxic to infants and pregnant women.

Lead Azide: Lead azide is classified as an "explosive A" and is also known as "initiating explosive lead styphinate". Health effects of this compound are not well known.

Lead Thiocyanate: No available information.

Lead Trinitroresorcinate: Lead trinitroresorcinate is classified as an "explosive A". Health effects of this compound are not well known.

Nitrocellulose: Human toxicity from drinking water and any other exposure has not been reported. Principle ingredient of propellants, smokeless powders, rocket fuel, mortar increments and some explosives. There is a lack of data on the terrestrial bioaccumulation data of nitrocellulose in the literature.

Nitroglycerin: Individuals exposed to nitroglycerin frequently suffer from: headache, dizziness, and postural weakness; acute poisoning, occurring especially in industrial workers: nausea, vomiting, abdominal cramps, headache, mental confusion, delirium, paralysis, convulsions, circulatory collapse, and even death. Most serious effect of chronic exposure is form of organic nitrate dependence; individuals without demonstrable vascular disease have died suddenly or developed myocardial infarctions after few days' break.

Polyisobutylene: Polyisobutylene is used for making microcapsules and plastic films and for the impregnation of paper-insulated power cables. Laboratory studies indicate that this compound is moderately carcinogenic.

Potassium Chlorate: Potassium chlorate is the potassium salt of chloric acid and is used as an oxidizing agent. The lowest concentration that causes death after oral exposure in rats is 7000 mg/kg. The threshold limit (TL_m) value for the aquatic toxicity of potassium chlorate ranges from 100 to 1000 ppm (parts per million).

Potassium Nitrate: Potassium nitrate is an oxidizing compound. Health effects are not well known.

Potassium Perchlorate: Potassium perchlorate, the potassium salt of perchloric acid, is used as an oxidizing agent. Health effects are not well known.

Sodium Stearate: Sodium stearate is the sodium salt of steric acid. The lowest dose causing causing death in mice is 400 mg/kg.

Sulfur: The threshold limit (TL₃, 96 hr) value for the aquatic toxicity of sulfur is greater than 1000 ppm.

Tetracene: No available information.

Tungsten: Recent studies have failed to indicate any serious toxic effect following the inhalation or ingestion of various tungsten compounds, although heavy exposure to the dust or the ingestion of large amounts of soluble compounds produces a certain rate of mortality in experimental animals.

1,3,5 - Triamino -2,4,6-Trinitrobenzene: No available information.

Vinylidene Fluoride: Vinylidene fluoride is a flammable gas. Health effects are not well known.

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Alternative

Technologies

for the
Destruction of
Chemical Agents
and Munitions

**COMMITTEE ON ALTERNATIVE CHEMICAL
DEMILITARIZATION TECHNOLOGIES**

BOARD ON ARMY SCIENCE AND TECHNOLOGY

COMMISSION ON ENGINEERING AND TECHNICAL SYSTEMS

NATIONAL RESEARCH COUNCIL

**National Academy Press
Washington, D.C. 1993**

NOTICE: The project that is the subject of this report was approved by the Governing Board of the National Research Council, whose members are drawn from the councils of the National Academy of Sciences, the National Academy of Engineering, and the Institute of Medicine. The members of the committee responsible for the report were chosen for their special competencies and with regard for appropriate balance.

This report has been reviewed by a group other than the authors according to procedures approved by a Report Review Committee consisting of members of the National Academy of Sciences, the National Academy of Engineering, and the Institute of Medicine.

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06/00

MEMORANDUM

DATE: May 18, 1992

FROM: Jay Goldring, Ph.D., Toxicologist
Chronic Disease and Health Assessment Section 

TO: Marty Herrick
DNR, Bureau of Solid Waste Management, SW/3

SUBJECT: Badger Army Ammunition Plant: RCRA Part 3 Permit

I have completed my review of the Badger Army Ammunition Plant RCRA Part 3 Permit. The purpose of the permit is to allow burning of up to 2,500 lbs per day of propellants in open dishes on the site. A health risk assessment performed by Eder and Associates of Madison is included in the permit. The risk assessment assumes that the two chemicals of concern, lead and dinitrotoluene, will be emitted from the proposed burning operations. I am not qualified to evaluate the modelling procedure used by Eder and Associates. However, assuming that their modeling procedure is accurate, I agree with the conclusions that the potential health risks posed by the proposed burning operation are negligible.

However, I am concerned about the proposed amount of lead emissions. Data contained in the "Draft Interim Final Remedial Assessment" of 1989 (containing data collected by Metatrace) indicates that past burning practices have already contaminated surface soil with lead. However, I am not aware of any analysis of surface soil which associate the rate at which lead concentrations decrease with increasing distance from the burning pads. Such data would be helpful in evaluating the accuracy of their model and should be included in the permit application.

In addition, if Badger personnel were to burn the full amount allowed them under the permit and if all of the material burned were AA2 (consisting of 1.5% lead), the facility would emit approximately 13,688 lbs/year of lead. According to 1990 Toxic Release Inventory data, this emission rate would make Badger the second-highest emitter of lead in Wisconsin.

A potential solution for this problem would be to issue two separate permits: one for non-lead containing propellants and one for lead-containing propellants. Another possibility would be to specify the total amount of lead which could be emitted by the facility. If you or the Bureau of Air Management decide to pursue either of these ideas, I would be happy to provide any assistance you may need.

Thank you for including my input in your review of the permit application.

cc: Mike Ross, DNR, AM/10
Meg Ziarnik, BPH

OPEN BURNING OF PROPELLANTS

The potential for increased risk of cancer in workers and residents

The legacy of fifty years of military activity at the Badger Army Ammunition Plant has damaged the environment and jeopardized the health of the community. Of the 40 contaminated military sites in Wisconsin, the Defense Environmental Restoration Agency has cited Badger as the most contaminated; 32 areas within the plant are polluted with high levels of solvents, toxic metals and explosive wastes. Environmental cleanup costs are expected to exceed \$250 million.

The Propellant Burning Ground, located at the south end of the Badger Army Ammunition Plant, was used between 1942 and 1983 for open burning of waste explosives, propellants and waste process chemicals. During production, these burnings took place almost daily, producing a "ball of fire" visible from several miles away.

In 1990, in response to community concerns about exposure to pollution from Badger, the Wisconsin Division of Health conducted a health survey. The study confirmed that communities near the Badger plant have a significantly higher incidence of cancer deaths. The incidence of female non-Hodgkin's lymphoma and male kidney/ureter cancer deaths are 50% higher than the balance of the State. Despite these alarming findings, the State refused to take any subsequent action.

In 1995, the Division of Health finally responded to pressure from CSWAB and agreed to reopen the community health study. The following document was presented to the Wisconsin Division of Health to support inclusion of lung and breast cancers in this new study.

Citizens for Safe Water Around Badger
E12629 Weigand's Bay South Merrimac WI 53561 (608) 643-3124
November 1995

file copy

E12629 Weigand's Bay South
Merrimac, Wisconsin 53561
Phone (608) 643-3124

Ms. Beth Fiore
Wisconsin Division of Health
1414 East Washington
PO Box 309
Madison, WI 53701-0309

November 2, 1995

Dear Ms. Fiore,

We are pleased that the Division has agreed to look at 1980-93 incidence rates of cancers among residents living near the Badger Army Ammunition Plant. In addition to investigating liver, kidney, and non-Hodgkin's lymphoma cancers, we request the Division of Health include **breast and lung cancers** in its analysis. We believe it is reasonable to expect that the community may be at increased risk for these cancers and submit the following:

1. **Gunning for Lead.** This limited, but pertinent study demonstrated a correlation between elevated blood lead levels and exposure to lead-contaminated dust in indoor firing ranges.
2. **The Open Burning Issue: Cancer.** The Commonwealth of Massachusetts commissioned Boston University Professor David Ozonoff to perform an epidemiological study to determine whether local environmental contamination was a factor in the elevated cancer rates found in the community. A significant finding of this report was a dose response relationship between residence proximity to the nearby artillery training area, where propellant bags were burned, and the risk of **lung and breast cancer**. The identified contaminant of concern was **2,4-DNT**.
3. **Tooele County Incidence of Lung Cancers.** Over the years, open detonation and burning has been used for the disposal of military propellants, explosives and pyrotechnics at Tooele Army Depot in Utah. Although the *Utah Cancer Report*, a publication of the Utah Cancer Registry, reports the state of Utah has some of the lowest cancer rates in the U.S., a comparison of cancer rates shows the incidence of **lung cancers** in Tooele County, home of the Tooele Army Depot, is well above the State average from 1966 to 1990.

4. **Incineration of explosives poses threat to atmosphere.** An extensive study, conducted by scientists from the Weizmann Institute of Science in Israel, and the University of Florida found that burning common explosives produces toxic gases such as nitric oxide and carbon monoxide. According to the report, open-air detonation causes serious contamination of the surrounding environment.

5. **'Bang Box' tests.** In an attempt to measure and identify emissions from the burning of propellants, Sandia National Lab conducted the so-called "Bang Box" tests. Emission factors from these tests included toxic and carcinogenic substances such as carbon monoxide, methane, benzene, **2,4 dinitrotoluene**, **2,6 dinitrotoluene**, and nitrogen oxides.

6. **Badger Army Ammunition Plant.** Of all the areas at Badger, the propellant burning ground is the most contaminated. Surface soils contain hazardous amounts of lead as high as 3,300 mg/kg; contamination of DNT's, phthalates and diphenylamine is widespread (up to 47,000 ppm **2,4-DNT** and 86,000 ppm di-n-butyl phthalate) at or near the surface and at depth (920 ppm **2,4-DNT** and 97 ppm **2,6-DNT**). The impact of years of open burning and disposal of military waste is evidenced by the tremendous devastation to the surrounding environment.

There is little doubt residents living near the Badger Army Ammunition Plant have been exposed to emissions and particulates from years of open burning of propellants. The Propellant Burning Ground, located at the south end of the Badger Army Ammunition Plant, was used between 1942 and 1983 for open burning of waste explosives, propellants and waste process chemicals. During production, these burnings took place almost daily, producing a "ball of fire" visible from several miles away. Recent air dispersion modeling in Badger's RCRA permit application, confirms pollutants from open burning readily migrate beyond the plant boundary.

7. **Overview of the Health Effects of Selected Munitions Chemicals** published by the USEPA and the Department of the Army, reports:

"DNT is classified B2 (probable human carcinogen) and thus a Lifetime HA is not recommended. The cancer potency is associated with hepatocellular and mammary gland carcinogenic activity in rats after **2,4-DNT** treatment. **2,4-DNT** also may be a promoter." "There is some evidence which suggests that **2,6-DNT** has both initiation and promotion activity and, therefore, may be a complete carcinogen."

In summary, we believe there is ample evidence that the residents living near the Badger Army Ammunition Plant have been exposed, over many years, to air-borne contaminants from open burning activities at Badger, and these contaminants are probable human carcinogens. The evidence of this contamination is found in and around the source of these burning activities, the Propellant Burning Grounds. The dispersal of DNT's and lead to the air and the surrounding environment from open burning of propellants at military facilities is well documented. At least two previous epidemiological studies suggest a correlation between elevated lung and breast cancer rates and proximity to open burning activities. Federal agencies, including the USEPA,

report DNT is a probable human carcinogen and have further linked this munitions chemical to breast cancer in laboratory animals.

Moreover, we believe a study that is inclusive of breast and lung cancers will not only benefit the residents living near the Badger plant -- it will contribute to the body of knowledge that we have just begun to build; the health effects of munitions chemicals on workers, soldiers and community members is largely unknown. We believe there is great value to this endeavor, both to this community and other communities across the country that daily struggle with the environmental legacy of the Cold War.

Thank you for your consideration of this letter and the information we have enclosed.

Sincerely,

copy

Laura Olah
Executive Director

Enclosures.

(I included 50+ pages
of supporting documents
in enclosure)

'Gunning for Lead'
Association between lead exposure and Kidney Cancers

Citizens for Safe Water Around Badger
E12629 Weigand's Bay South Merrimac WI 53561 (608) 643-3124

Poison, Pb

Poison

"Gunning for Lead" (Continuum, *Omni* 12/3:44, December 1989). Police trainees, competitive shooters and others who spend an hour or more a week at an indoor firing range are at high risk for lead poisoning, a recent study indicates. Lead from bullets pollutes dust in the air, which shooters inhale. Blood lead levels were measured in 17 police recruits who had spent up to an hour every four days firing pistols at an indoor range. Fifteen had lead levels well beyond what is considered safe. Though none complained of serious problems, the recruits were at high risk for lead poisoning's symptoms: slowing of reaction time, loss of coordination and damage to the central nervous system. Firing range operators could get the lead out by improving ventilation and by requiring the use of bullets "jacketed" with copper. ■

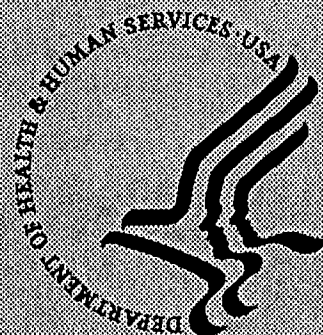
UPDATE
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UPDATE

**Toxicological
Profile
for**

LEAD

U.S. DEPARTMENT OF HEALTH & HUMAN SERVICES
Public Health Service
Agency for Toxic Substances and Disease Registry

TP-92/12



2. HEALTH EFFECTS

selection criteria were used in order to minimize the effects of other potential genotoxic factors, such as smoking, drinking, viral diseases, exposure to medical X-rays, chelation agents, or use of medications with known clastogenic effects. A common problem in these occupational studies is concurrent exposure to many other agents in the occupational environment.

Occupational exposure to lead is associated with increased mitotic activity in peripheral lymphocytes, increased rate of abnormal mitosis (Forni et al. 1976; Sarto et al. 1978; Schwanitz et al. 1970), and increased incidence of chromosomal aberrations (Al-Hakkak et al. 1986; Forni et al. 1976, 1980; Nordenson et al. 1978; Schwanitz et al. 1970) at blood lead levels ranging from 22 to 89 $\mu\text{g/dL}$. While a positive correlation between blood lead levels and the frequency of chromosomal aberrations has been reported (Nordenson et al. 1978), most of the available data on occupationally exposed workers show no increase in the frequency of chromosomal aberrations when blood lead levels ranged from 38 to 120 $\mu\text{g/dL}$ (Bauchinger et al. 1977; Maki-Paakkanen et al. 1981; O'Riordan and Evans 1974; Schmid et al. 1972; Schwanitz et al. 1975) or in environmentally exposed children with blood lead levels of 12–33 $\mu\text{g/dL}$ (Bauchinger et al. 1977).

Other genotoxicity studies are discussed in Section 2.4.

2.2.1.8 Cancer

The information available that has examined the association of occupational exposure to lead with increased cancer risk is generally limited in its usefulness because the actual compound(s) of lead, the route(s) of exposure, and level(s) of lead to which the workers were exposed were not reported. Furthermore, potential for exposure to other chemicals including arsenic occurred, particularly in lead smelters, and smoking was a possible confounder (Cooper 1976; IARC 1987). These studies, therefore, are not sufficient to determine the carcinogenicity of lead in humans, and the following discussion is restricted to the most comprehensive of these studies.

The most extensive was a series of reports of a large number of workers at 6 domestic lead production plants (smelters and recycling plants) and 10 battery plants (Cooper 1976; Cooper and Gaffey 1975). Increased incidences of total malignant neoplasms were observed for both categories of lead workers, but the increase was statistically significant only for lead production workers. The increase in total malignancies appeared to be due to small, statistically nonsignificant increases in digestive and respiratory tract tumors (evident in both the lead production and battery workers) and urinary tract tumors (in production workers). In a statistical reanalysis of the Cooper and Gaffey (1975) data, Kang et al. (1980) determined that the incidence of total malignant neoplasms, cancers of the digestive tract, and cancers of the respiratory tract were statistically elevated in both lead production workers and battery workers.

In a follow-up to the original study, Cooper (1981) reported that lead had no cancer-inducing properties, although standard mortality ratios (SMRs) of 125–149% for total malignant neoplasms, 172% for respiratory cancer, and 229% for cancers of other sites were reported in battery workers. In a recent evaluation of a more select subset from the original study, Cooper et al. (1985) reported increased SMRs for total malignancies in both groups of workers (statistically significant only in the battery workers) attributed to digestive and respiratory cancers. These small excesses of cancer deaths could not be correlated with onset, duration, or level of exposure. In addition, no adjustments could be made for other concomitant industrial exposures or for smoking. The attributable risk of smoking could easily explain the small increase in respiratory cancer in an industrial cohort that contained an excess of heavy smokers. Also, a marginally significant increase in digestive tract cancer in acid-lead battery workers was observed

2. HEALTH EFFECTS

during the early years of lead exposure (when lead levels were presumably higher than in later years) (Fanning 1988; Malcolm and Barnett 1982).

In a retrospective cohort mortality study of primary lead smelter workers, an SMR of 204% for mortality from renal cancer was calculated (Selevan et al. 1985). Although the results were not statistically significant because of small numbers, the study is of interest because animal studies associate lead exposure with kidney cancer (see Section 2.2.2.8). In addition, two cases of renal cancer have been reported in occupationally exposed men who had symptoms of lead poisoning and high blood lead levels (Baker et al. 1980; Lilis 1981). In one case, the tumor was reported to contain a high level of lead and to have histopathological characteristics similar to those of kidney tumors induced by lead in animals (Baker et al. 1980).

In a study of cancer incidence in workers exposed to tetraethyl lead, a statistically significant association was found between exposure to this compound and rectal cancer (odds ratio = 3.7; 90% confidence limits of 1.3-10.2) (Fayerweather et al. 1991). The odds ratio increased four times at the high-to-very high cumulative exposure level, demonstrating a dose-response relationship. When a 10-year latency was assumed, the association became even more pronounced. No increases in the incidence of cancer at other sites (i.e., brain, kidney, lung, spleen, and bone) were observed in the exposed workers. Despite the strength of the association and the appearance of a dose-response relationship for the effect, the authors of this study caution against assigning any causal relationship to these findings. They explain that the increase in rectal cancer observed in this study may be explained by other causal mechanisms or non-causal mechanisms (such as statistical and methodological bias or chance).

2.2.2 Inhalation Exposure

2.2.2.1 Death

Deaths associated with occupational exposure to inorganic lead (which is predominantly by the inhalation route of exposure) are discussed in Section 2.2.1.1. No studies were located regarding death in animals after inhalation exposure to inorganic lead.

2.2.2.2 Systemic Effects

No studies were located regarding cardiovascular, gastrointestinal, musculoskeletal, or dermal/ocular effects in humans or animals after inhalation exposure to inorganic lead.

Respiratory Effects. No studies were located regarding respiratory effects in humans after inhalation exposure to inorganic lead. See Section 2.2.1.2 for a discussion of the respiratory effects of lead in humans after multi-route exposure.

Lung weights in mice continuously exposed to lead nitrate at a concentration of 1.6 mg lead/m³ for 28 days were slightly but significantly elevated. The lungs from these mice appeared hemorrhagic at necropsy. These effects were most likely due to pulmonary edema resulting from an irritative response to the inhalation of lead aerosol for 28 days (Hillam and Ozkan 1986). Increased lung weight and hemorrhage were not observed in the lungs of mice similarly exposed for 14 days, indicating that the effects observed in mice exposed for 28 days were exposure duration dependent (Hillam and Ozkan 1986). This LOAEL is presented in Table 2-2 and plotted in Figure 2-1.

2. HEALTH EFFECTS

Monkeys given daily doses of 1 or 5 mg of lead by intubation for 12 months showed only minor chromosome aberrations such as chromatid and chromosome gaps and fragments at the beginning of the experiment. After 7 months of exposure, more severe aberrations (translocations and dicentrics) appeared in the lymphocytes. However, no statistically significant difference in severe aberrations between the exposed monkeys and the controls was ever seen. Lead treatment did produce a significant increase in the number of gaps, but this was not related to dose or to measured blood lead level (Jacquet and Tachon 1981). An earlier chronic study on monkeys given lead acetate in the diet 6 days a week for 16 months showed that severe chromosome abnormalities occurred only in animals given a calcium-deficient diet (Deknudt et al. 1977).

Other genotoxicity studies are discussed in Section 2.4.

✓ 2.2.3.8 Cancer

No studies were located regarding cancer in humans after oral exposure to inorganic lead. See Section 2.2.1.8 for a discussion of cancer in humans following multi-route exposure to lead.

The available data on the carcinogenicity of lead following ingestion by laboratory animals indicate that lead acetate and lead phosphate are carcinogenic, and that the most common tumor response is renal tumors. However, the extremely high cumulative doses of lead used in these studies are difficult to extrapolate to low-level exposure in humans, and thus do not provide a sufficient basis for quantitative risk assessment (see Section 2.4). In addition, it is possible that the high doses required to induce renal tumors may themselves have produced a carcinogenic effect that was independent of any direct effect of lead as a result of nonspecific tissue damage. Furthermore, the relevance of male rat kidney tumors induced by some chemicals to humans has been questioned (EPA 1991c). It is not known whether the mechanism by which lead induces tumors in the rat kidney involves the same or similar species-specific proteins (α_{2u} -globulin) identified in the recent studies of other substances, such as unleaded gasoline (see Section 2.9.3 for a discussion of ongoing research designed to answer this question). Other deficiencies associated with these animal studies that limit their usefulness with respect to risk assessment include the fact that they are generally over 10 years old with small group sizes and poor reporting of results.

The most comprehensive set of studies was performed by Azar et al. (1973), who administered lead acetate to rats for 2 years. Renal tumors occurred in 5 of 50 male rats that received 27 mg lead/kg/day, in 10 of 20 males that received 56.5 mg lead/kg/day, and in 16 of 20 males and 7 of 20 females that received 105 mg lead/kg/day. No renal tumors were observed in the control groups or in rats administered 0.9–7 mg lead/kg/day. Limitations associated with this study include the following: experimental details were not reported, the likelihood of environmental contamination from lead in the air or drinking water was not mentioned, and the strains of rats used were not specified. Body weight gain in the two highest dose treatment groups was reported to be depressed, but no details were given regarding this finding.

Male Sprague-Dawley rats were administered lead acetate equivalent to 37 mg lead/kg/day in their drinking water for 76 weeks as part of a study to determine interactions between sodium nitrite, ethyl urea, and lead. There were no kidney tumors in the 10 control rats. Renal tubular carcinomas were found in 13 (81%) of the 16 treated rats. Three of these tumors were detected at 72 weeks and the remaining were found at terminal necropsy (Koller et al. 1985).

An increased incidence of renal tumors (7 out of 25 combined adenomas and carcinomas) was observed in male Swiss mice fed 0.1% basic lead acetate in the diet for 2 years (Van Esch and Kroes 1969). No

2. HEALTH EFFECTS

renal tumors were found in the control animals. One female in the 1.0% treatment group had a renal tumor. The authors attributed the low tumor incidence in the 1.0% group to early mortality.

The cancer effects levels described above are recorded in Table 2-4 and plotted in Figure 2-2.

2.2.4 Dermal Exposure

No studies were located regarding the following effects in humans or animals after dermal exposure to inorganic lead. See Section 2.2.1 for a discussion of these effects in humans following multi-route exposure to lead:

- 2.2.4.1 Death
- 2.2.4.2 Systemic Effects
- 2.2.4.3 Immunological Effects
- 2.2.4.4 Neurological Effects
- 2.2.4.5 Developmental Effects
- 2.2.4.6 Reproductive Effects
- 2.2.4.7 Genotoxic Effects

Genotoxicity studies are discussed in Section 2.4.

2.2.4.8 Cancer

No adequate studies were located regarding cancer in humans or animals after dermal exposure to inorganic lead. See Section 2.2.1.8 for a discussion of cancer in humans following multi-route exposure to lead.

2.3 TOXICOKINETICS

2.3.1 Absorption

2.3.1.1 Inhalation Exposure

Inorganic Lead. Prior to the actual absorption of lead by the lungs, some fraction of inhaled airborne lead must be deposited in the respiratory tract. The rate of deposition of particulate airborne lead in adult humans is approximately 30–50% and is modified by factors such as particle size and ventilation rate (EPA 1986a). Once deposited in the lower respiratory tract, particulate lead is almost completely absorbed, and all chemical forms of lead also appear to be absorbed (EPA 1986a; Morrow et al. 1980). After subjects breathed lead chloride, with a mass median aerodynamic diameter (MMAD) of 0.26 μm , and lead hydroxide, with an MMAD of 0.24 μm , through a standard respiratory mouthpiece for 5 minutes, 23% and 26%, respectively, of the aerosol was deposited in the lungs and respiratory tract (Morrow et al. 1980).

Absorption is suggested by elevated blood lead concentrations in subjects who were continuously (23 hours per day) exposed to 0.0032–0.011 mg lead/m³ for 18 weeks (the species of lead to which the subjects were exposed was not specified) (Griffin et al. 1975b). Elevated blood and urinary lead concentrations were also found in volunteers exposed to 0.15 mg lead/m³ for 7.5 hours per day, 5 days per week for 16–112 weeks (Kehoe 1987). Blood lead concentrations as high as 45 $\mu\text{g/dL}$ were observed in one subject exposed at that rate for 2 years. Daily lead absorption of 14 μg was reported for five male volunteers who inhaled ambient air (0.002 mg lead/m³) (Rabinowitz et al. 1977). Some evidence for complete absorption of lead

ELFS
1993
Super BAP

TABLE 3-6
PRELIMINARY REMEDIATION GOALS
PROPELLANT BURNING GROUND SURFACE SOILS

FEASIBILITY STUDY
BADGER ARMY AMMUNITION PLANT

COMPOUND	MAXIMUM CONCENTRATION DETECTED (mg/kg)	MAXIMUM BACKGROUND CONCENTRATION ¹ (mg/kg)	ACCEPTABLE ARAR-BASED CONCENTRATION ² (mg/kg)	ACCEPTABLE RISK-BASED CONCENTRATION ³ (mg/kg)	PRELIMINARY REMEDIATION GOAL (mg/kg)	RATIONALE
CU	2,700	100	--	0.015	100	Background
HG	7.7	0.38	--	0.03	0.38	Background
✓ PB	3,300	30	1,000	0.0054	30	Background
SE	2.03	0.7	--	0.00045	0.7	Background
ZN	5,200	81.26	--	2.5	81.26	Background

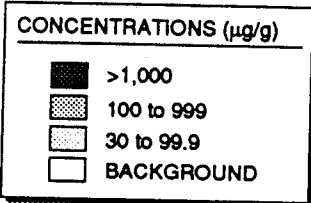
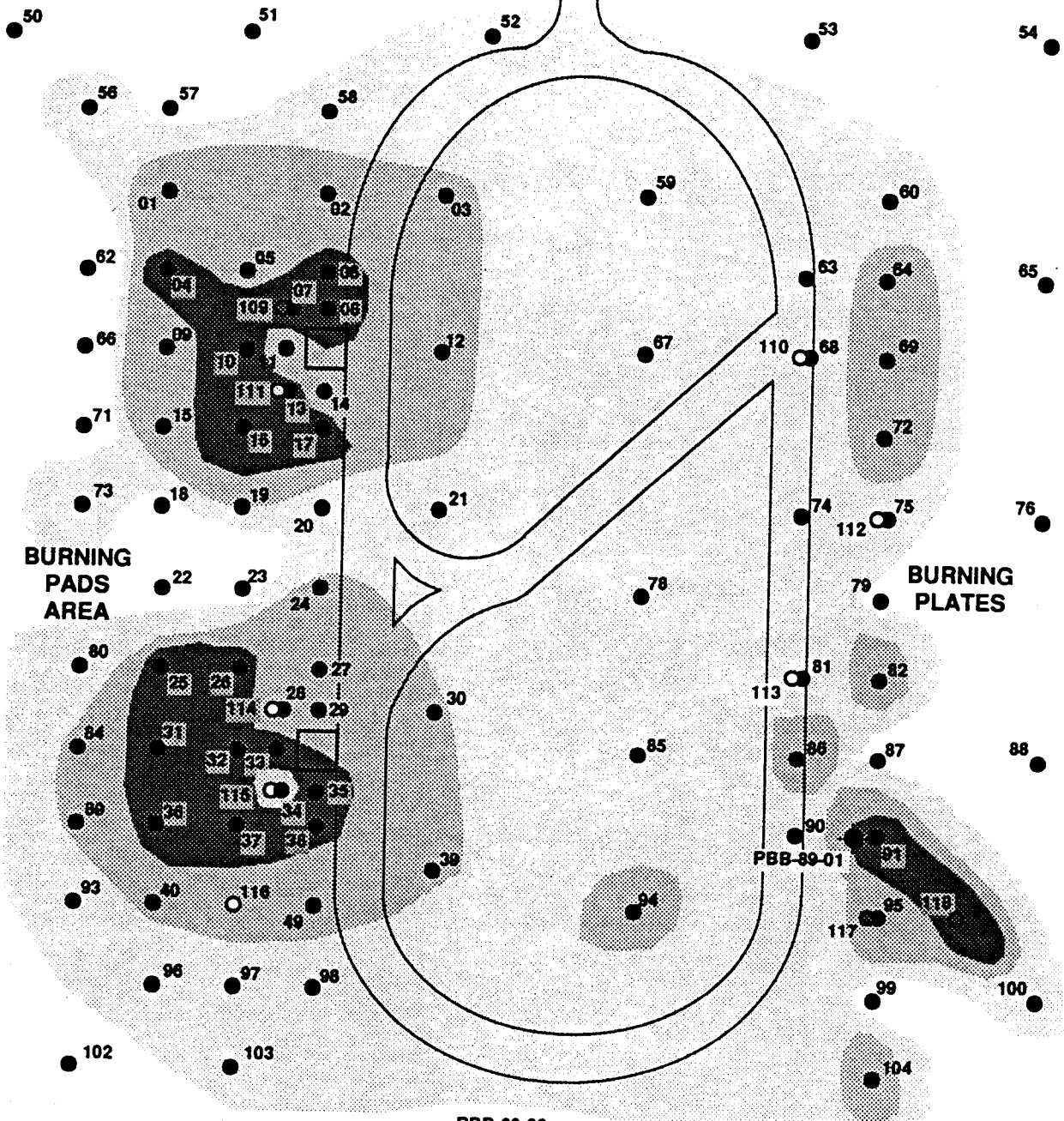
Notes:

- ¹ Maximum background concentrations are the high end of the range of either the BAAP or the regional background concentration presented in the Final Remedial Investigation Report, whichever is greatest (ABB-ES, 1993a).
- ² Only compound with ARAR-based concentration is PB. ARAR for PB is Interim Guidance on Establishing Soil Lead Cleanup Levels at Superfund Sites. OSWER Directive #9355.4-02, September 1989.
- ³ Acceptable risk-based concentration is result of ecological risk evaluation for terrestrial receptors. Other than PB, there is no significant risk to human health from these compounds.

mg/kg = milligrams per kilogram
ARAR = Applicable or Relevant and Appropriate Requirement

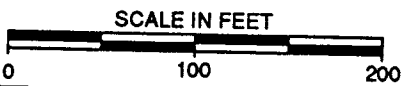
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LEGEND

- SURFACE SOIL SAMPLE LOCATION (PBS-91-01)
- SUBSURFACE SOIL SAMPLE LOCATION (PBS-91-109)
- ⊙ SOIL BORING LOCATION (PBB-89-01)
- APPROXIMATE SIZE OF CONCRETE BURNING PADS



NOTES:
 1. SEE REMEDIAL INVESTIGATION REPORT FOR CHEMICAL DATA SUMMARY (ABB-ES, 1993a).
 2. SAMPLE LOCATIONS 41-48 ARE LOCATED OFF THE GRID IN THE CONTAMINATED WASTE AREA.
 SOURCE: MODIFIED FROM FIGURE 4-12 OF TSAI ET AL., 1988.

**FIGURE 3-9
 INTERPRETIVE PB DISTRIBUTION
 IN SURFACE SOILS
 AT THE RACETRACK AREA
 PROPELLANT BURNING GROUND
 FEASIBILITY STUDY
 BADGER ARMY AMMUNITION PLANT
 ABB Environmental Services, Inc.**

'The Open Burning Issue: Cancer'

**Dose Response relationship between residence proximity to artillery training
and the risk of Lung and Breast Cancer**

Citizens for Safe Water Around Badger
E12629 Weigand's Bay South Merrimac WI 53561 (608) 643-3124

THE OPEN BURNING ISSUE:

CANCER

A few years ago residents of north-west Cape Cod, Massachusetts (the Upper Cape), discovered that their area had elevated rates of some types of cancer, and they convinced the Commonwealth of Massachusetts to conduct a study. The state commissioned Boston University Professor David Ozonoff to perform an epidemiological study to determine whether local environmental contamination was a factor in the cancer rate.

The area hosts the 21,000-acre Massachusetts Military Reservation, including the Camp Edwards Army National Guard Base and the former Otis Air Force Base. The area is also a fragile ecosystem, located over a sole-source aquifer.

Over the years groundwater in the area has been contaminated with carcinogens such as trichloroethylene (TCE), perchloroethylene (PCE), and other volatile organic compounds. The full extent has not yet been mapped, but the Army has had to provide alternate water supplies in areas where well water is now unsafe. In addition, the Army has routinely burned artillery propellant bags, containing 2,4-dinitrotoluene (DNT), another probable cancer-causing substance, during on-site training.

The Boston University study found an approximate two-fold increase in the risk of brain cancer among Upper Cape residents who consumed public water, compared to similar populations elsewhere. There was a

fairly strong relative risk of brain cancer for people who lived near the Air Force runways or the Barnstable County airport. There also appeared to be a link between leukemia and perchloroethylene (PCE) in the water distribution system.

Most important, Ozonoff found a dose response relationship between residence proximity to the artillery training area, where the propellant bags are torched, and the risk of lung and breast cancer. He concluded that persons who had lived for a long time within two kilometers of the artillery sites had a significantly elevated lung cancer rate.

The Greater Boston chapter of Physicians for Social Responsibility (GBPSR), working with the Association for the Preservation of Cape Cod and the National Toxics Campaign Fund, is attempting to permanently halt the practice. We and our allies have repeatedly forced back the Army's proposed date to resume burning 2,4-DNT.

In response to public pressure, the Army and the Massachusetts Department of Environmental Protection and Public Health designed a study in which large, measured quantities of propellant were to be burned openly to determine the dose received by the local population. However, the study would have exposed large numbers of people to additional contamination while adding little to the understanding of

the risks. The Alliance for Base Cleanup asked the Department of Environmental Protection to hold a public meeting to discuss the open burning and the proposed study.

At the meeting, attended by more than two hundred citizens, GBPSR warned that the public near Camp Edwards would be used as experimental subjects without their informed consent. In reporting the meeting, the *Boston Globe* told of another type of combustion, a "firestorm of public opposition." The Department has since decided to delay further burning while officials reconsider their options.

The regional director of the Federal EPA has stated that his agency considers the burning of excess 2,4-DNT an Army training activity, not hazardous waste disposal subject to RCRA (the Resource Conservation and Recovery Act). It is important, in the implementation of the just passed Federal Facilities Compliance Act, that such wastes be regulated like other hazardous wastes.

GBPSR believes that the Boston University study was limited by the size of the affected population. So it identified another site with a history of propellant burning, the Dugway Proving Ground in Tooele County, Utah. GBPSR has already discovered that Tooele has a significantly higher lung cancer rate than the rest of Utah.

Jefferson Dickey, MD, Greater Boston Physicians for Social Responsibility, 60 Atherton St., Somerville, MA 02143 • 617/625-7624.

National Toxics Campaign Fund
Military Toxics Project
1168 Commonwealth Avenue
Boston, MA 02134-4634



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Oct 13 '89
 Cape Cod Times
Cancer rates rose in '89

Analysis shows Upper Cape trend continuing

By GWENN FRISS
 STAFF WRITER

The Upper Cape's cancer problem continued in 1989, with women 58 percent more likely to contract the disease than their counterparts in the rest of the state, according to unofficial figures computed by a local activist.

The cancer rate for Upper Cape men in 1989 was 21 percent above state average. Overall, the Upper Cape rate was 39 percent above average in 1988 and 38 percent above average in 1989. Since the state began compiling cancer statistics in 1982, rates in

the five-town area — Barnstable, Bourne, Falmouth, Mashpee and Sandwich — have been above the state average.

From 1982 to 1989, the Upper Cape's cancer rate was 23 percent above state average: There were 29 percent more cases of cancer in Upper Cape women than expected; the cancer rate for men was 17 percent higher than normal.

Women in Falmouth were 79 percent more likely to contract cancer in 1989 than women in the rest of the state.

"From 1982 to 1989, we're talking about 900 extra cases on the Upper Cape. It's just a terrible, ter-

rible tragedy, whatever the cause," said Joel Feigenbaum of Sandwich. "If a hurricane caused this kind of destruction, it would be worldwide news."

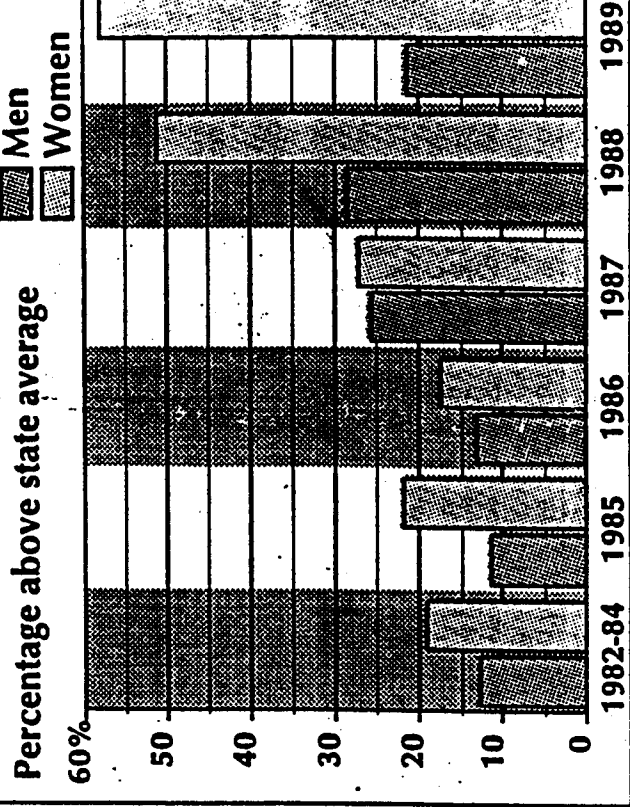
Since cancer is more likely to strike the elderly, the number of cases that would be expected in a community is figured based on the total number of cases in the state and the age of people living there.

By town, the 1989 cancer rate in Falmouth was 55 percent above state average, up from 34 percent above state average in 1988; in Barnstable, 44 percent above aver-

Please see **CANCER/A-12**

See over

UPPER CAPE CANCER RATES 1982-1989



Source: Joel Feigenbaum

Staff chart by JAMES WAR

CANCER

Continued from A-1

age, up from 43 percent in 1988; in Mashpee, 34 percent above average, down from 47 percent in 1988; in Bourne, 22 percent above average, down from 48 percent in 1988; in Sandwich, 2 percent below state average, down from 14 percent above state average.

Feigenbaum, a mathematics professor at Cape Cod Community College who holds a doctorate in theoretical physics, calculated the rates using census figures and the number of cancer cases reported to the state cancer registry.

A founder of the Upper Cape Concerned Citizens, Feigenbaum has pushed state officials to study the cancer rates and possible links to pollution at the Massachusetts Military Reservation, the 21,000-acre military base on the Upper Cape. Dozens of hazardous-waste dumping sites have been identified on the base, which is now a federal Superfund site.

The Massachusetts Cancer Registry, part of the state Department of Public Health, has not yet calculated each community's 1989 rates.

They will be released sometime in the coming year, in a book reporting 1982-89 rates for the state, a department spokesman said.

Feigenbaum, who spent weeks seeking the proper census information and producing dozens of charts comparing the 1989 rates to those of previous years, is angry that state officials are not pushing to get those cancer rates out faster.

But state public health officials say a single year's data reveals little, other than to support the trend developing over the past seven years.

"I would expect that the 1989 numbers would show the same thing, that there is still an excess cancer situation on the Upper Cape. And I would predict it is the same things we saw before — especially increases in lung and prostate cancer," said Robert Knorr, deputy chief of the Massachusetts Department of Public Health's assessment department.

"The more data you have, the more stable your numbers are," Knorr said. "We're able to get a better idea of the true cancer rate. But you're not going to see a big change overnight unless there's human error (in collecting data) or

some statistical fluke. That's not the way the disease works."

According to Feigenbaum's calculations, from 1988 to 1989 the region's excess lung cancer rate increased 9 points among women — from 32 percent above average to 41 percent above average — and 11 points among men, from 6 percent above average to 17 percent above average.

Prostate cancer decreased slightly in that time, from 46 percent elevation to 41 percent.

Most cancers develop over 20 years or more; while leukemia can show up in five years, lung cancer takes two decades or more after the person is exposed to carcinogens.

Therefore, Feigenbaum argues that rising cancer rates in the 1980s point to environmental factors in the mid- to late 1960s — when activities at the Upper Cape military base, then an active Air Force base, were at their peak.

Traditionally, men have been more likely to get cancer than women, because, in the past, they were more likely to smoke or be exposed to hazardous chemicals in the workplace.

With \$500,000 from the state,

Boston University's School of Public Health studied the life, work and residential histories of a group of Upper Cape cancer patients and compared them to a similar group that did not get cancer.

The study, released early this year, found that people were somewhat more likely to get cancer if they lived near air base runways or cranberry bogs; swam in Johns Pond (which has since tested clean for chemicals); or lived near positions where heavy guns are fired on the base.

Several follow-up efforts were launched. Public health officials want to test-burn artillery propellant to ensure that no carcinogens are released. The Ashumet Valley Property Owners Association in Falmouth says a test on the Upper Cape is needed to answer the question conclusively.

But pressure from several other community groups — including the Alliance for Base Cleanup, Responsible Environmental Protection for Sandwich and the Association for the Preservation of Cape Cod — has caused officials to seek an isolated site off-Cape for the burn.

Panel suggests changes in federal health study

Agency to give response tonight

By WILLIAM MILLS
STAFF WRITER

Members of a local advisory group have raised questions about the design of a federal health study scheduled to begin today in the Upper Cape and Brewster.

The Agency for Toxic Substances and Disease Registry, an arm of the U.S. Public Health Service, is conducting a two-part study of 400 neighbors of the Massachusetts Military Reservation, which contains 77 hazardous-waste sites. About 200 residents of Brewster will also be studied for comparison.

On Monday night, members of the Community Advisory Panel, set up by the federal agency in November to advise it on local concerns, recommended three major changes to the study:

- Adding Hatchville to the study area. The agency has already agreed to study 100 residents each of Mashpee's Briarwood neighborhood, Falmouth's Ashumet area, Sandwich's Forestdale section and Bourne's Picture Lake region.

- Increasing the number of people studied in each area.

- Increasing the minimum length of residency for those studied.

Agency officials would say only that they would consider the suggestions. Late yesterday the agency scheduled a meeting with advisory group members at 7 tonight at the Cape Codder Hotel, the former Cape Cod Plaza on Route 132 in Hyannis, to respond to the recommendations.

Between now and May 12, the 600 residents will be asked a variety of questions, including their age, length of residency, and water-drinking habits.

About a month later, they will be asked to give blood and urine samples and complete a detailed health questionnaire. They will be paid \$25 for their time.

The health study will examine organ damage or dysfunction for the renal, liver and immune systems, which are most affected by contaminated ground water. It will also study blood-lead levels and self-reported illnesses and symptoms.

The purpose of the study is to detect the prevalence of illnesses in the four Upper Cape neighborhoods and compare the results with those in Brewster.

Joel Feigenbaum of Sandwich, an advisory-panel member, said the number of residents studied will be too small to draw significant conclusions.

"It's absolutely clear that they are designing a study that will be useless," he said. "A year from now they will come back to us and say they have found no measureable difference between the people living around the base and the people living in Brewster."

Fliers draw few from Brewster

By GWENN FRISS
STAFF WRITER

BREWSTER - Federal health officials mailed out 1,700 fliers inviting Brewster residents to a meeting last night to learn more about a health study that starts today.

Eight people came. "I was hoping for more than eight, but we'll start with eight," said Jerry Pereira, a community involvement representative for the Atlanta-based Agency for Toxic Substances and Disease Registry.

Contractors working for the agency will begin a door-to-door census of two Brewster neighborhoods next week to see who is living at each house and get occupants' ages. A computer will then randomly select 200 of those people to participate in the study, which requires a 60- to 75-minute health screening.

The Brewster residents' health information will be used for comparison with the data from people living around the Upper Cape military base. Residents there are being studied to see if their health is affected by

pollution at the base.

As an experiment, federal officials held last night's meeting to see if providing information before the census would generate word-of-mouth interest in the project and make people more open to participating if they are randomly chosen. Pereira said he had hoped the fliers, addressed to "resident," would have brought out 25 to 30 people.

Peggy Drach, 65, one of the Brewster residents who came, said she thought the agency would have reached more people by addressing town meetings, the PTA or other local groups. She and her companions - Pat Barletta, 64, and Virginia Joudrey, 70, said they would spread the word to neighbors and definitely would participate if chosen.

Federal health officials said sometimes screening provides early warning of health problems in the control group, as well as the study group. Mrs. Barletta said she thought it was important, especially for children in Brewster, to participate in the screening.

But Mary McEnroe of New Seabury, another panel member, said she was satisfied with the design: "It's a good study. Let's get on with it."

Another panel member, Linda Clark of Ashumet, questioned the agency's plan to test residents who have lived in the target area for only a year.

"What is the value of testing people who have only lived there for one year?" she said. "Ashumet has been on town water for six years."

Spills and dumping of fuel and cleaning solvents at Otis/Camp Edwards from 1959 through 1975 have created eight underground paths of pollution, which have threatened drinking water in Falmouth and other Upper Cape communities.

Noelle O'Brien of Hatchville said it would be inappropriate to compare tests of those who have lived in the area for many years, including those who drank well water, with those who have moved here recently and used town water.

"I think that will throw a wrench into the results," she said.

Kelli Davis, principal investigator of the study, said the agency is trying to take a snapshot of the health situation in the region today and is not able to do a long-term study.

Mrs. O'Brien asked whether Hatchville could be included in the study: "It bothers me," she said. "I pay taxes. I pay federal taxes. I

came here because I have two young children, and I find out I'm not even included in the study."

Jerry Pereira, the federal agency's community-involvement representative, said the agency cannot please everyone.

"Whether we increase the number of people to be studied or the length of time they've lived there, someone will still be excluded," he said. "This is not an end-all study. This is a start."

Feigenbaum interrupted: "Don't give us that public relations bull---. We all agree on the intent of the study. We disagree on the design of the study."

Feigenbaum also questioned the selection of Brewster as the comparison site. He said Brewster recorded the second highest rate of environmentally related cancers in Massachusetts from 1982 to 1986.

"That could skew the results of this study," he said.

Ms. Davis said Brewster was chosen because its demographic profile was similar to the target population. She said the median age of residents in the target and comparison communities is about 35.

Feigenbaum also said the federal study ignores the elevated cancer rates among Upper Cape women.

Ms. Davis said the agency has included a section in its questionnaire on reproductive health. The survey will determine the number of birth defects and miscarriages in the study population.

#2

Advisers accept limited scope of cancer study

Health officials say there's no money to widen research

By GWENN FRISS
STAFF WRITER

HYANNIS — Disgruntled community advisers agreed last night that federal health officials should continue their study of four Upper Cape neighborhoods near Otis/Camp Edwards while they keep trying to get money to broaden the study's scope.

The community advisory panel wants the Agency for Toxic Substances and Disease Registry to add a fifth community — Hatchville — and to study more people in each neighborhood as they explore whether pollution from the Upper Cape military base is making people sick.

Jeffrey Lybarger, director of health studies for the Atlanta-based agency, said the current study of 400 subjects and 200 controls will cost an estimated \$700,000 and there is no more money available for the effort, which started yesterday.

"We absolutely agree there's not enough people," Lybarger told the group last night at the Cape Codder Hotel. "These are our options: we can do the original two communities that we suggested with 200 people each; we can stick with 100 people in each of the four communities; or we can close down the operation, go for funding and maybe start again at a later date."

Those options left the panel divided.

"Sounds like we do it now with what they can do or we lose out entirely," said Linda Clark of Ashumet Valley in Falmouth.

Lybarger said, "Not entirely, but you couldn't do it this summer."

After learning there was no more money available now, the group had to choose between a study that had more neighborhoods with fewer people, or fewer neighborhoods with more people.

Otis/Camp Edwards is a 21,000-

acre complex surrounded by Bourne, Mashpee, Falmouth and Sandwich. Spills and dumping of fuel and cleaning solvents two decades ago polluted ground water. Open burning of fuels, stopped in 1985, created air pollution that was never monitored.

Since drinking water was polluted in Falmouth's Ashumet Valley and Mashpee's Briarwood neighborhood, Lybarger's staff suggested studying people who live there.

Community adviser Joel Feigenbaum of Sandwich, a Cape Cod Community College mathematics professor who has tracked Upper Cape cancer rates for a decade, argues that the plan ignores Bourne, which is near Army Guard gun sites and has extremely high lung cancer rates.

Picture Lake, near Route 28 in Bourne, and Forestdale, near Route 130 in Sandwich, were added to the study.

Panel member Donna Dragos of Falmouth, a nurse who has done cancer research, said she understands the desire to screen four areas but worries there won't be enough people studied in each area to show results.

Panel member James Kinney of Mashpee said, "Maybe by studying all four areas we'll pick up diseases nobody even knows to suspect. We will get the major problems. We may not get the minor ones but this may be the only shot we get at looking at those neighborhoods."

A door-to-door census to determine who lives in each of the neighborhoods began yesterday, and will continue for about three weeks. At the urging of community advisers, federal investigators will study people who have lived in the area for at least eight years, since exposure to well-water pollution would have occurred before then.

The Boston Doctors Lend Support

It is interesting that it is doctors from Boston who have come forward to lend their support to members of the Alliance for Base Cleanup and the Association for the Preservation of Cape Cod in their previously lonely battle with the military over propellant bag burning.

The concern expressed by the Boston doctors further highlights the silence of the Cape's medical community on this issue, which has been cited as one possible cause of the higher incidence of cancer on the Upper Cape.

Greater Boston Physicians for Social Responsibility wrote Governor Weld last week protesting the open burning of artillery propellant, which contains 2,4-DNT. If the practice is not stopped, the doctors wrote, Cape residents should be warned that they are in effect being used as guinea pigs.

More than the military is at fault here. State agencies that are supposedly protecting the public's health and the public interest are walking in lock step with the National Guard Bureau and other military agencies.

Physicians for Social Responsibility express confidence Governor Weld "will act responsibly." The governor could begin by asking his Department of Environmental Protection and Department of Public Health who they are protecting, the Pentagon or Cape citizens?

These agencies have given the go-ahead for an on-site test of the propellant in an amount that far exceeds that allowed under existing state permits. Nor have they followed through on their own request that the propellant burning at the base here be examined in the context of health conditions at other bases where it happens, including one in Utah.

The Boston physicians tell Governor Weld about the incidence rate for lung cancer in Tooele County, Utah, where research is being conducted on this community that is subjected to open burning of artillery propellant at the neighboring Dugway Proving Ground.

According to the Utah Cancer Registry, the physicians wrote, "the incidence for lung cancer in Tooele County is significantly higher than the rest of the state. The relationship with the national average is fascinating, but not relevant because of the dense Mormon population in Utah, most of whom do not smoke and live a very healthy lifestyle."

Because of this "statistically significant association," the doctors protest further open burning at the

Massachusetts Military Reservation "until the health status around other army bases has been fully studied [their emphasis]."

They inform the governor that if it continues in spite of their protest "an ongoing health status monitoring study should be performed in the Upper Cape area."

The doctors close their letter to Governor Weld by saying that "since this population must be considered to be potentially exposed to a possibly carcinogenic substance, informed consent must be obtained from the civilian population in accordance with the canons of human subject research."

At first, the test burn was to be conducted with simply a week's notice. Now, thanks to pressure from APCC and the Alliance, a public meeting — not hearing — is reported to be scheduled for August 5, though no official notice has been received.

Congressman Gerry Studds is among those trying to find out why normal public hearing processes are not being followed. Mr. Studds met with state public health officials yesterday morning. "The details are all too sketchy," said his aide, Mark Forest, yesterday afternoon. "It is important that whatever information is available about Utah is made available to Cape residents. This process is clearly deficient. Our biggest fear is that the process for this test burn is on a fast track. It is plainly not right. Integrity must be restored to the process so that Cape residents can be part of the decision-making."

For the volunteer citizens who comprise the Alliance for Base Cleanup the Physicians for Social Responsibility have helped to restore some integrity to the process.

"They have made a valuable addition to the whole debate," said Richard Hugus of Falmouth. "It never occurred to us that there were ethical rules, canons, to follow for conducting tests on human beings."

James Kinney of Mashpee said this stand by "respected physicians is wonderful news for local residents." The military and others "discounted us because we are not experts," Mr. Kinney said, "but we can read." The propellant burning is clearly identified as a possible cause of cancer in the BU study, he said. For the military to want to proceed with the test, he said, "it is as if the tobacco companies were to say, 'We've got a report that shows smoking is dangerous to your health, so we are going to conduct a test by making a lot of people smoke a lot of cigarettes to prove that smoking is safe.'"

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3-7-92

Cancer fear leads base to stop shelling

By **GWENN FRISS**
STAFF WRITER

CAMP EDWARDS — Although battlefield practice resumes at the Upper Cape military base this weekend, the artillery shells suspected of causing cancer will remain idle for the time being.

In artillery training, soldiers use a specified number of bags of propellant — the explosive charge that hurls the shell — then burn the rest as they would on the battlefield to keep it out of enemy hands.

Protested by the Upper Cape Concerned Citizens activist group for several years, the practice drew wide attention in January when Boston University's cancer study showed an increased risk of lung and breast cancer for people living near gun positions. The BU researchers recommended that propellant bags containing the cancer-causing chemical 2,4-dinitrotoluene not be burned near populated areas.

Earlier this month, the Association for the Preservation of Cape Cod and the Barnstable Assembly of Delegates called for a ban pend-

ing further study of the health risks.

National Guard and state officials said yesterday artillery use will be halted until later this spring when an air quality test will determine what goes into the air when propellant bags are burned.

Richard Hugus, a member of the Falmouth Alliance for Base Cleanup, said, "We don't need more studies. They should just put a stop to it."

In the meantime, mortars will be fired.

"Our concern is not as great, because mortar propellant does not contain 2,4-DNT or any other known carcinogen we're aware of," said James Begley, an environmental engineer for the Massachusetts Department of Environmental Protection.

"But one thing we know is when people hear those mortars fired this weekend, everything they've heard about the cancer study and 2,4-DNT will be on their minds. We want them to know that the bags in question will not be being burned," he said.

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Artillery bag test to move off-Cape

Propellant burn may be out of state

By GWENN FRISS
STAFF WRITER

CAMP EDWARDS - State health and environmental officials have asked the National Guard to look for an isolated area, perhaps outside Massachusetts, for a test to determine whether burning artillery propellant bags releases cancer-causing chemicals into the air.

"There is going to be a test but it will not be on Cape Cod," said Suzanne Condon, director of the state Department of Public Health's Bureau of Environmental Health Assessment.

The test, originally scheduled to be completed at Camp Edwards last month, has been on hold since an Aug. 5 public meeting at which there was an outpouring of opposition from people who say it is foolhardy to do a test burn in an area where cancer rates are already elevated. Propellant bags for the artillery guns contain 2,4-dinitrotoluene, labelled a probable carcinogen by the Environmental Protection Agency.

Based on tests conducted in other parts of the country, state public health officials said they are confident a test burn at Camp Edwards - about two miles from the base border - would not expose anyone to toxins.

"But there's a perception that the public has. Because of that perception, we're more than willing to have the test take place somewhere else," Ms. Condon said yesterday afternoon to a gathering of elected officials at the base dining hall.

Terry Spence, the air pollution program manager of the federal National Guard Bureau in Washington, said, "The Army can find an isolated area to do this test where it won't bother anybody. But will the people of Cape Cod accept that?"

The consensus of several community activists interviewed yesterday was "no." The activists had been invited to a morning meeting with state and National Guard officials but were banned from the afternoon session with elected offi-

Please see TEST/A-14

just three hours and eight miles. Most of the cases involve men with a... One of the most serious pro...

TEST

Continued from A-1

cial. All but four of the groups invited boycotted the morning session, saying it was wrong to segregate them from the legislators. The Cape Cod Times attended the afternoon session and interviewed activists afterward by telephone.

"I'm glad they're not going to do the test burn on the Cape. However, if the test burn off Cape indicated there was not a problem, I would still question the appropriateness of burning propellant bags on the Cape," said Susan Walker of Sandwich, a Barnstable County Assembly delegate and a member of Responsible Environmental Protection for Sandwich.

"We have a high density of residences by the base. We already have a high unexplained cancer rate. And our wind patterns are site specific," she said.

Richard Hugus of Falmouth, a

member of the Alliance for Base Cleanup, said, "I just don't think they should burn artillery bags. We have an elevated cancer rate. They should be taking extraordinary measures to protect us."

Susan Nickerson, executive director of the Association for the Preservation of Cape Cod, said, "Why do these propellant bags have to be burned at all? I think that question needs to be pursued. ... They're going to a lot of expense to prove this is not a problem. Maybe they should just get rid of the bag burning."

Camp Edwards Army National Guard and Reserve Training Site, on the Upper Cape, is one of 28 bases across the country where artillery is fired. The number of propellant bags loaded into a gun determines how far the shell travels. Since Camp Edwards does not fire the maximum range, each training exercise produces leftover bags, which are burned during the 15 to 21 days of artillery practice each year, as they would be in war.

Earlier this year, Boston Univer-

sity researchers recommended the practice be banned near populated areas because their cancer study indicated people living within 1.9 miles of the guns for 20 years or more contracted lung and breast cancer at higher rates than other Upper Cape residents.

The Army National Guard will resume artillery practice at Camp Edwards tomorrow but will not burn leftover powder bags until officials complete the test.

Joel Feigenbaum of Sandwich, a member of the Upper Cape Concerned Citizens, questioned what they will do with the excess bags for the time being. In the past, military officials have said it is dangerous to store or transport the bags because they become unstable once exposed to moisture.

Maj. Rick Thomas, an Army spokesman at the Pentagon, said live firing - including destroying the excess propellant bags - is needed so soldiers can fight properly, as was shown in Desert Storm. "I don't see it stopping," he said of the bag-burning training.

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plete the test, is cause for some relief. But serious concerns remain.

For example, can we trust their test results? We're relying on a military establishment that exposed soldiers to nuclear explosions in the 1950s — without their consent. This is the same military that denied for years that Agent Orange caused health problems in Vietnam vets in the 1960s — and is denying similar problems in the Gulf War vets of the 1990s.

Can we trust local military leaders who threatened to stop sewage plant construction because a lease extension was an absolute precondition to moving forward — and then withdrew their request when it seemed that the state might call for an environmental impact review?

This is the same local military establishment that took more than two years to settle with Mashpee over NGB pollution of Briarwood's wellwater — and to this day denies that they were at fault. This is the same military that denied responsibility for EDB groundwater pollution in Sandwich until Congressman Studds and other officials and activists demanded decisive action.

And this is the same military that has yet to clean up a single shovelful of soil or a pint of water at Otis/Camp Edwards — after 13 years of study.

Here's another cause for concern: The Army National Guard uses only three of every set of five propellant bags to fire one artillery round at Camp Edwards. They open burn about 5,500 pounds of excess propellant per year. But no one has yet addressed the possible health effects of the 8,250 pounds of propellant released into the air annually during actual artillery firing.

At an August 6 meeting, James Woods of the Army Environmental Hygiene Agency admitted that no studies have focused on the chemicals released when the guns are fired.

When asked last year, an NGB artillery expert explained that it was impossible to get propellant in sets of three bags rather than five; impossible to practice with dummy propellant bags; impossible to forego the open burning of excess bags; impossible to transport the bags elsewhere for disposal. But now — after a year of growing public understanding and outrage — the impossible has

become possible and the bags will not be burned on base, at least for the moment.

Given the Upper Cape's unexplained high cancer rates (especially lung and breast cancers among women) and the BU Cancer Study's finding of increased lung and breast cancer among women living within 1.9 miles of base artillery placements, it is foolhardy to burn any amount of a substance considered a "probable carcinogen" by the EPA — unless and until it is proven absolutely safe by independent researchers.

Why not study the health risks of artillery practice or develop safe alternatives to it rather than spend \$1.6 mil-

lion to build a 23-mile fence around the base to keep our children away from the artillery, as the NGB plans to do?

Why don't the state departments of Public Health and Environmental Protection spend our tax money on identifying and eliminating the causes of the area's high cancer rates, rather than trying to prove that the NGB's dubious training practice is safe for residents?

Apparently, Governor Weld and the state agencies he oversees have decided that protecting the traditional training practices of the National Guard is more important than protecting the health and safety of Cape Codders. Apparently, the

only people working to safeguard the health, safety and economic wellbeing of Cape Codders are Cape Codders themselves.

Isn't it time to question the fundamental need for artillery practice at Camp Edwards? Shouldn't all propellant use stop until it is proven safe? Perhaps the NGB, the governor and our state agencies should face the fact that what was an allowable risk when the Cape's total population was around 30,000 and the Cold War was at its height is no longer necessary or acceptable.

James Kinney

Nohono Road
Mashpee

Falmouth Board of Selectmen Committee Vacancies To Be Filled

Falmouth

'Serious Concerns Remain'

The National Guard Bureau recently announced that the test burn of artillery propellant to be done in conjunction with the state departments of Public Health and Environmental Protection will take place off-Cape.

That decision — forced by numerous calls and letters to Governor Weld and other officials — is good news. Coupled with the NGB's announcement that leftover propellant bags won't be burned until officials com-

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A-3

Guard OKs artillery practice

Propellant-bag burning needs go-ahead from state officials

By GWENN FRISS
STAFF WRITER

CAMP EDWARDS — The Army National Guard will resume artillery practice at Camp Edwards Sept. 19 but will not burn leftover powder bags until state officials determine whether open burning releases cancer-causing chemicals into the air.

"We will resume firing but we will not burn the (propellant) bags. The National Guard is going to figure out a way to either store them or find a way to safely transport them," Lt. Col. Stuart Tauber, the Guard's director of public affairs, said yesterday.

A test burn, scheduled at the base this week to measure possible harmful effects, has been put on hold. A decision on whether to conduct it will be made in two or three weeks, said Te Leone, spokesman for the Massachusetts Department of Environmental Protection.

The Alliance for Base Cleanup, a community group that opposes any open burning of artillery powder, last night lauded the Guard's decision to either store or transport the extra bags.

"I'm extremely happy they're not going to continue to do it (burn excess bags) in the fall schedule. What it really points to is how powerful the citizens are when folks get mobilized," said Joel Feigenbaum, an alliance member and Cape Cod Community College mathematics professor who tracks the Upper Cape cancer rates.

Feigenbaum said continuous air

monitoring is needed around the base border to determine if any hazardous chemicals are generated by the propellant when used in artillery practice or from any other base activity, such as jets.

Camp Edwards Army National Guard and Reserve Training Site, on the Upper Cape, is one of 28 bases across the country where artillery is fired. The number of propellant bags loaded into a gun determine how far the shell travels. Since Camp Edwards does not fire the maximum range, each training exercise produces leftover bags that are burned during the 15 to 21 days of artillery practice each year.

Earlier this year, Boston University researchers recommended the practice be banned near populated areas because their cancer study indicated people living within 1.9 miles of the guns for 20 years or more contracted more lung and breast cancer than other Upper Cape residents.

The artillery propellant contains, 2,4-dinitrotoluene, labeled a probable cancer-causing agent by the EPA.

Artillery firing, normally suspended during the summer months, was stopped in March at the request of state public health officials while a test was designed to see if bag burning releases chemicals into the air.

The test calls for burning 725 pounds of artillery propellant — the maximum amount burned at Camp Edwards on any single training day — and monitoring air nearby to see what, if any, chemicals are released.

Doctors ask base to end bag-burning

Group says practice threatens Upper Cape

BY GWENN FRISS
STAFF WRITER

CAMP EDWARDS — A group of Boston-area doctors this week called for a ban of Camp Edwards's artillery propellant burning and said, if it is not stopped, nearby residents should be warned they are guinea pigs in a medical experiment.

The National Guard normally suspends artillery firing and the burning of bags from Memorial Day to Labor Day. This year, at the request of state public-health officials, the military stopped firing in March. The Guard intends to burn 725 bags in August as a test to determine if the practice releases carcinogens into the air.

After artillery guns are fired at the Upper Cape base, soldiers burn the excess propellant bags as they would in war to keep them out of enemy hands. That propellant contains 2,4-dinitrofluorene, labeled a probable carcinogen by the Environmental Protection Agency.

Earlier this year, Boston University's cancer study said people living within three kilometers of the guns had a higher risk of contracting cancer.

"You can't just ignore this and keep exposing people to this stuff. That's just outrageous," said Jefferson Dickey, a Somerville doctor and director of the military toxic project of the Greater Boston Physicians for Social Responsibility.

Dickey said his group called for the ban after discovering there are statistically significant increases of lung cancer in the communities surrounding Camp Edwards and the Dugway Proving Ground in Utah — the two places where artillery propellant is known to be burned.

Please see **BURNING** /A-12

BURNING

Continued from A-1

"In light of this statistically significant association, (the physicians group) protests further open burning of propellant bags at the Massachusetts Military Reservation until the health status around other Army bases has been fully studied," the physicians wrote in a letter to state officials.

If the burning is not stopped, the letter said, the state should conduct an health status monitoring study and should obtain informed consent from people living near the base.

"Informed consent is a scientific term with a very specific meaning. When scientists do research with humans, it's required to inform the subject about benefits and risks of the study. Every scientist in our country and in western civilization does this," Dickey said.

Massachusetts environmental and public health officials said they could not comment this week because they had not yet received the letter.

The doctors' letter was mailed out in the midst of a controversy over the plan to test burn 725 pounds of artillery propellant in an isolated area at Camp Edwards — about three kilometers from civilian neighborhoods — in August.

The plan, drafted by the Massachusetts Department of Environmental Protection, the state Department of Public Health and the Army Environmental Hygiene Agency, calls for setting up four monitors to determine what, if any, chemicals are released to the air when propellant burns.

Details of the proposed test burn will be aired at an Aug. 5 meeting. The 7 p.m. session is in Bourne High School auditorium, state officials said Thursday. According to the test plan, 725 pounds represents

the most propellant burned on any training day. It would be burned incrementally, as it is in training, with one monitor set upwind as a control; one directly at the site; and two downwind of the site at the point where the highest concentrations of chemicals would be expected.

Robert Donovan of the Massachusetts Department of Environmental Protection said officials are not putting air monitors in the surrounding communities because dispersion — which increases with the distance from the base — would make it difficult to find exactly the right spot to monitor.

If the up-close air tests are clean, he said, it will show no chemicals are being released. If there are chemicals, then computer modeling would be needed to estimate how far the pollution travels.

Community activists on the Upper Cape say it is senseless to burn 725 pounds of potentially carcinous material in an area already plagued by lung cancer.

"It's a new level of absurdity. They have to be assured there is no danger in order to be able to do this test in the first place," said Richard Hugus, a Fal-mouth resident and member of the Alliance for Base Cleanup.

Based on tests at other military bases, Donovan said, "We don't believe there is a problem associated with it but I think before we allow it to be done for the next 20 years, a responsible agency would do what the cancer study suggests and look into it."

Dickey said the physicians group sides with community activists, saying there should be no open burning — test or no test.

Referring to the Tooele County cancer increases in Utah, he said, "It shifts the burden of proof. Rather than a bunch of volunteer civilians having to spend a lot of unpaid time trying to defend themselves, it becomes incumbent on the military to prove what they're doing is safe."

COWS

up Louise's grooming job, using the cows occasionally bellowed. Chimp Miss Harris' name was on the list.

Studds seeks ban on Cape burning

Artillery propellant risk cited as health concern

By GWENN FRISS
STAFF WRITER

HYANNIS — Saying that too many questions remain unanswered, Rep. Gerry Studds yesterday said he will ask for a ban on burning artillery propellant at the Upper Cape military base until more is known about its health effects.

Soldiers training at Camp Edwards dispose of extra artillery propellant bags by burning, as they would in wartime to keep them out of enemy hands. The propellant contains dinitrotoluene, or DNT, listed as a probable carcinogen by the U.S. Environmental Protection Agency.

Boston University's Cape cancer study said people living near the gun positions contracted more lung cancer than in other areas of the state.

The artillery practice, normally suspended from May to September, was stopped in March this year at the state's request. Studds said it should not resume until more is known about why it is done and whether it is harmful.

"I don't for a minute mean to suggest there is reason for undue alarm. But certainly there have been questions about the long-term effects," said Studds, D-Mass., in a press conference yesterday morning at his Hyannis office.

"We want to ask around the country to see whether the same concerns have been raised and whether they have been addressed by any studies," he said.

Among other questions, Studds said, are why the excess must be burned on the Upper Cape and whether the soldiers burning the material have protective gear.

A 1990 study conducted at Aberdeen Proving Grounds in Maryland by the Army Environmental Hygiene Agency found dinitrotoluene was the major residue of open burning but that it did not exceed government limits for exposure. The agency said training manuals fail to warn about potential occupational health hazards of the practice.

State public health officials say they are interested in taking a nationwide look at the issue of bag burning but they think it is important to conduct a test burn here in August, before the Army National Guard resumes artillery practice at Camp Edwards in September.

"The Army has made it clear they have a training program scheduled for September. They have agreed to at least do this test to see where the data will fall and then take it into consideration," Kate McCormack, spokeswoman for the Massachusetts Department of Public Health, said yesterday.

State and military officials plan to burn 725 pounds of artillery propellant — the maximum amount burned at Camp Edwards on any single training day — and monitor air nearby to see what, if any, chemicals are released. A public meeting is scheduled for 7 p.m. Aug. 5 at Bourne High School to discuss the plan.

Studds yesterday agreed with community activists who say they want ample time to review the test plan and comment on it. Their major objection is that the test should not be conducted here on the Cape, where lung cancer rates are elevated.

Robert Donovan of the Massachusetts Department of Environmental Protection said he has heard many of the concerns at other meetings. If new issues are raised Aug. 5, he said, there will be time to change the test-burn plan.

This Burning Should Stop

EW 3-6-92

The Upper Cape Cancer Incidence study conducted by Boston University suggested that the military should not continue to burn propellant bags near populated areas.

Despite this recommendation the practice continues at Camp Edwards.

The BU study found that among Upper Cape residents living near gun and mortar positions at the base there was an association between possible airborne exposures and the risk of lung and breast cancer.

The U.S. Environmental Protection Agency has rated a propellant constituent, 2,4-dinitrotoluene, as a probable human carcinogen.

Barnstable County Assembly of Delegates Wednesday unanimously gave its support to a resolution drafted by the delegates from Falmouth, Bourne, Mashpee, Sandwich, and Barnstable calling for the practice to cease.

Assembly delegates sensibly urged that "health, environmental, political, and military authorities should confer and bring this concern to a resolution and the practice of propellant bag burning should cease at the Massachusetts Military Reservation until a satisfactory resolution is achieved."

Priorities

Why burn propellants?

The Adjutant General's Office says: "It is necessary to meet the training requirements of the U.S. Army. Artillery men must be proficient in disposal of excess propellant."

The U.S. Army Hygiene Agency conducted its own study last year and determined "it is very unlikely that individuals... exposed to the smoke... would experience any significant adverse health effects due to the airborne contaminants."

Further down on this "propellant burning fact sheet" it states that this same agency "is developing an air sampling strategy to examine air quality associated" with the burning.

The military should cease the burning until this strategy is developed and until the state Department of Public Health has provided the Army with what this statement implies it needs: "technical assistance in assessing what public health risk, if any, is suggested by the air quality study."

By ceasing this practice until there are independent findings, the military will at least be improving public relations, even if it doesn't believe it will be improving public health.

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Guard stops burning artillery 4-4-82 propellant

By RON RECINTO
STAFF WRITER

CAMP EDWARDS – National Guardsmen will fire artillery as usual this weekend, but, in a break with tradition, will not burn the surplus gunpowder because some contend the practice may cause cancer.

In combat, leftover propellant bags are usually burned to keep them out of enemy hands.

The recent Boston University cancer study showed an increase risk of breast and lung cancer for people living near gun and mortar positions. The study's chief investigator, Ann Aschengrau, recommended the practice stop until tests of the possible cancer-causing agents can be performed.

So this weekend the National Guard units from Connecticut training in artillery will collect their unused propellant bags and store them until a test can be devised to test the chemicals that are carried into the air when the bags are burned, guard environmental coordinator Peter Connolly said.

The Guard Bureau in Washington, D.C., agreed to stop bag burning until tests from the state's Department of Public Health and Department of Environmental Protection could be designed, Connolly said.

The firing will go on because an agreement between the Department of Public Health, the Department of Environmental Protection and National Guard Bureau that had postponed any artillery firing or associated bag burning ended this month, Connolly said.

"We are not going to burn anything, however, until the protocol that is being developed is released," Connolly said.

However, activist Richard Hugus of the Falmouth Alliance for Base Cleanup said the probable carcinogen 2,4-dinitrotoluene (DNT) is released even during the firing of the guns.

"Even if they don't burn the extra bags, the DNT still gets burned when the firing goes off," Hugus said.

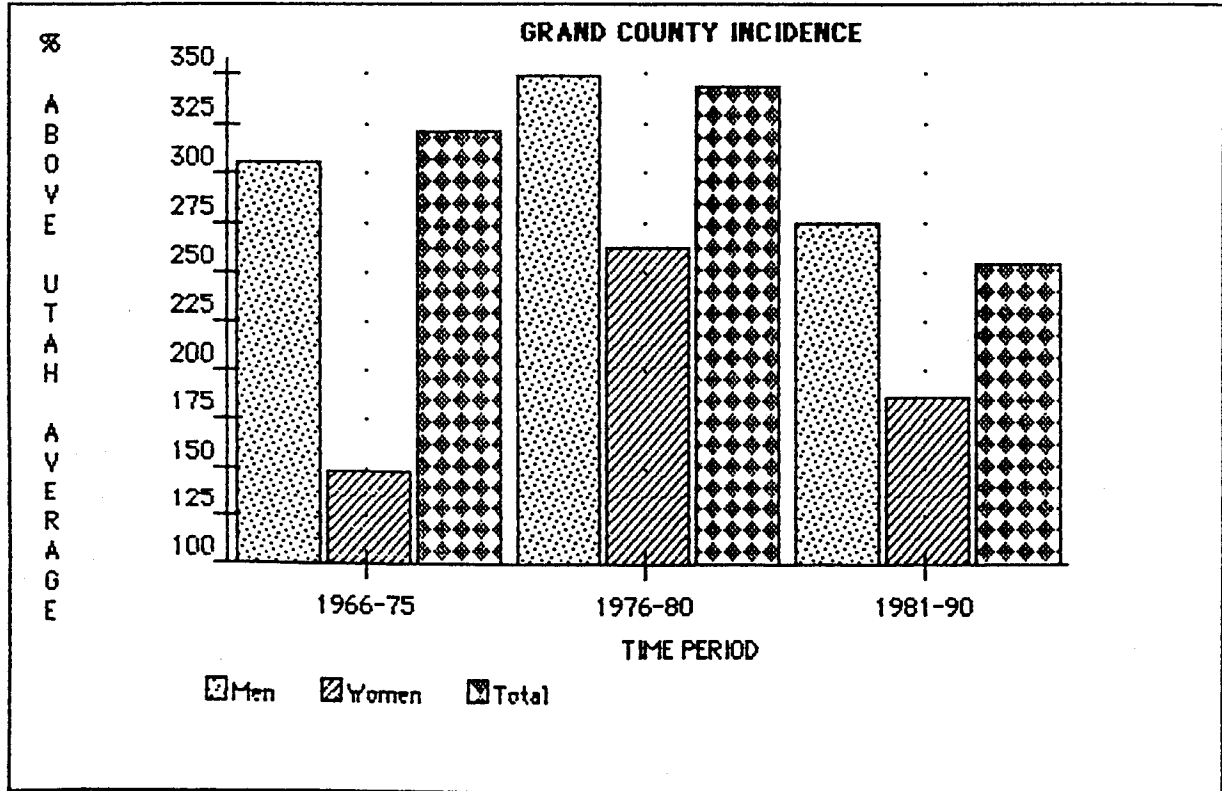
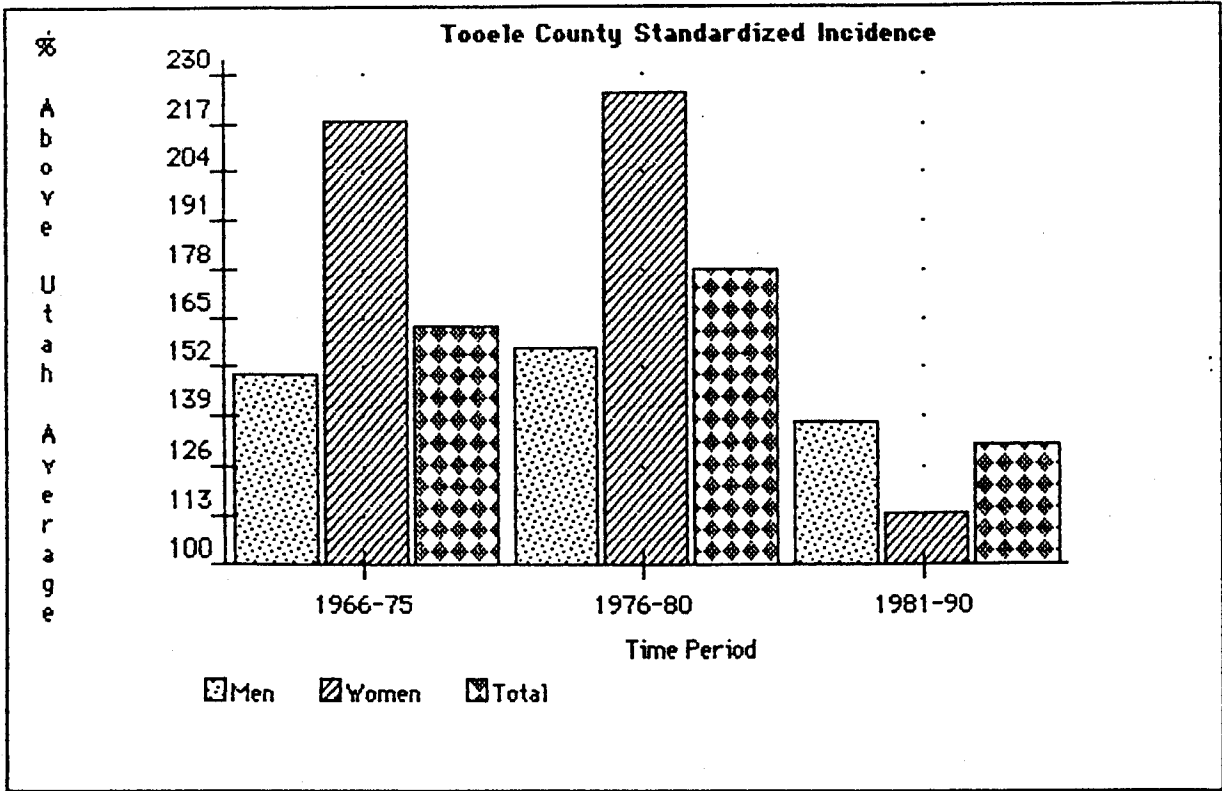
Hugus said the practice of stockpiling the bags may also be dangerous since the propellant contains unstable compounds, a reason he says they burn the bags.

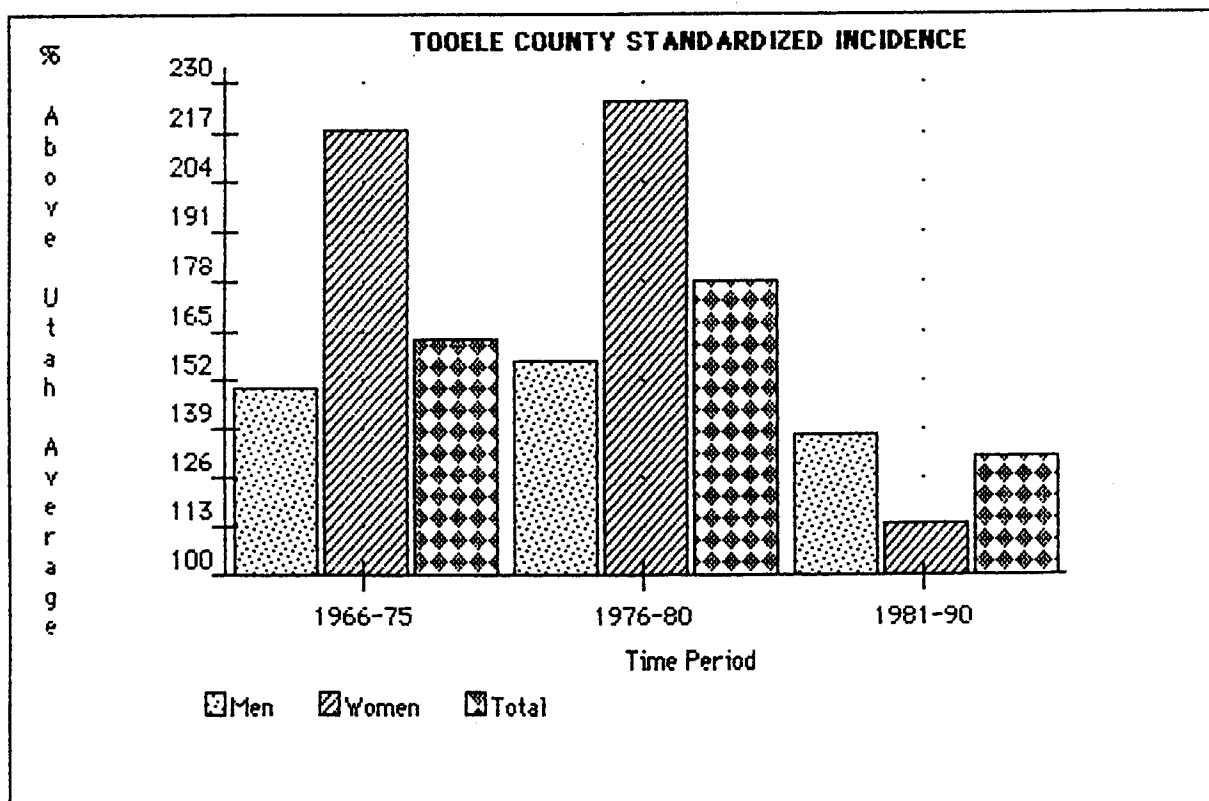
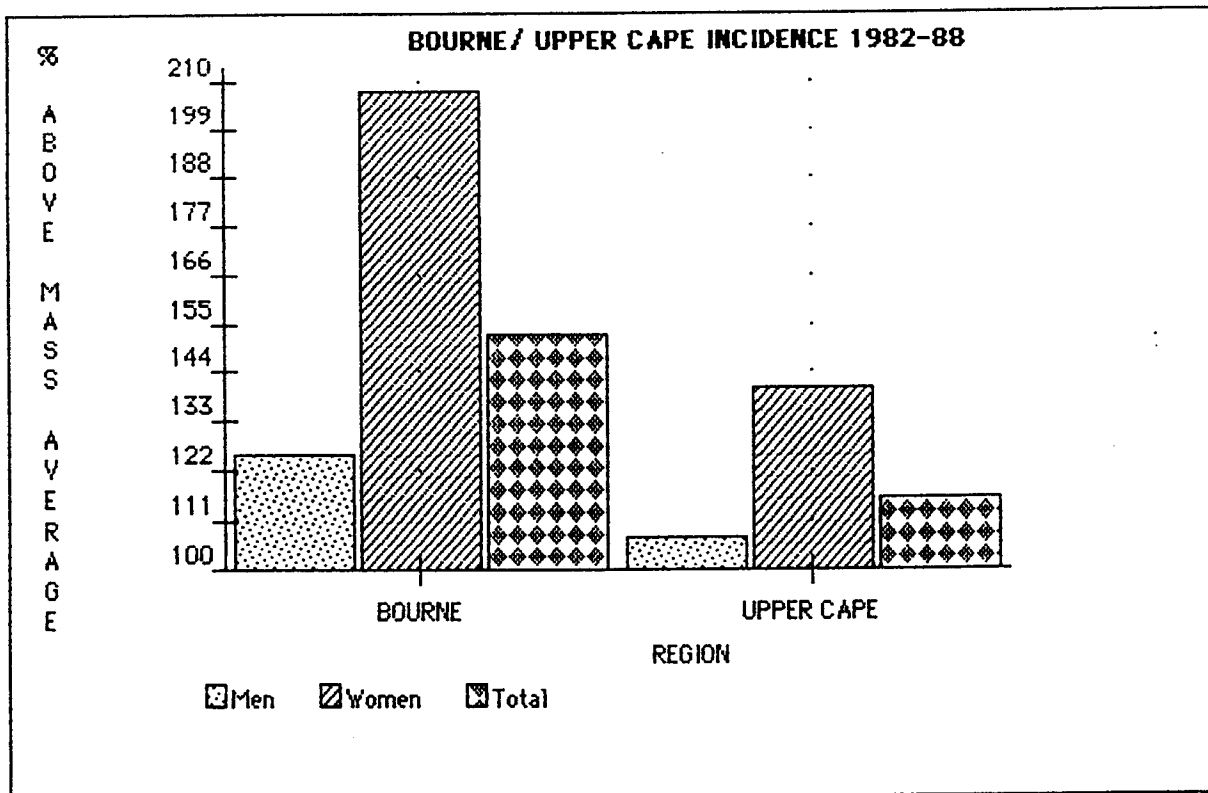
"They are afraid if they stop burning here they will have to stop it all over the country," Hugus said.

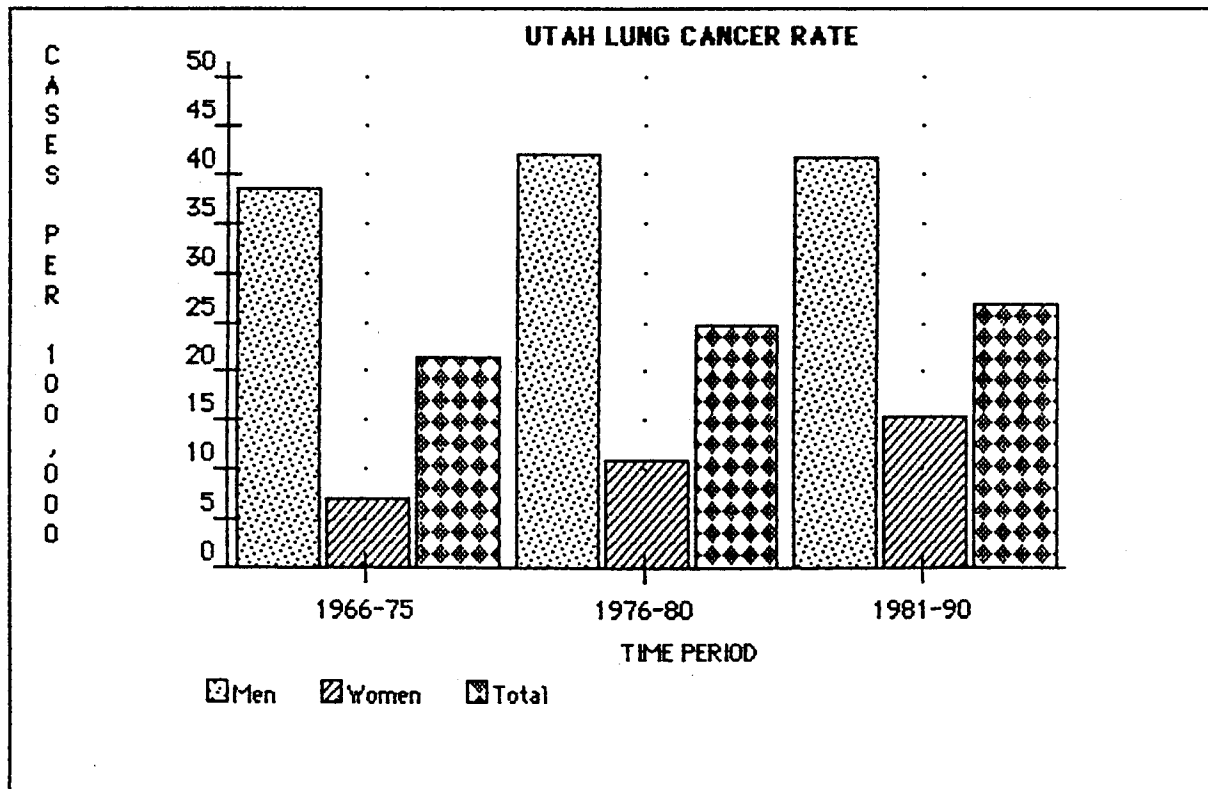
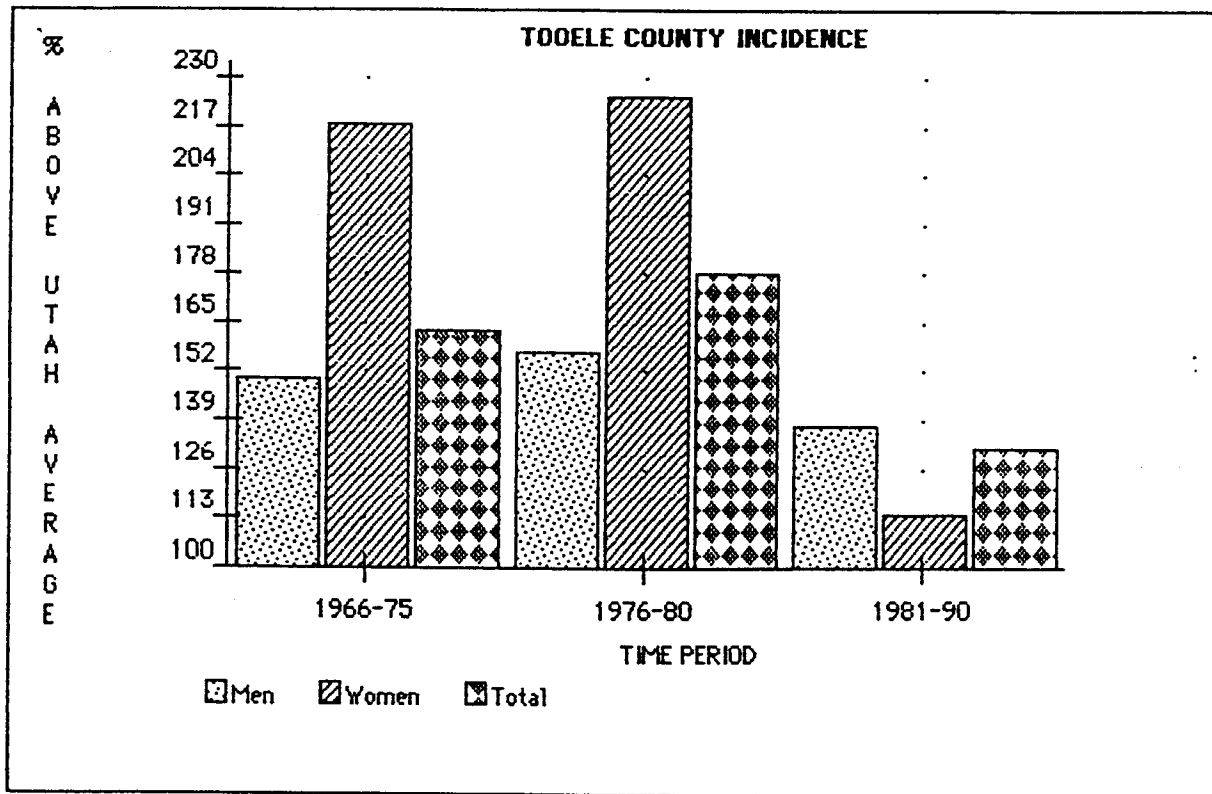
Artillery firing as well as mortar and small arms firing will begin this morning and continue through the weekend, Connolly said.

'Tooele County Incidence of Lung Cancers'
Elevated lung cancers in the Tooele County, home of the Tooele Army Depot

Citizens for Safe Water Around Badger
E12629 Weigand's Bay South Merrimac WI 53561 (608) 643-3124







BIG BOOMS

Leavitt seeks review of open-air munitions blasting

Governor wants to know of health risks along Wasatch Front, in Tooele.

By Matthew S. Brown
Deseret News staff writer

Gov. Mike Leavitt has asked state environmental regulators and the military to review the practice of open-air blasting of rockets and munitions.

One such blast rattled homes along the Wasatch Front and in Tooele County last week.

"The governor is concerned and wants more information," his spokeswoman, Vicki Varela, said. He wants to know if there are any potential health risks to residents in Tooele and the Wasatch Front."

Leavitt's request came in response to a letter Monday from military watchdog group Downwinders, which was outraged over two routine open-air blasts conducted by Hill Air Force Base and Tooele Army Depot. Downwinders also has been invited to the review to be convened by the state Department of Environmental Quality.

Residents from Ogden to South Salt Lake felt the concussion last Wednesday when two 15,000-pound Navy Poseidon rocket motors were detonated at the Air Force's Utah Test and Training Range on the western shore of the

Great Salt Lake.

Within hours of that blast, the Army blew up 1,000 pounds of explosives at Tooele Army Depot, startling residents from Erda to Rush Valley, said Steve Erickson of Downwinders.

Both the Army and Air Force, which have state air quality permits to conduct the demolitions, said an unexpected temperature inversion trapped and amplified the sound of the blasts.

State Bureau of Air Quality director Marv Maxwell said neither blast violated the permits, which don't address noise pollution.

But Varela said the meetings, which have yet to be scheduled, should include a review of those permits and influence possible changes in future permits.

Tooele County is also investigating whether it will adopt a noise ordinance targeted at the depot's blasting work, county environmental health director Jeff Coombs said.

In its letter to Leavitt, Downwinders urged him to convene a task force of state, federal and local government officials and others to formulate objectives, criteria and policies governing open detonation and burning of military propellants, explosives and pyrotechnics.

"In the past, the military has conducted all manner of open-air burns and detonations almost with impunity," Erickson wrote. "Until

quite recently, virtually open-ended permits for (open detonation, open burning) were granted with little or no oversight."

Erickson said he knew of only two instances in which the state refused to allow missile motors to be blown up. In one instance, the state did not allow more blasts after the test destruction of Pershing II rocket missiles by Hercules Aerospace in 1989. Earlier this year, Hercules was denied permission to destroy three defective solid fuel

rocket motors, he said.

He contended that open detonations or burnings unleash toxic chemicals, including carcinogens, ozone depleters and acid rain generators. Army researchers have concluded the plumes emitted from the open-air blasts and burns are harmless.

Environmental concerns and regulations tied to open-air detonation and burning have prompted Hercules and Thiokol Corp., nevertheless, to pursue new

technologies to dismantle and recycle rocket motors.

Demolition of obsolete explosives will be one activity that will remain at Tooele Army Depot after its truck maintenance mission is dismantled by 1997. The depot bids on demolition work and has the explosives shipped in from other Army installations.

"Our permits are issued by the state, so we will cooperate with the state in any way it wants us to," depot spokesman Jeff Lindblad said.

Hill environmental managers will also arrange to meet with the state, said Sgt. Barbara Fisher, base spokeswoman. "Hill prides itself in its environmental stewardship," she said.

FILE: Tooele Army Depot

Leavitt Wants Data On Air Force, Army Detonations

By Mike Gorrell
THE SALT LAKE TRIBUNE

Gov. Mike Leavitt wants state officials to meet with Army and Air Force officers and a military critic to discuss demolition operations that last week shook up some northern Utahns.

The governor has asked Utah Department of Environmental Quality Director Dianne Nielson to convene a meeting to discuss the Air Force's destruction of old solid-fuel rocket motors in the west desert and the Army's detonation of conventional ammunition at Tooele Army Depot.

"He's concerned about what happened last week and feels he needs more information," said Mr. Leavitt's spokeswoman, Vicki

■ See C-2, Column 4

11-12-93

Leavitt Wants Data On Air Force, Army Detonations

■ Continued from C-1

Varela. "He wants the [meeting group] to review everything that has happened and make a recommendation. The potential impact could be a review of the military's current [detonation] permits."

When the Air Force blew up two Poseidon rocket motors shortly after noon on Nov. 3, scores of people called the University of Utah Seismograph Stations wondering if an earthquake had occurred. Shock waves from the blast were felt from Ogden to South Salt Lake, and seemed particularly strong around Layton.

Four hours later, after a cache of conventional ammunition was destroyed at Tooele Army Depot's North Area, 14 residents in Grantsville, Erda and the Rush Valley area complained about excessive vibration and noise. Depot officials apologized to the residents and referred anyone with damage claims to their legal office.

"This type of demilitarization is

routinely done using guidelines established by the depot and the state . . . including verification of weather conditions with the National Weather Service," said depot spokesman Jeff Lindblad.

"Weather information indicated that conditions were within established guidelines," he added. "The vibration and noise caused by these detonations are being investigated to determine any unique situation that may have been present."

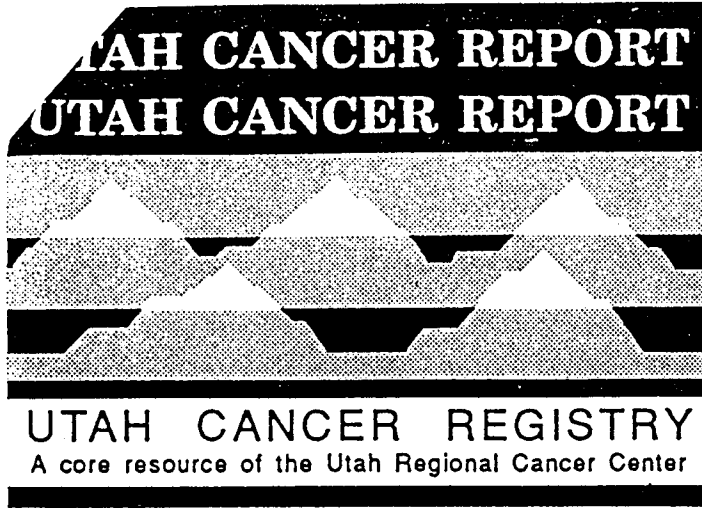
That's ridiculous, responded military critic Steve Erickson.

"Both blasts were detonated despite low cloud cover which amplified sonic shock waves. The Air Force and the Army know this can happen, and should not have proceeded," Mr. Erickson said in a letter asking Mr. Leavitt to review the incidents. "The state should demand a full explanation of these two fiascos."

He contends the state should be wary of military plans to make Utah a major demolition area for obsolete ordnance.

The Air Force has proposed to destroy around 350 aging Poseidon motors in the west desert. Last week's detonation was the third in a series conducted to determine the best way to minimize air and dust pollution during demolition.

CC: 7.20.92 J. Goldrise
A. Behrman



A report of cancer facts, trends
and research results published
by the Utah Cancer Registry

Number 14

March 1990

**CANCER INCIDENCE IN UTAH
BY COUNTY**

BACKGROUND

The state of Utah has some of the lowest cancer rates in the U.S., including the lowest overall incidence in the National Cancer Institute's Surveillance, Epidemiology, and End Results (SEER) network of nine population-based registries around the country.¹ Statewide incidence rates have been reported in detail in the publication "Cancer in Utah 1973-1985" and in previous "Utah Cancer Reports". However, rates vary

among the 29 counties within the state. This report provides incidence data for some of the more common and interesting cancer sites by individual county. In order to put these in perspective, these rates are compared both to the published national rates and to statewide rates. Also in order to help put these numbers in perspective, approximate statistical significance levels have been calculated.

EXPLANATIONS

Utah's counties vary greatly in the size of their populations, and in some of the smaller counties, few cancer cases occur each year. Therefore, we have calculated incidence rates over the ten-year period 1978-1987, in order to obtain more stable rates. The total number of cancers occurring over this period in each county is given in Table 1.

The national SEER rates are given for comparison. To see whether a county rate is statistically higher or lower than the U.S., one must take into account the number of cases which go into that rate. We have calculated approximate 95% confidence intervals around the individual county rates, using a Poisson distribution assumption.² These rates are compared to the SEER rates for Whites for the five-year period 1981-1985, the closest comparison figures which have been published³. The rates which are significantly higher (two-sided $p < 0.05$) than the national rates are

noted with a plus sign in the first column after the numbers, and the rates which are significantly lower than the U.S. rates are noted with a minus sign. (These calculations do not take into account variations in case age structure or the variance in the U.S. rates, so the intervals are probably somewhat too narrow. The appropriate significance level may be in the range of 0.07.) You will notice that some of the rates which are numerically quite high are not noted with a plus sign, while some lower rates are. This is because a high rate based on very few cases has a wide confidence interval, and may not be statistically different from the U.S. rates, while a rate based on many cases does not have to be very different from the U.S. rates to be statistically significant.

The statewide rates are also given for comparison. The same statistical calculations have been done to compare each county with the statewide rates. The counties which (continued on page 2)

TABLE 1 CANCER INCIDENCE IN UTAH, 1978-1987, BY COUNTY OF RESIDENCE

County	No. Cases	All Sites	Lung	Breast	Prostate	Colon	Bladder	Uterus	Cervix	Lymphomas	Leukemias	Melanoma
Beaver	166	302 -	31.8 -	64.6	73	39.9	14.0	32.4	7.9	9.8	5.0	18.2
Box Elder	895	289 -	25.3 -	72.6 -	111 +	31.4 -	12.5	24.5	6.8	11.5	13.1	10.1
Cache	1332	278 - -	11.3 - -	72.1 -	129 + +	34.4 -	10.1 -	35.8 + +	3.7 - -	14.2	8.3	11.5
Carbon	677	323 - +	37.4 - +	85.3	94	44.7	13.4	25.3	8.7	12.1	10.1	9.8
Daggett	16	288	29.8	106	221	0	0	0	0	36.1	0	0
Davis	2781	288 -	23.9 -	84.2 -	111 +	38.9 -	10.9 -	23.6 -	4.6 - -	15.2	10.5	13.6 +
Duchesne	314	324	30.7 -	72.2	111	29.2 -	12.6	14.4	13.8	10.4	17.3 + +	10.2
Emery	252	345 +	40.4	69.5	153 + +	32.8 -	17.3	14.8	14.7	7.8	19.4 + +	15.6
Garfield	143	345	34.1	106	129 +	41.4	16.8	32.6	4.8	15.5	11.0	13.5
Grand	209	323	75.3 +	96.5	84	20.7 +	9.6	32.6	23.6 + +	10.9	3.7	11.4
Iron	472	323 -	28.5 -	98.7	122 +	40.7	13.8	12.5 - -	2.2 -	13.5	9.2	15.1 +
Juab	208	341	32.2 -	94.4	115	52.2	7.2 -	37.4	0	15.3	9.4	25.5 +
Kane	123	265 -	31.1 -	56.3 -	120 +	27.4 -	14.4	14.8	0	10.0	12.7	19.9
Millard	310	282 -	24.4 -	80.7	114 +	34.1 -	9.3 -	11.4 - -	1.3 -	13.4	8.6	9.6
Morgan	128	350	19.8 -	96.5	138 +	39.7	13.4	22.8	14.1	12.7	6.6	17.4
Piute	70	384 +	80.5 +	87.0	135	33.0	0	0	43.7 + +	20.8	22.0	18.6
Rich	46	283	0	121	200 + +	27.1	18.1	26.6	0	0	5.1	5.5
Salt Lake	15967	310 - +	29.8 - +	91.3 - +	103 +	38.5 - +	11.6 -	24.6	7.6	12.9 -	9.7	12.0 +
San Juan	151	215 -	29.0 -	46.1 - -	54 -	19.5 - -	2.8 - -	21.5	15.4	9.2	4.6	4.8
Sanpete	507	313 -	18.6 - -	84.4	135 + +	32.5 -	11.0	24.9	7.5	9.6	9.9	14.8
Sevier	486	301 -	21.6 -	60.6 - -	141 + +	28.2 -	11.1 -	14.4	11.6	15.0	16.2 + +	9.4
Summit	235	307 -	18.7 -	94.9	119 +	35.1	15.2	16.1	6.9	20.0	6.7	14.4
Tooele	632	321 -	41.0 - +	82.2	107 +	37.6 -	11.4	16.8	8.0	14.9	10.1	8.9
Uintah	421	297 -	34.3 -	74.7	95	26.7 -	11.2	26.7	6.4	12.8	13.3	6.2 -
Utah	4108	274 - -	19.6 - -	78.4 -	113 +	31.0 - -	9.5 -	22.5	4.3 - -	14.0	10.4	11.3 +
Wasatch	249	322	33.6 -	111	111	28.8 -	16.6	23.2	6.8	13.5	10.8	11.2
Washington	1070	294 -	22.0 -	64.3 - -	105 +	39.7 -	11.6 -	14.8 - -	4.0	14.1	8.0	15.3 +
Wayne	62	275	13.0 -	53.0	78	24.0	8.5	5.8	7.2	26.2	14.9	15.4
Weber	4104	291 -	27.8 -	71.5 - -	98 +	39.1 -	10.6 -	25.7	7.9	13.5	9.1	11.9 +
State of Utah	36134	298 -	26.9 -	83.0 -	106 +	36.5 -	11.1 -	23.8	6.8 -	13.1 -	9.9	11.9 +
U.S. (SEER)		354	54.5	95.7	81.3	51.0	17.3	24.2	7.9	15.1	10.0	9.5

EXPLANATIONS (CONT)

are significantly higher than the state are noted with a plus sign in the second column after the number, and the counties which are significantly lower than the state rates are noted with a minus sign. The confidence intervals are almost certainly too narrow, for the reasons above, and the appropriate significance level is probably in the range of 0.10 - 0.15. Supporting this estimate is the fact that 14% of the county rates do not include the statewide rates in their confidence intervals. However, the significance tests still help put the county rates into perspective, both when comparing them to statewide rates and national rates.

These rates are age-adjusted by the direct method to the 1970 standard U.S. population. Only malignant cases occurring in Utah residents were considered.

¹National Cancer Institute. SEER Program: Cancer Incidence and Mortality in the United States 1973-1981. NIH Publication Number 85-1837.

² Breslow NE, Day NE. Statistical methods in cancer research, Volume 2 Lyon: IARC Scientific Publication Number 82; Page 70.

³ National Cancer Institute. 1987 Annual Cancer Statistics Review, including cancer trends: 1950 - 1985. NIH Publication Number 88-2789.

DISCUSSION

General

The variation in incidence rates by county was modest. When the statewide rate for a site was significantly lower than the national rate, the individual counties were also lower, or at least not significantly higher, than national rates. The only exception to this was cervical cancer in Grand and Piute counties. When statewide rates were significantly higher than the national rate for that site, no counties were significantly lower than the national rate. Maps were made, showing the higher and lower counties for each site. There were no consistent geographical patterns noted for any site.

All sites, both sexes.

Utah had an overall incidence rate which was 17% below the national average. The rates varied by county, but were significantly lower than U.S. rates in 18 of the 29 counties, and were not significantly higher in any county. The main reason for the lower overall rate in Utah is the low rate of cigarette smoking; this is reflected in low rates for lung and bladder (and perhaps cervix) cancers.

Lung and bronchus, both sexes (ICD-O 162.2-162.9).

Utah had a lung cancer incidence only half that of the national average. The rates for 23 of the counties were significantly lower than U.S. rates,

and none were significantly higher. There was a correlation between lung cancer rates and cervical cancer rates by county; the association between smoking and cervical cancer has been noted numerous times in the past. There was not a similar association between lung and bladder cancer rates. Although the rates for males were higher than for females, the gender specific rates by county tended to parallel each other, especially when excluding counties with fewer than 10 cases. The rates were significantly below national averages in 17 counties for males, and in 18 counties for females.

Breast, females (ICD-O 174.0-174.9).

Utah had a breast cancer incidence 13% below the national average. The rates for 10 of the counties were significantly lower than U.S. rates, and none were significantly higher. These low rates may be due to early and frequent pregnancies, which have been shown to be protective.

Prostate, males (ICD-O 185.9).

Utah had a prostate cancer incidence 30% higher than the national average. The rates for 17 counties were significantly higher than U.S. rates, and none were significantly lower. No explanation for these high rates has been found.

Colon, both sexes (ICD-O 153.0-153.9).

Utah had a colon cancer incidence 18% lower than the national average. The rates for 18 counties were significantly lower than U.S. rates, and none were significantly higher. Dietary factors are apparently related to these lower rates.

Bladder, both sexes (ICD-O 188.0-188.9).

Utah had a bladder cancer incidence 36% lower than the national average. The rates for 10 counties were significantly lower than U.S. rates, and none were significantly higher. These low rates appear to be related to low smoking rates.

Uterus, females (ICD-O 182.0-182.8).

Utah had essentially the same rate as the national average. Three counties had significantly lower rates than the U.S. rates, and one was significantly higher.

Cervix, females (ICD-O 180.0-180.9)

Utah had a cervix cancer incidence 14% lower than the national average. The rates for five counties were significantly lower than U.S. rates, and two were significantly higher. Smoking appears to be related to this cancer as well.

Lymphomas, both sexes

(ICD-O M-9590-9594, 9650-9698, 9702-9704). Utah had a lymphoma incidence 13% lower than the national average, e. The rate for one county was significantly lower than U.S. rates, and none were significantly higher. No risk factors have been proposed to explain these lower rates.

Leukemias, both sexes

(ICD-O M-9800-9904).

Utah had essentially the same leukemia incidence rate as the national average. The rate for three counties were significantly higher than U.S. rates, and none were significantly lower. The counties with higher rates did not form a geographic cluster.

Melanoma, both sexes

(ICD-O M-8720-8790).

Utah had a melanoma incidence 25% higher than the national average. The rate for seven counties were significantly higher than U.S. rates, and none were significantly lower. The combination of light skin and high sun exposure appears to be responsible for these high rates.

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Incineration of explosives
Gaseous emissions threaten the atmosphere

Citizens for Safe Water Around Badger
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■ Incineration of explosives poses threat to atmosphere

Disposal of obsolete explosives by incineration may pollute the atmosphere, according to a study carried out by Jehuda Yinon, of the Weizmann Institute of Science, Rehovot, Israel, and Richard Yost, of the University of Florida, Gainesville. In research that will be presented at the 13th International Mass Spectrometry Conference in Budapest, Hungary, later this month, Yinon and Yost pyrolyzed a number of common explosives, analyzed the combustion products by gas chromatography and mass spectrometry, and found that burning common explosives produces toxic gases such as nitric oxide and carbon monoxide. The chemists now aim to determine whether combustion of explosives under different conditions can eliminate toxic product formation. Disposing of large quantities of explosives in an environmentally acceptable manner poses serious difficulties, Yinon says. Dumping, burial, and open-air detonation—methods that have been attempted to date—all cause serious contamination of the surroundings. He adds that bacterial transformation and supercritical water degradation may eventually prove safer, although work on these techniques is still in an early experimental stage.

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"Bang Box Tests"

**Emission factors from burning of propellants
include toxic and carcinogenic substances**

Citizens for Safe Water Around Badger
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Table 2 Average Emission Factors for Propellant Burns.

Analyte	BangBox		Phase A			Phase B			Phase C		
	Double Base	Composite	Triple Base	Manuf Res	M-1	M-6	Double Base*	M-1	M-6	Double Base*	
INORGANIC COMPOUNDS											
Carbon Dioxide	0.97	0.42	0.66	0.77	1.1	1.06	1.0	1.1	1.06	1.0	
Carbon Monoxide	0.91×10^{-3}	0.13×10^{-3}	0.025×10^{-3}	0.5×10^{-3}	0.25×10^{-3}	0.095×10^{-3}	0.7×10^{-3}	0.25×10^{-3}	0.095×10^{-3}	0.7×10^{-3}	
Nitrogen Oxide	0.14×10^{-3}	3.0×10^{-3}	5.2×10^{-3}	2.8×10^{-3}	1.2×10^{-3}	2.4×10^{-3}	2.6×10^{-3}	1.2×10^{-3}	2.4×10^{-3}	2.6×10^{-3}	
Nitrogen Dioxide	0.88×10^{-3}	0.61×10^{-3}	2.1×10^{-3}	0.5×10^{-3}	0.47×10^{-3}	5.2×10^{-3}	0.150×10^{-3}	0.47×10^{-3}	5.2×10^{-3}	0.150×10^{-3}	
VOLATILE COMPOUNDS											
Methane	67×10^{-6}	20×10^{-6}	BD	BD	8000×10^{-6}	46×10^{-6}	750×10^{-6}	8000×10^{-6}	46×10^{-6}	750×10^{-6}	
Total Non-methane Hydrocarbons	160×10^{-6}	33×10^{-6}	15×10^{-6}	45×10^{-6}	460×10^{-6}	13×10^{-6}	560×10^{-6}	460×10^{-6}	13×10^{-6}	560×10^{-6}	
Benzene	11×10^{-6}	5.7×10^{-6}	BD	BD	4.8×10^{-6}	1.7×10^{-6}	16×10^{-6}	4.8×10^{-6}	1.7×10^{-6}	16×10^{-6}	
SEMI-VOLATILE COMPOUNDS											
2,4-Dinitrotoluene	BD	10×10^{-9}	BD	BD	1.2×10^{-9}	1.0×10^{-9}		1.2×10^{-9}	1.0×10^{-9}		
2,6-Dinitrotoluene	14×10^{-9}	3.7×10^{-9}		BD	BD	0.1×10^{-9}		BD	0.1×10^{-9}		
2,4,6-Trinitrotoluene	50×10^{-9}	BD		BD	BD	BD		BD	BD		
2-Nitronaphthalene	54×10^{-9}	13×10^{-9}		3.7×10^{-9}	BD	BD		BD	BD		
N-Nitrosodiphenylamine	1500×10^{-9}	35×10^{-9}		19×10^{-9}	BD	0.14×10^{-9}		BD	0.14×10^{-9}		
4-Nitrophenol	0.69×10^{-6}	0.41×10^{-6}	BD	BD	NA	NA		NA	NA		
Diphenylamine	BD	BD	BD	20×10^{-9}	0.11×10^{-9}	0.26×10^{-9}		0.11×10^{-9}	0.26×10^{-9}		
1-Nitropyrene	BD	20×10^{-9}		NA	BD	BD		BD	BD		
Naphthalene	BD	1400×10^{-9}		1500×10^{-9}	19×10^{-9}	75×10^{-9}		19×10^{-9}	75×10^{-9}		
Benz[a]anthracene	BD	BD		38×10^{-9}	BD	BD		BD	BD		
Benzo[a]pyrene	900×10^{-9}	BD		23×10^{-9}	BD	BD		BD	BD		
Pyrene	NA	NA		71×10^{-9}	BD	BD		BD	BD		
Phenol	4400×10^{-9}	3800×10^{-9}		8000×10^{-9}	3.43×10^{-9}	1.5×10^{-9}		3.43×10^{-9}	1.5×10^{-9}		
Dibenzofuran	0.26×10^{-6}	0.28×10^{-6}		0.26×10^{-6}	BD	BD		BD	BD		

Data not available for Semi-volatile compounds. BD - Below Detection Limits. NA - Not a target analyte.

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ARMY TESTS OF MUNITIONS BURNING AND DETONATION

a summary by James Teo

prepared for the Pacific Studies Center, August, 1993

In January, 1992 the U.S. Army conducted a series of tests to identify and quantify the emission products from the open burning and open detonation (OB/OD) of military munitions. These tests were labeled as the Bangbox Test Series and Field Test Series A,B, and C. The purpose of these tests was to accumulate data that would be beneficial in acquiring disposal permits under provisions of the Resource Conservation and Recovery Act (RCRA) Subpart X. It is likely that the Army also hoped, through such tests, to convince the public that its munitions disposal practices are safe. The Bangbox Test Series and the Field Test Series A,B and C both try to prove that the emissions of toxic substances are minute and do not travel far, hence they do not present a threat to human health.

The Bangbox tests were conducted using small amounts of explosives and propellants, in a controlled indoor environment. In comparing the two series, the Army hoped to show that it could simulate open disposal with a method that is generally less expensive, safer, and more consistent.

The reports generated from the Bangbox and Field Tests give an extensive report of the different chemicals and elements emitted. They are useful tools, for they indicate what substances to test for in actual disposal situations. However, as tests conducted with small quantities under laboratory conditions, they provide no assurance that toxic exposures from OB/OD in the real world are small enough to pose no threat to human health and the environment.

First, the tests do not take into account the cumulative impact of continued testing. Each test measured the impact of disposal of a single explosive or propellant with a maximum weight of 2,000 to 8,000 pounds, or one to four tons. To put this in perspective the military, as of 1990, had designated 206,156 tons for demilitarization, and such excess and obsolete stocks are rapidly growing. Before 1990 the stock of items to be demilitarized rose by 24,000 tons each year. In 1990 the new items to be demilitarized jumped to 32,000, in 1991 to 36,000, in 1992 to 66,000. This year it is supposed to peak at 120,000 tons.

Over a period of years, even small toxic releases from individual events will create large potential exposures. Furthermore, the Army viewed each toxic substance independently, ignoring the potential for both combined and synergistic effects. The release of many chemicals, in low concentrations, could be a greater threat to the environment and human health than the release of a single substance at a greater concentration.

Finally, in the tests, the Army reported near complete combustion of the explosive or propellant. Testers paid a large amount of attention to each and every single detail of the detonation process. In a real life scenario, after the process has been completed over and over again, incomplete reactions are much more likely. For example exact procedures might not be followed or a quota might have to be met, resulting in a rushed job. Incomplete combustion generally means that significantly higher portions of the carbon from the burning or detonation is released in toxic organic—that is, carbon-containing—compounds, instead of carbon dioxide.

BANGBOX TEST SERIES

In the Bangbox Test Series, the Army measured emissions from the burning or detonation of four substances: Trinitrotoluene (TNT), lead-containing Double-Base Propellant, Composite Base Propellant (Solid Rocket Fuel), and Foam Attenuated TNT. In each test, it analyzed five categories of emissions: gases, volatile organic compounds, semi-volatile organic compounds, bubblers and metals.

List of compounds and their scientific nomenclature:

CO ₂	Carbon dioxide
CO	Carbon monoxide
NO ₂	Nitrogen dioxide
NO	Nitrous oxide
CH ₄	Methane
TNMHC	Total non-methane hydrocarbons (i.e. propane, ethane, acetylene and other light hydrocarbons)
HCl	Hydrogen chloride

2,4,6 TNT (Trinitrotoluene)

Gases % of emissions parts/million (ppm)

CO ₂	133.00	1,330,000
CO	0.717	7,170
NO ₂	0.260	2,600
NO	1.46	14,600

Volatile Organic Compounds

CH ₄	0.0131	131
Paraffins (see Fig. 1)	0.0145	145

Semi-Volatile Organic Compounds

Phenol	0.00252	25.2
Naphthalene	0.0150	150
✓ 2,5 Diphenyloxazole	0.00723	72.3

Bubblers

Ammonia	0.0292	292
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Metals

Barium	0.0931	931
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Double-Base Propellant

Gases % of emissions parts/million (ppm)

CO ₂	97.00	970,000
NO	0.281	2,810
NO ₂	2.47	24,700

Volatile Organic Compounds

None over 100 ppm

Semi-Volatile Organic Compounds

None over 100 ppm or no data

Metals

Copper	0.37	3,710
Lead	1.27	12,700

Foam Attenuated TNTGases % of emissions parts/million (ppm)

CO ₂	123.00	1,230,000
CO	7.64	76,400
NO ₂	0.522	5,220
NO	0.417	4,170

Volatile Organic Compounds

Olefins (see Fig. 1) 0.38 3,800

Semi-Volatile Organic Compounds

No sampling was completed for SVOC's

Metals

No sampling was completed for metals

Composite Base (Solid Rocket Fuel)Gases % of emissions parts/million (ppm)

CO ₂	41.80	418,000
NO	0.157	1,570
NO ₂	0.537	5,370

Volatile Organic Compounds

None over 100 ppm

Semi-Volatile Organic Compounds

None over 100 ppm

Bubblers

HCl	0.0943	943
-----	--------	-----

Metals

Aluminium	0.0133	133
Iron	0.0604	604
Barium	0.0159	159

FIELD TEST SERIES

In Field Tests A, B and C several different explosives and propellants were detonated or burned. These consisted of Trinitrotoluene—both surface and suspended detonations—Composition B, Explosive D, RDX, Propellant M1, Propellant M6, Triple Base, and two Manufacturing Residues. In addition to quantifying non-metallic emissions, the study measured concentrations over distance. In general concentration levels increased with distance until about 200 meters, where they peaked and then subsided.

Unfortunately, the field tests did not analyze for metallic releases. This is a significant shortcoming. Although the concentration of various organic (carbon-containing) compounds varies with the efficiency of the burn, the releases of elemental metals are determined by their composition within the munition or the underlying pan.

2,4,6 TNT (Trinitrotoluene)

Gases	% of emissions	
	(surface)	(suspended)
CO ₂	129.00	135.00
CO	6.10	0.73
NO	0.14	0.25
NO ₂	0.36	0.21
<u>Volatile Organic Compounds</u>		
CH ₄	0.0015	0.0015
TNMHC	0.0021	0.005
<u>Semi-Volatile Organic Compounds</u>		
Phenol	0.0000052	0.000012

The suspended detonations resulted in a more complete combustion with noticeably more amounts of carbon being converted to carbon dioxide. Suspended detonations also launched considerably less soil debris into the atmosphere. The highest average particulate mass concentration for surface detonations was 258 mg/m³ and 37 mg/m³ for suspended detonations. Although the VOC's and SVOC's levels are all very low it is important to note that the highest levels were recorded for Phenol, Naphthalene, Methane and TNMHC's (total non-methane hydrocarbons, i.e. propane, ethane, acetylene and other light hydrocarbons). For surface detonations the average amount of soil ejected was 114 metric tons.

Composition B

Gases	average % of emissions
CO ₂	87.00
CO	3.00
NO ₂	0.10
NO	0.08
<u>Volatile Organic Compounds</u>	
CH ₄	0.06
TNMHC	0.12

Although Semi Volatile Organic Compound concentrations were not high within the 10 meter explosive site, their concentrations—particularly 2,4,6 TNT, 2,4,6 DNT, Naphthalene, Pyrene and Diphenylamine—did increase with distance, peaking at 200 meters and then subsiding.

Explosive D

<u>Gases</u>	<u>average % of emissions</u>
CO ₂	99.00
CO	5.30
NO ₂	0.10
NO	0.09

<u>Volatile Organic Compounds</u>	
CH ₄	0.24
TNMHC	0.20

The average weight of the ejected soil was 114 metric tons. As with Composition B, SVOC concentration levels generally rose the further the distance from the detonation. For example, Naphthalene was recorded in concentrations of 2.2 µg/kg at 50 meters, 6.1 µg/kg at 100 meters, 11 µg/kg at 150 meters, and 120 µg/kg at 200 meters. (For a complete list refer to figures 2 and 3)

RDX

<u>Gases</u>	<u>% of emissions</u>
CO ₂	57.00
CO	3.10
NO	0.09
NO ₂	0.06

<u>Volatile Organic Compounds</u>	
CH ₄	0.02
TNMHC	0.13

Semi-Volatile Organic Compounds
All below detection or trace amounts

For RDX the average amount of displaced soil was 67 metric tons. Concentrations of the SVOC's rose with increased distance from the detonation site. However the concentration levels peaked at about 150 meters.

Propellant M1

<u>Gases</u>	<u>% of emissions</u>
CO ₂	111.00
CO	0.025
NO	0.12
NO ₂	0.047

<u>Volatile Organic Compounds</u>	
CH ₄	0.80
TNMHC	0.046

Semi-Volatile Organic Compounds

All below detection or trace amounts

There is a very high rate of conversion of carbon to carbon dioxide (99% for M1). Other gases and VOC's such as CO, NO, NO₂, TNMHC and Benzene were all detected at trace levels. Methane, however, accounted for approximately 1% of the emissions. The mass of ash recovered from sputter around the pan varied from 5.61 g/m³ to 8.76 g/m³. Of this 2,4 DNT recorded the highest levels, ranging from 440 to 850 ng/m³. Furthermore, there was 2.87 mg of 2,4 DNT spread out over 100 m². Finally, in the burn pan itself up to 100 grams of 2,4 DNT was recorded for a propellant weighing 400 kg. Other SVOC's recording higher concentrations were 2,6 DNT and Diphenylamine.

Propellant M6

<u>Gases</u>	<u>% of emissions</u>
CO ₂	106.00
CO	0.000095
NO	0.24
NO ₂	0.052

Volatile Organic Compounds

All below detection or trace amounts

Semi-Volatile Organic Compounds

All below detection or trace amounts

The carbon conversion rate to carbon dioxide was 99%. Other gases and VOC's such as CO, NO₂, CH₄, TNMHC and Benzene were all recorded at trace levels. Nitrous oxide, however, was measured at 0.25% of the emissions. In the sputter area (less than 1 meter away from the burn pan) and fallout area (6 to 12 meters) 2,4 DNT was detected at the highest concentrations. For sputter, 2,4 DNT values ranged from 44 to 60 ng/m³. Over 1,000 meters 1.32 mg. of 2,4 DNT was detected. Finally, in the burn pan residue the highest concentrations detected were 2,4 DNT at .13 g/kg., Dibenzofuran at .072 g/kg and Diphenylamine at .002 g/kg..

Triple Base Propellant

<u>Gases</u>	<u>% of emissions</u>
CO ₂	66.00
CO	0.000025
NO	0.52
NO ₂	0.21

Volatile Organic Compounds

All below detection or trace amounts

Semi-Volatile Organic Compounds

All below detection or trace amounts

The rate of carbon conversion to carbon dioxide was 99%. Rough estimates of particulate concentrations in clouds amounted to 4 mg/m³. It is suggested by the military that these particulates are composed of soil particles that have been entrained in the smoke column.

Any VOC and SVOC emissions detected were of trace amounts ranging from 10^{-6} to 10^{-9} g/g. Fallout values, recordings taken at six and twelve meters from the pan, for the SVOC's were highest in Phenol (0.120 $\mu\text{g/g}$), Ethyl Centralite (2.80 $\mu\text{g/g}$), Nitroglycerin (0.73 $\mu\text{g/g}$) and Nitroguanidine (0.79 $\mu\text{g/g}$). Beyond 12 meters analyte levels were undetectable.

Manufacturing Residue

Gases	% of emissions	
	Mixed	NOSIH-AA-2 and N5
CO ₂	77.00	100.00
CO	0.049	0.07
NO	0.28	0.26
NO ₂	0.051	0.015

Volatile Organic Compounds

CH ₄	Trace amounts	0.075
TNMHC	Trace amounts	0.056

Semi-Volatile Organic Compounds

Phenol	0.000008	Trace amounts
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The rate of conversion of carbon to carbon dioxide was 99%. For every kilogram of propellant burned 16 grams of particulate matter was released into the atmosphere. This resulted in particulate concentrations of 4.7 mg/m³ within the atmosphere. In relation to this the Manufacturing Residue propellant is composed mainly of Ammonium perchlorate and some metal which would, "release undesirable emittant products during combustion." At ground level the highest concentrations were detected in 2,4 DNT. Over 1000 meters 1.32 mg/m³ of 2,4 DNT was recorded. Other noticeable concentrations were observed in Pyrene, Naphthalene and 2,6 DNT.

As the military closes dozens of major bases, many of the weapons stored at those installations are designated for demilitarization. Thus, the environmental and public health threat posed by open burning and open detonation will continue to increase unless the armed services are forced to develop and utilize alternatives.

The Bang Box and Field Tests generated useful information, but they should not be accepted as proof that open burning and open detonation are safe, particularly since the real world examples of harm are just starting to be documented. For example, when the Blue Grass Army Depot in Richmond, Kentucky committed unauthorized and excessive burning of varied propellants, six people were hospitalized and forty others were treated for throat irritations, chest pains and nausea. A detailed epidemiological study of open propellant burning at Camp Edwards, Massachusetts, demonstrated a link to lung and breast cancer among nearby residents. High cancer rates in Tooele County, Utah, site of the Bangbox and Field A, B and C tests, may be associated with munitions disposal there.

It is in the real world that the safety of munitions disposal must be demonstrated, but studies should be based upon past exposures, not continuation of existing, irresponsible practices. The neighbors (and residents) of military bases should no longer be treated as guinea pigs. The U.S. military has both the technological capability and the financial resources to protect from its own activities the health of the public and the land that is pledged to defend from foreign adversaries.

TOXIC SUBSTANCES FACT SHEET

Carbon monoxide (CO): 0.001% of CO can bring on symptoms of poisoning if inhaled directly. 2% is usually fatal. CO emissions ranged from trace amounts to 7.64% (Foam Attenuated TNT).

Nitrogen oxides (NOx): Nationally, emissions of nitrogen oxides are the main contributors to acid deposition. Amounts of NOx emissions ranged from trace levels to 2.47% (Double-Base Burn).

Phenol: Repeated exposure to low levels of phenol in drinking water has been linked to diarrhea and mouth sores. In the air these low levels have been linked to muscle tremors and loss of coordination. The National Institute of Occupational Safety and Health (NIOSH) has limited phenol in the workplace to 5 ppm/10hr. The EPA has set a limit of 0.3 mg/l of water. Phenol emissions ranged from trace amounts to 25.2 ppm (TNT explosive).

Naphthalene: The primary concern for humans is that short or long exposures to naphthalene have been linked to Hemolytic anemia (a condition involving the break-down of red blood cells). Also, kidney and liver damage, jaundice, and cataracts may occur. The Occupational Safety and Health Administration (OSHA) limit is 10 ppm/8hr. The EPA's policy is that if more than 100 pounds of naphthalene is released into the environment then it must be reported immediately to the national government. Naphthalene emissions ranged from trace amounts to 150 ppm (TNT explosive).

2,4,6 DNT: Exposure to 2,4,6 DNT has been linked to heart disease and damaged nervous systems. One study even showed reduced levels of sperm in men. The OSHA limit is .2 ppm/8hr. and the EPA dictates that releases of more than 1000 pounds into the environment must be reported. Releases of 2,4,6 DNT ranged from trace amounts to 0.13 g/kg. This was recorded in the M6 propellant burn pan residue.

Lead (Pb): Lead is a toxic heavy metal that is highly prone to accumulation and dispersal because, as an element, it does not break down. The effects of lead poisoning are widespread. In children it can lead to low IQ scores, slow physical growth, and hearing problems. In adults lead exposure may increase blood pressure. High levels may also lead to brain and kidney damage and reduced levels of sperm. The EPA limits lead in air to 1.5 $\mu\text{g}/\text{m}^3$ over a three-month exposure period. NIOSH limits lead concentrations to 100 $\mu\text{g}/\text{m}^3/10$ hrs in the workplace. Emissions of lead ranged from trace amounts to 1.3% (TNT explosive).

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Figure 1

Table 5.7 Categories of Volatile Organic Compounds Analyzed by OGC.

Compound	Units	Compound	Units	
Carbon dioxide	ppmv	Olefins - Cont'd		
Carbon monoxide		Isoprene	$\mu\text{g}/\text{m}^3$	
Methane		1,3-Butadiene		
Paraffins	trans-2-Pentene			
n-Heptane	$\mu\text{g}/\text{m}^3$	cis-2-Butene		
2,4-Dimethylhexane		cis-2-Hexene		
2-Methylheptane		1-Pentene		
2-Methylpentane		2-Methyl-2-butene		
3-Methylpentane		1-Hexene		
Ethylcyclohexane		4-Methyl-1-pentene		
n-Hexane		trans-2-Butene		
i-Butane		i-Butene		
Methylcyclopentane		2-Methyl-2-pentene		
n-Butane		2-Methyl-1-butene		
2,4-Dimethylpentane		2-Pentene		
2,2-Dimethylpropane		Cyclopentene		
Cyclohexane		Non-Benzene Aromatics		
n-Pentane		Toluene		$\mu\text{g}/\text{m}^3$
2,3-Dimethylpentane		3-Ethyltoluene		
Cyclopentane		1,3,5-Trimethylbenzene		
3-Methylhexane		n-Propylbenzene		
n-Octane	1-Ethyltoluene			
Ethane	Styrene			
2,3-Dimethylhexane	i-Propylbenzene			
Methylcyclohexane	2-Ethyltoluene			
2,3,4-Trimethylpentane	Ethylbenzene			
n-Nonane	o-Xylene			
2,3-Dimethylbutane	p-Xylene			
2,2,3-Trimethylpentane	m-Xylene			
i-Pentane	1,2,4-Trimethylbenzene & sec-Butylbenzene			
Propane	Acetylene	$\mu\text{g}/\text{m}^3$		
2,2-Dimethylbutane	Benzene	$\mu\text{g}/\text{m}^3$		
3-Ethylhexane	Terpenes			
Olefins	$\mu\text{g}/\text{m}^3$	β -Pinene	$\mu\text{g}/\text{m}^3$	
Ethylene		α -Terpinene		
2-Methyl-1-pentene		d-Limonene		
Propene		α -Pinene		
1-Butene		Δ^3 -Carene		
trans-2-Hexene		γ -Terpinene		
3-Methyl-1-butene		Terpinolene		
Myrcene				

Figure 2

Table 4.2.31a Explosive D, Summary of Semivolatile Organic Concentrations from Phase C Fallout Soil Samples, Based on Weight of Sample.

Source of Sample	Number of Observations		Analyte ^b	Range Response ($\mu\text{g}/\text{kg}$) ^c	Geometric Mean ^d ($\mu\text{g}/\text{kg}$)
	Total	AD ^e			
50-m circle	3	3	2,4-Dinitrotoluene	0.48 to 0.56	0.51
	3	3	2,6-Dinitrotoluene	0.059 to 0.25	0.15
	3	3	2,4,6-Trinitrotoluene	0.73 to 38	5.3
	3	1	2-Nitronaphthalene	BD ^e to 0.085	0.085
	3	3	1,3,5-Trinitrobenzene	0.041 to 0.15	0.082
	3	1	2-Nitrodiphenylamine	BD to 0.61	0.61
	3	1	1-Nitropyrene	BD to 0.081	0.081
	3	2	Picric acid	BD to 1.9	1.2
	3	3	Naphthalene	0.97 to 6.5	2.2
	3	2	Benz[a]anthracene	BD to 0.97	0.89
	3	1	Pyrene	BD to 5.9	5.9
	3	1	Diphenylamine	BD to 1.7	1.7
100-m circle	3	3	2,4-Dinitrotoluene	10 to 15	12
	3	3	2,6-Dinitrotoluene	0.60 to 1.8	1.0
	3	3	2,4,6-Trinitrotoluene	4.5 to 34	12
	3	3	2-Nitronaphthalene	0.37 to 2.9	1.1
	3	2	N-Nitrosodiphenylamine	BD to 0.96	0.83
	3	3	1,3,5-Trinitrobenzene	0.69 to 2.2	1.3
	3	2	2-Nitrodiphenylamine	BD to 1.3	0.97
	3	2	1-Nitropyrene	BD to 0.18	0.14
	3	1	Picric acid	BD to 7.1	7.1
	3	3	Naphthalene	2.7 to 9.5	6.1
	3	2	Benz[a]anthracene	BD to 0.41	0.29
	3	3	Pyrene	7.6 to 12	10
	3	1	Dibenzofuran	BD to 2.4	2.4
	3	1	Diphenylamine	BD to 1.1	1.1

^aAbove detection limit.

^bSee Table 3.16 for list containing the semivolatile organics and the detection levels in soil.

^c μg of analyte per kg of soil.

^dGeometric means were computed from the values above the detection limit.

^eBelow detection limit.

Figure 3

Table 4.2.31b Explosive D, Summary of Semivolatile Organic Concentrations from Phase C Fallout Soil Samples, Based on Weight of Sample.

Source of Sample	Number of Observations		Analyte ^b	Range Response ($\mu\text{g}/\text{kg}$) ^c	Geometric Mean ^d ($\mu\text{g}/\text{kg}$)
	Total	AD ^a			
150-m circle	3	3	2,4-Dinitrotoluene	34 to 410	82
	3	3	2,6-Dinitrotoluene	4.5 to 24	10
	3	3	2,4,6-Trinitrotoluene	11 to 73	20
	3	3	2-Nitronaphthalene	2.5 to 14	7.0
	3	3	N-Nitrosodiphenylamine	2.8 to 20	9.1
	3	3	1,3,5-Trinitrobenzene	3.5 to 17	7.1
	3	3	2-Nitrodiphenylamine	3.1 to 35	11
	3	3	1-Nitropyrene	3.2 to 16	7.8
	3	1	Picric acid	BD ^e to 18	18
	3	2	Naphthalene	BD to 29	11
	3	2	Benz[a]anthracene	BD to 5.1	3.2
	3	1	Benzo[a]pyrene	BD to 1.7	1.7
	3	2	Pyrene	BD to 65	24
	3	3	Dibenzofuran	9.2 to 130	24
	3	3	Diphenylamine	9.7 to 23	15
200-m circle	3	3	2,4-Dinitrotoluene	65 to 1300	210
	3	3	2,6-Dinitrotoluene	11 to 140	37
	3	3	2,4,6-Trinitrotoluene	15 to 460	120
	3	3	2-Nitronaphthalene	12 to 150	41
	3	3	1,3,5-Trinitrobenzene	8.1 to 100	31
	3	3	2-Nitrodiphenylamine	7.5 to 180	39
	3	3	1-Nitropyrene	4.6 to 38	18
	3	2	Picric acid	BD to 36	36
	3	3	Naphthalene	36 to 720	120
	3	1	Benz[a]anthracene	BD to 20	20
	3	1	Benzo[a]pyrene	BD to 53	53
	3	3	Pyrene	5.8 to 260	11
	3	3	Dibenzofuran	13 to 540	19
	3	2	Diphenylamine	BD to 140	10

^aAbove detection limit.

^bSee Table 3.16 for a list containing the semivolatile organics and the detection levels in soil.

^cRepresents μg of analyte per kg of soil.

^dGeometric means were computed from the values above the detection limit.

^eBelow detection limit.

Badger Army Ammunition Plant
Open burning of propellants threatens the environment
and the health of workers and residents

Citizens for Safe Water Around Badger
E12629 Weigand's Bay South Merrimac WI 53561 (608) 643-3124

Dept. of the Army Headquarters,
United States Armament, Munitions & Chem. Command

Env. Assessment for Total Plant Op.
Badger Army Ammunition Plant
July 1983.

BADGER AAP
TOTAL PLANT
OPERATIONS - EA
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b. Incineration

Figure 3-A shows the site of the present incinerator which is in standby, inoperative, and noncomplying. The MCA project for the construction startup, proveout and operation of the Contaminated Waste processor-Small Unit is scheduled for completion during 1982. This unit will be used to dispose of combustible waste that is or may be contaminated with Propellants Explosives and/or Pyrotechnics (PEP). A MCA project submitted for the installation startup, proveout, and operation of an Explosive Waste Incinerator is in the out-year program. The use of these incinerators will reduce the amount of particulate matter and oxides of nitrogen released to the atmosphere during open burning. Amounts and types of materials to be incinerated are directly related to operational status and plant mission assignment.

c. Open Burning

- ✓
- (1) Figure 3-A shows the current site where open burning is carried out to dispose of waste explosives and propellants and explosive-contaminated wastes because it was the only known method for safe and economical disposal of these materials. However, this method does not comply with current EPA standards. MCA projects submitted by BAAP for the installation of facilities for the incineration of explosive and propellant wastes and explosive contaminated waste are described in 4.b. above. Table I-C describes the location, contents, and status of land disposal sites at BAAP.
 - (2) The Burning Grounds are operated by BAAP's Maintenance Department.
 - (3) During standby operations through full mobilization, approximately 65 tons of material per year are accumulated at the Burning Grounds for disposal. These materials include waste explosives and propellant as well as roofing and structural items that are contaminated with explosives and/or propellant.
 - (4) Normally, material is burned once per month depending on rate of accumulation. Ignition is accomplished with excelsior, fuel oil and a match.
 - (5) Restrictions regarding operation of the Burning Grounds depend on the quantity of material to be burned, the wind factor and humidity. All operations of the Burning Grounds are covered by the Burning Grounds SOP.
 - (6) No unusual burning operations are expected or anticipated to occur.
 - (7) All "burns" are restricted to daylight hours.
 - (8) Applicable SOP's/regulations for Burning Grounds are Standing Operating Procedure - Burning Grounds.
 - (9) The MCA incinerator programs should eliminate most of the requirements for open burning and make the currently used area available

Proposed Open Burning of Hazardous Waste at BAAP

Badger Army Ammunition Plant has applied to the Wisconsin Department of Natural Resources for a permit to Open Burn/Open Detonate (OB/OD) up to 2,500 pounds per day of waste propellants. The current level of open burning is less than 1,000 pounds per YEAR. The new open burning facility would be built at the same site as the old propellant burning grounds on the far West side of BAAP near Highway 12. The Wisconsin Department of Natural Resources recommended utilizing the same site.

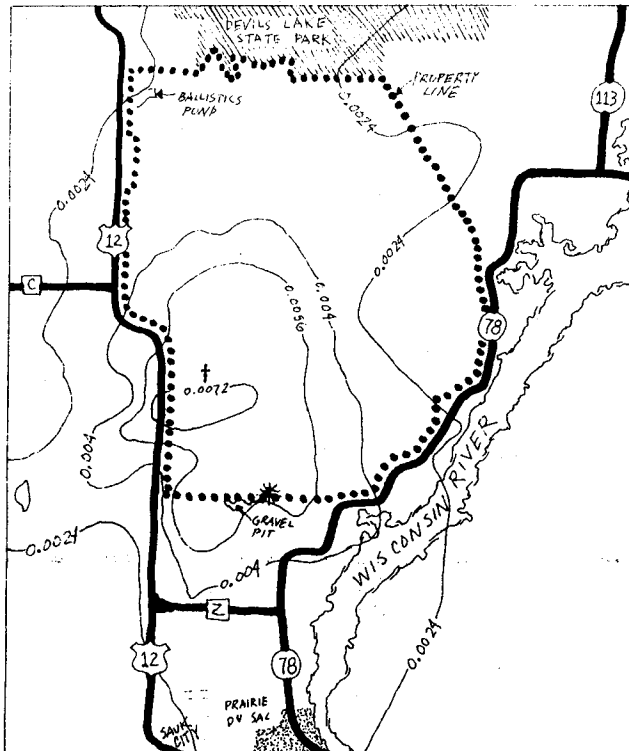
1. Open burning could distribute contaminated ash as far east as the Wisconsin River, as far south as Prairie du Sac, and west beyond Bluffview. See map.

2. One of the contaminants in this ash is lead. SWAB has asked that the army not burn lead-based propellants, and they have refused. SWAB has asked that BAAP never accept waste from other sites for burning, and they have refused. BAAP wrote to the Town of Merrimac on May 4, 1992: "Regarding a prohibition against burning propellants with a lead component, the Department of Army cannot accept such a prohibition." In this same letter, BAAP writes: "The installation will not open burn any waste from other locations except under emergency or written request from appropriate regulatory agency." (Currently, Fort McCoy is trying to get their own OB/OD permit.)

3. If we do not stop this permit, BAAP could become the second-highest emitter of lead in Wisconsin. According to a May 18, 1992 letter from Jay Goldring, Ph.D., who is a toxicologist with the Wisconsin Department of Health, "In addition, if Badger personnel were to burn the full amount allowed them under the permit and if all the material burned were AA2 (consisting of 1.5% lead), the facility would emit approximately 13,688 pounds/year of lead. According to 1990 Toxic Release Inventory data, this emission rate would make Badger the second-highest emitter of lead in Wisconsin."

4. Lead is a serious health concern. According to Dr. Louis Sullivan, Health and Human Services Secretary, lead poisoning is the "number one environmental threat to the children in the United States."

5. Lead is not the only dangerous contaminant. According to the Army document "Residues From Open Burning," "nitroglycerin appears to be present in some samples both of the surface and subsurface soils. Nitroglycerin is present in many of the BAAP compounds in amounts ranging as high as 44.5% in the M8 propellant."



**Badger Army Ammunition Plant
Modeled Lead Concentration in Air--Proposed Operation**

Key: † = SOURCE
* = .00832 ug/m³ (Highest concentration)

6. 2,4-DNT is another contaminant in the ash which is also of a health concern. According to a March 11, 1992 Letter from Hank Weiss, MS, MPH, of the Bureau of Community Health and Prevention, "Dinitrotoluene (2,4-DNT) appears to have had come up positive in a review by the National Cancer Institute; however, its effect through uptake and metabolism by vegetation is not clear. Next, all of the soils sample contaminants, of course, pose varying degrees of leaching potential and therefore risk to groundwater supplies." It is interesting to note that in a March 4, 1992 letter, George C. Kopsak, Director of the Office of Munition, Office of the Secretary of Defense, wrote, "Items which contain known carcinogenic substances are not subjected to OB/OD." This appears to contradict what the Army has proposed at BAAP.

7. The Army's own contractors have advised utilizing an alternative to open burning. According to Warzyn Engineering, Inc. on September 24, 1982: "Steps toward the development of an alternative burning installation should continue. Until an ultimate disposal method is operational, all burning should be confined to as small an area as possible. Inactive areas should be abandoned immediately."

8. According to the Wisconsin DNR, the site is already highly contaminated with lead. In a March 4, 1985 report from L. Egge, after a site visit to BAAP, she states, "We did not see a burn, but it was described as a 10 to 15 foot flame height with a considerable plume of grey smoke (exempt from air regulations, NR 154.10). Since this

area had been used for open burning for many years and surface soil is already contaminated with high levels of lead (EP toxicity of soils samples up to 47 ppm) it would be difficult, if not impossible, to document current impacts from open burning in the dish."

9. State legislators support safe alternatives to open burning and incineration. State Senator Russ Feingold wrote to BAAP on July 15, 1992: "I believe the burden in this situation lies with the Army to find alternative methods of disposal which do not release toxic by-products into the environment."

"Further, I do not regard the possibility of an incinerator on the plant grounds an acceptable alternative, because this would still result in toxic output in addition to increasing the likelihood of additional waste being shipped to BAAP from other army installations. "Other Army installations have been subjected to scrutiny with regard to alternative systems. I urge you to lead the way in environmentally hazardous means of disposal with an environmentally safe system. The end goal should be no new contamination."

10. We may have reason to question the Department of Natural Resources' desire for public input. According to a February 25, 1992 interoffice memo from Mike Netzer, Hydrogeologist, WDNR, "I seriously doubt that anything that the Department could say at such a hearing would sway the SWAB group one way or the other. Instead, we would more likely see more of the "grand standing" by SWAB on issues that may or may not be related to the licensing of the propellant burning grounds."

"It is my feeling that rather than putting the Department on the spot, it should be BAAP's responsibility to discuss the status of the propellant burning grounds in any forum that is outside of the required hearing process required by state rules unless we have something to "give" to the SWAB group, which we do not."

11. Without pressure from the public and our legislators, the U.S. Army intends to burn lead-based propellants. Mike Netzer, February 25, 1992: "However, the issue of the propellant burning grounds is only one of many issues at BAAP that we must deal with. I don't think that it's advisable to start having public meetings on each and every issue that crops up with the 10 SWMU's that have been identified at BAAP."

SWAB intends to block this permit.
Write to Citizens for SWAB to find out how you can help.

1. Single-base propellant compositions are used in cannons, small arms, and grenades. These compositions contain the propellant nitrocellulose as their chief ingredient. In addition to containing a stabilizer, they may also contain inorganic nitrates, nitro-compounds, and nonexplosive materials such as metallic salts, metals, carbohydrates, and dyes.
2. Double-base propellant compositions are used in cannons, small arms, mortars, rockets, and jet propulsion units. This term generally applies to compositions containing both nitrocellulose and nitroglycerine. They can also be defined as a propellant containing nitrocellulose and a liquid organic nitrate which will gelatinize nitrocellulose. Additives are frequently used in addition to a stabilizer.
3. Triple-base propellant compositions are used in cannon units. This term is applied to propellants containing three explosive ingredients, with nitroguanidine as the major ingredient and the other two usually nitroglycerine and nitrocellulose.

Mixed nitrate esters are a propellant composition developed to replace the triple-base composition during a time of nitroguanidine shortages. As an example, the XM35 composition contains nitrocellulose, TMETN (1,1,1-trimethylolethane trinitrate), TEGDN (triethylene glycol dinitrate), and DEGN (diethylene glycol dinitrate). As another example, the XM34 composition contains nitrocellulose, BTTN (1,2,4-butanetriol trinitrate), TMETN, and TEGDN. The combination of mixed nitrate ester yields a higher gas volume and lower flame temperatures than the use of nitroglycerine alone.

4. Composite propellants contain neither nitrocellulose nor an organic nitrate. They are usually a physical mixture of a fuel such as metallic aluminum, a binder (which is normally a synthetic rubber that is also a fuel), and an inorganic oxidizing agent such as ammonium perchlorate. Composite propellants are used primarily in rocket assemblies and chemical fuel jet propulsion units.

A detailed chemical breakdown of all the propellant ingredients is provided in Tables D-1 and D-2 to demonstrate a representative sample of the waste propellants. These tables give the chemical composition of each propellant that could be treated in the thermal treatment unit. The potential compounds that could be formed during open burning exist for only a fraction of a second and therefore

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TABLE D-1

CURRENT PRODUCTION WASTES - (Percentages are approximate)

<u>NAME</u>	<u>CHEMICAL FORMULA</u>	<u>PERCENTAGES</u>
Nitrocellulose	$C_{12}H_{16}(ONO_2)_4O_6$	
Nitroglycerine	$C_3H_5N_3O_9$	
BALL POWDER® Propellant WC846		
Nitrocellulose	$C_{12}H_{16}(ONO_2)_4O_6$	85%
Nitroglycerine	$C_3H_5N_3O_9$	10.8%
Dibutylphthalate	$C_6H_4(COOC_4H_9)_{12}$	4.5%
Diphenylamine	$(C_6H_5)_2NH$	1.3%
Calcium Carbonate	$CaCO_3$.2%
BALL POWDER® Propellant WC870		
Nitrocellulose	$C_{12}H_{16}(ONO_2)_4O_6$	81%
Nitroglycerine	$C_3H_5N_3O_9$	10.8%
Dibutylphthalate	$C_6H_4(COOC_4H_9)_{12}$	6.0%
Diphenylamine	$(C_6H_5)_2NH$	1.2%
Calcium Carbonate	$CaCO_3$.2%
Potassium Nitrate	KNO_3	.9%
Tin Oxide	SnO	.9%
BALL POWDER® Propellant WC844		
Nitrocellulose	$C_{12}H_{16}(ONO_2)_4O_6$	85%
Nitroglycerine	$C_3H_5N_3O_9$	10.8%
Dibutylphthalate	$C_6H_4(COOC_4H_9)_{12}$	4.5%
Diphenylamine	$(C_6H_5)_2NH$	1.3%
Calcium Carbonate	$CaCO_3$.2%

TABLE D-2

POSSIBLE FUTURE PRODUCTION WASTES - (Percentages are approximate)

<u>NAME</u>	<u>CHEMICAL FORMULA</u>	<u>PERCENTAGES</u>
Nitroguanidine	$\text{CH}_4\text{N}_4\text{O}_2$	
DIGL-RP		
Nitrocellulose	$\text{C}_{12}\text{H}_{16}(\text{ONO}_2)_4\text{O}_6$	60.5%-65.5%
Diethylene Glycol Dinitrate	$\text{C}_4\text{H}_8\text{O}_5\text{N}_2$	35.7%-37.7%
Ethyl Centralite	$\text{C}_2\text{H}_5(\text{C}_6\text{H}_5)\text{NCON}(\text{C}_6\text{H}_5)\text{C}_2\text{H}_5$.20%-.50%
Methyldiphenyl Urea	$(\text{C}_6\text{H}_5)_2\text{NH}$.30%-.75%
Carbon (Graphite)	C	.05%
Magnesium Oxide	MgO_2	.03%-.05%
JA2		
Nitrocellulose	$\text{C}_{12}\text{H}_{16}(\text{ONO}_2)_4\text{O}_6$	59.11%
Nitroglycerine	$\text{C}_3\text{H}_5\text{N}_3\text{O}_9$	15.45%
Diethylene Glycol Dinitrate	$\text{C}_4\text{H}_8\text{O}_5\text{N}_2$	24.64%
Methyldiphenyl Urea	$(\text{C}_6\text{H}_5)_2\text{NH}$.7%
Carbon (Graphite)	C	.06%
Magnesium Oxide	MgO_2	.04%
Slotted Stick M31A1E		
Nitroguanidine	$\text{CH}_4\text{N}_4\text{O}_2$	54.7%
Nitroglycerine	$\text{C}_3\text{H}_5\text{N}_3\text{O}_9$	18.0%
Nitrocellulose	$\text{C}_{12}\text{H}_{16}(\text{ONO}_2)_4\text{O}_6$	21.5%
Dibutylphthalate	$\text{C}_6\text{H}_4(\text{COOC}_4\text{H}_9)_2$	3.0%
Ethyl Centralite	$\text{C}_2\text{H}_5(\text{C}_6\text{H}_5)\text{NCON}(\text{C}_6\text{H}_5)\text{C}_2\text{H}_5$	1.5%
Potassium Sulfate	K_2SO_4	1.25%
Carbon Black		.05%
N34 Rocket Propellant		
Nitrocellulose	$\text{C}_{12}\text{H}_{16}(\text{ONO}_2)_4\text{O}_6$	50%
Nitroglycerine	$\text{C}_3\text{H}_5\text{N}_3\text{O}_9$	35%
Diethylphthalate	$\text{C}_6\text{H}_4(\text{COOC}_2\text{H}_5)_2$	10.6%
2-Nitrodiphenylamine	$\text{C}_6\text{H}_5\text{NHC}_6\text{H}_4\text{NO}_2$	2%
Lead Hexoate	$(\text{C}_6\text{H}_7\text{O}_2)_3\text{Pb}$	1.2%
Lead Salicylate	$\text{Pb}(\text{OOC}_6\text{H}_4\text{OH})_2 \cdot \text{H}_2\text{O}$	1.2%

D. WASTE ANALYSIS PLAN [NR 680.06(3)(b) and (c)]

D-1. WASTE CHARACTERISTICS

D-1a. PROPELLANTS, EXPLOSIVES AND PYROTECHNICS (PEP)

Explosives are substances or mixtures capable by chemical reaction of producing gas at high temperature and pressure. Explosives can include high explosives, low explosives, propellants, igniters, primer, initiating and pyrotechnic compositions. For explosives, a fast reaction produces a very high pressure shock in the surrounding medium capable of causing significant disruption or damage to that medium.

In propellants, a slower reaction produces lower pressure over a longer period of time. This lower sustained pressure is used to propel objects or to power auxiliary devices. Propellants can be distinguished from high explosives by the chemical rate of reaction. Propellants characteristically react (burn) at a rate that is much lower than the reaction rate of explosives. It is difficult to distinguish between propellants and explosives based on chemical composition alone. Propellants are characterized by the ability to be made to burn at reproducible, controllable, and predetermined rates. This is accomplished by the addition of compounds to stabilize and/or deter combustion rates. When confined to the breech and barrel of a gun, the evolved gases produce high pressures, which provide the propulsion for the projectile. Under certain conditions, however, the propellants can be made to detonate.

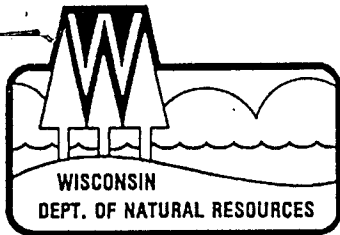
Pyrotechnics evolve large amounts of heat, noise, smoke, light, or infrared radiation but much less pressure than propellants or explosives. Pyrotechnic chemical reactions are generally non-explosive, relatively slow, and self-sustaining.

D-1b. TYPES OF PROPELLANTS

Propellants can be grouped into four classes. A given propellant composition may be suitable for use in several applications.

FILE: BAGS/pics

~~FILE~~: DNR CORRSP.
(copy in OB/OD file)
+ BAGS/PROPELLANTS



George E. Meyer
Secretary

State of Wisconsin \ DEPARTMENT OF NATURAL RESOURCES

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TELEPHONE 608-266-2621

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SOLID & HAZARDOUS WASTE MGMT 608-266-2111

SOLID & HAZARDOUS WASTE TELEFAX 608-267-2768

February 17, 1993

File Ref: 157005420

Sauk Co.
HW. Lic. File

Ms. Laura Olah
E 12629 Weigand's Bay South
Merrimac, Wisconsin 53561

SUBJECT: Concerns on Badger Army Ammunition Plant Open Burning
License Application as noted in February 8, 1993
Letter

Dear Ms. Olah:

In order to answer your February 8, 1993 letter I have summarized your questions and also provided two related general comments. Note also that I have provided additional explanation for the final steps in the permitting process.

Question #1

What constituents/parameters in the Dugway Utah proving grounds "Bang Box" testing did not correlate with BAAP data.

In our recent phone conversation I think I did not understand your question in regards to the Dugway Proving ground information when I responded to you on it. When I answered that the Dugway information was not very applicable to the open burning at Badger Army Ammunition Plant (BAAP) what I was referring to was that the report I saw only had open detonation information for that site and not open burning. The report did however have information on open burning by the use of modelling through mass and carbon balance at Sandia National Labs in Albuquerque, New Mexico using an enclosed "Bang Box". So in response I was specifically referring to the information obtained at the Dugway site in Utah. The confusion arises in that the Sandia Lab acted as a subcontractor for the Dugway report. The Sandia lab information was used in designing capture equipment and analytical methods for the Dugway open detonation tests.

The information on open burning at the Sandia National Lab "Bang Box" tests was very applicable to the activity at BAAP for open burning. The emission factors that were developed from this testing I believe are the best available. The carbon and mass balance approaches to determining emissions are the most conservative approach that can be used. I have included a copy of one of the tables from the Dugway report showing emission factors for the open burning at the Sandia Lab site.

Badger Open Burning License Application:

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Comment# 1

Massachusetts testing.

✓ (The information on open burning in Massachusetts is helpful but their appears to be propellant bags involved in the test and this complicates the analyses. The formulation of the bags and the potential for products of incomplete combustion (pic's) from the burning of the bags could be a major concern. In the past I have talked to people from U.S. EPA headquarters about other open burning licenses pending and they have raised substantial concern over the potential for pic's with the burning of propellant bags. Badger license application is specific to the referenced formulations for propellants and the license will not allow treatment of other materials. Note that at other installations it is sometimes very hard for the propellant to be separated from the bags and so they are burned with the propellant.

Question #2

What is the definition of clean for the propellant burning area.

There are really two parts to this question. The first part being that to what concentration is considered clean and the second part being to what radial extent and depth will the area have to be clean.

In response to the first part the soil would have to be at background concentrations for the surrounding area which has not been impacted by the previous area activities. Note that lead and copper the two major metal constituents found near the burning pads, occur naturally in soils and the acceptable concentration would have to be in that range. In terms of how BAAP proposes to achieve this it is up to them.

In response to the second part, the radial extent of how much has to be cleaned up to establish baseline monitoring conditions, BAAP has been asked this in the Preliminary Notice of Incompleteness and the Notice of Incompleteness will require a response from the facility. The response will have to demonstrate how the radial extent of fallout from the open burning process was determined and to what depth the material will have to be treated to establish a standard reference for monitoring of future open burning.

Also along this same line of questioning the Department and the U.S. EPA have expressed concern to the facility in the preliminary notice of incompleteness on the mobility and transport potential of the fallout material. And the Notice of incompleteness will require a response from BAAP on this issue. I have included a copy of the Preliminary Notice of Incompleteness with this letter.

Badger Open Burning License Application:

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Question #3

Concrete Pads

Along the lines of question #2 the Department is requiring BAAP to determine the extent of the fallout from the open burning process in order to size the pads to prevent releases to the environment. Also the pads will have to manage the water that lands on them to prevent flushing of material off of the pads onto the surrounding soils. The preliminary notice of incompleteness has additional information on this.

Question #4

Closure requirements for federal facilities

BAAP has had memorandum of agreements (MOA) with the State of Wisconsin on previous financial responsibility requirements related to closure and this will be used again. The Federal Facilities Compliance Act does not prevent this type of financial assurance mechanism.

As part of any licensing application the applicant/facility is required to submit a closure plan. The closure plan outlines the steps the facility will follow to close the facility.

Comment #2

If BAAP responds adequately to WDNR and U.S. EPA's concerns a completeness determination can be made. Note that at the same time as the Department is completing its review an Environmental Screening worksheet is done to decide on whether an environmental impact statement is required for this license activity. When the Department has deemed the application is complete an opportunity for a public hearing will be public noticed in the local newspaper and in the Milwaukee Journal, the states official paper for public notices. Also the Department will send a copy of the public notice to people or groups who are on the list of interested parties and the local libraries. You have been included on this list. And the Department will broadcast the notice over a local radio station and a public radio station if there is one available in the area.

If there is an interest a public hearing will be held and this will also be public noticed following the same steps as the initial notification. The hearings are usually held in the early evening hours in a school gymnasium or a courthouse. At the hearing comments will be received in writing and orally. The major purpose of the hearing is to receive public input on the licensing activity but also when relevant concerns specific to the licensing activity are raised, which have not been addressed in the review, they will be acted on after the meeting. It is not uncommon for additional conditions to be added to a license as a result of a public hearing.

Badger Open Burning License Application:

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Note that the comments have to be relevant to the licensing activity and have to show actual or potential environmental harm or harm to humans and issues such as property values can not be addressed. After the completion of the meeting an additional 30 to 45 day comment period will be held where comments received in writing will also be taken into consideration. After public comment period has expired the Department will respond to the concerns and provide responses to all of the respondents as well as a notice of the Departments decision on the licensing activity

If you have any questions on the above referenced items please contact me at (608) 266-5798.

Sincerely,

Martin Herrick

Martin Herrick
Environmental Engineer
Solid & Hazardous Waste Section

cc: w/o encl.

Ed Lynch - SW/3
Mike Netzer - SW/3
Bob Egan - U.S. EPA - HRP/8J
Mike Ross - AM/7

06/00

MEMORANDUM

DATE: May 18, 1992

FROM: Jay Goldring, Ph.D., Toxicologist
Chronic Disease and Health Assessment Section

TO: Marty Herrick
DNR, Bureau of Solid Waste Management, SW/3

SUBJECT: Badger Army Ammunition Plant: RCRA Part 3 Permit

I have completed my review of the Badger Army Ammunition Plant RCRA Part 3 Permit. The purpose of the permit is to allow burning of up to 2,500 lbs per day of propellants in open dishes on the site. A health risk assessment performed by Eder and Associates of Madison is included in the permit. The risk assessment assumes that the two chemicals of concern, lead and dinitrotoluene, will be emitted from the proposed burning operations. I am not qualified to evaluate the modelling procedure used by Eder and Associates. However, assuming that their modeling procedure is accurate, I agree with the conclusions that the potential health risks posed by the proposed burning operation are negligible.

However, I am concerned about the proposed amount of lead emissions. Data contained in the "Draft Interim Final Remedial Assessment" of 1989 (containing data collected by Metatrace) indicates that past burning practices have already contaminated surface soil with lead. However, I am not aware of any analysis of surface soil which associate the rate at which lead concentrations decrease with increasing distance from the burning pads. Such data would be helpful in evaluating the accuracy of their model and should be included in the permit application.

In addition, if Badger personnel were to burn the full amount allowed them under the permit and if all of the material burned were AA2 (consisting of 1.5% lead), the facility would emit approximately 13,688 lbs/year of lead. According to 1990 Toxic Release Inventory data, this emission rate would make Badger the second-highest emitter of lead in Wisconsin.

A potential solution for this problem would be to issue two separate permits: one for non-lead containing propellants and one for lead-containing propellants. Another possibility would be to specify the total amount of lead which could be emitted by the facility. If you or the Bureau of Air Management decide to pursue either of these ideas, I would be happy to provide any assistance you may need.

Thank you for including my input in your review of the permit application.

cc: Mike Ross, DNR, AM/10
Meg Ziarnik, BPH



on bombing ranges across the country. It is common DOD practice to fire millions of rounds of ordnance at a site, burn all the rounds that are left over, releasing hazardous substances into the air, land and water, then leave the site littered with unexploded bombs and shells and toxic explosive wastes.

Compounding this problem is the fact that the Department of Defense has acted as if the testing and disposal of conventional munitions, as well as the storage, treatment and transportation of munitions waste, were exempt from the nation's hazardous waste laws.

Last year, when Congress was considering a law to close this regulatory double standard, the Defense Department was once again trying to exempt themselves from environmental compliance. However, MTP activists convinced the EPA to write a rule protecting the public and the environment in regard to munitions waste.

As a result of relentless pressure, MTP's Conventional Munitions Network won a meeting with top EPA, DOD and state officials to discuss developing restrictions of the Pentagon's flagrant abuse of public health by burning and detonating unexploded weapons to "get rid of them".

One by one, activists described how their groundwater and land was contaminated due to the DOD's activities. They told how millions of acres are rendered off limits and permanently unusable for civilian reuse because public lands were littered with unexploded bombs and shell, and laced with toxic chemicals.

Michael Moore is a member of the

Conventional Munitions Network and an employee of Jefferson Proving Ground in Madison, Indiana. JPG is 55,254 acres littered with conventional munitions including high explosives, white phosphorous, and depleted uranium. Mr. Moore said, "the reason this meeting was so important was to convince the EPA and DOD to define unexploded ordnance as hazardous waste. This is the FIRST STEP to cleaning up JPG and land across the country contaminated with conventional munitions." JPG is scheduled to close in 1995. Without this ruling, this land may never be cleaned up and reused.

At the end of the meeting, EPA and the DOD officials were impressed with the knowledge and recommendations of the Conventional Munitions Network activists. The citizens brought specific concerns from their communities and proposed policies designed to protect the health and the environment of their locals. The Network is now awaiting written proposals from EPA.

Once these are published, MTP will push for full regulation of munitions waste. The days of leaving the Pentagon to trash our communities in the name of defending us are over.

Victory for Citizens for Safe Water Around Badger

A practice that was described by the Wisconsin Department of Natural Resources as producing a "10 to 15 foot flame height with a considerable plume of grey smoke" and "contaminating nearby surface soils with high levels of lead" is being discontinued thanks to a successful campaign spearheaded by Citizens for Safe Water Around Badger (CSWAB). Fifty years of open burning of hazardous waste at Badger Army Ammunition Plant has been stopped. The Badger plant—a 7,354 acre industrial installation located approximately four miles north of Prairie du Sac, Wis-

consin—produced explosive propellants during three active production periods since its construction in 1942: World War II, the Korean conflict and the Vietnam conflict.

The propellant Burning Grounds, on the south end of the plant, has been used since 1942 for the open burning of waste explosives, propellants and waste process chemicals. These burning, which took place almost daily, produced a large "ball of fire" visible from miles away, spewing toxic chemicals and ash into the air and eventually setting on surrounding soils.

After 1986, Badger's burning slowed down—an interim license from the Wisconsin Department of Natural Resources limited their burning to less than 100 pounds per day.

But in 1991, area residents became alarmed when the Army submitted an application to the WDNR and proposed increasing their burning limit from 100 pounds per day to 2,500 pounds per day.

CSWAB, already organized in response to groundwater contamination that had poisoned nearby private drinking water wells, responded with a deliberate campaign to stop the open burning. CSWAB members asserted alternative, safer technologies could be applied at Badger and that Congressional funding should be redirected to new, innovative technologies that do not release toxins into the environment. These new technologies would eliminate the existing threats to plant workers and nearby residents and protect the local environment from further contamination.

Over the next two years, CSWAB's work gained support from other local, state, and national groups. The Military Toxics Project funded citizens' trips to Washington for meetings with the Army, DOD and EPA. NukeWatch, a Madison-based peace organization joined CSWAB in producing full page advertisements and the distribution of thousands of informational flyers.

Wisconsin Community Fund, Citizens Clearinghouse for Hazardous Wastes (CCHW), Environmental Support Center, and the John Knox Presbytery kept CSWAB going with day to day financial support.

Public health organizations advocated the campaign to stop the burning. Madison Physicians for Social Responsibility

cont. on p.6

Badger Victory *cont. from p. 4*
joined local practitioner and testified at public meetings about potential health concerns.

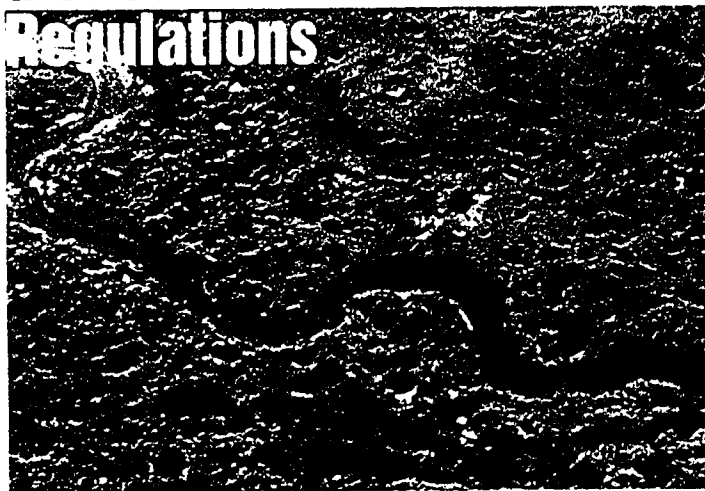
The Wisconsin Division of Health shared these concerns, on May 18, 1992 they wrote, "...if Badger personnel were to burn the full amount allowed them under the (new) permit and if all the material burned are AA2 (consisting of 1.5% lead), the facility would emit approximately 13,600 pounds/year of lead. According to 1990 Toxic Release Inventory data, this emission rate would make Badger the second highest emitter of lead in Wisconsin."

At the same time, epidemiological studies in Massachusetts revealed a link between elevated cancer rates and the open burning of waste propellants at a nearby Army base.

Until November 30, the Army gave no indication they would not pursue increased burning limits. Now, nearly two years after CSWAB began their campaign, Badger Army Ammunition Plant has announced they will "discontinue open burning and drop the application process."

"Area residents have succeeded in reversing the Army's decision and have stopped further damage to the environment," said Laura Olah, President of CSWAB. "Still, the Army is pursuing open burning and open detonation permits at bases around the country. We hope our success will pave the way for other communities facing the military

A Good Picture is Worth a Thousand Regulations



pollution. We will continue to pursue related goals—to stop the construction of an incinerator at Badger and to establish a statewide moratorium on the incineration and burning of hazardous waste. Environmental justice is not just a cause, it is our right."

Contact: Citizens for Safe Water Around Badger, E12629 Weigand's Bay, So., Merrimac, WI 53561, 608/643-3124.

Getting Paid to Poison:

Military Companies Get Reimbursed for Environmental Damage

We have all heard about the \$800 hammer and \$500 toilet seat the military buys and charges to the U.S. taxpayer. But who has heard about the \$100 million dollar cleanup FMC was seeking reimbursement for, or \$27 million that Boeing sought from the Air Force, or \$100 million that Aerojet was seeking?

As it turns out it's common practice for military companies to pollute the ground water in the course of making weapons and tanks for the Pentagon, then charge the government for the cost of their environmental negligence. This practice is bad enough, but what's worse is that the U.S. government has been paying the companies for their cleanup costs.

The Pentagon sweetheart deals with its contractors not only cheats the public out of hundreds of millions (and the government says they have no funds for

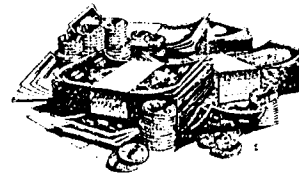
school lunch programs and Medicare) and diverts funds away from their cleanup efforts, but it gives the companies the clear message that they can get away with environmental recklessness again and again.

The Military Toxics Project, along with ally groups in California, raised the issue of contractor reimbursement with Congress over the last several years. As a result, the House Government Operations Subcommittee on Legislation and National Security held hearings on the subject in May.

At those hearings, Dwayne Peterson, of Sacramento Valley Toxics Coalition described how Aerojet Corporation polluted Sacramento area water supplies with cancer causing trichloroethylene, despite order from state regulators to control its waste. Peterson said, "My mother always taught me to clean up my own mess; defense contractors should be held to the same standard and not be bailed out by the taxpayers for fixing problems by the private corporations."

Henry Cole, represented the Military Toxics Project, as well as the Silicon Valley Coalition and Silicon Valley Conversion and Job Retention Project. He reported that the

FMC Corporation, which manufactures infantry vehicles in San Jose, was seeking taxpayer reimbursement for as much as \$100 million in cleanup costs. Since FMC is downsizing rapidly and may even halt production in the area, Cole proposed that FMC and similar contractors be helped out if and only if they commit to a conversion plan that benefits its workers and the community. (*cont.*)



At the Conventional Munitions meeting, Dick Smith, of Citizens for Responsible Fort McCoy Growth, displayed "blow-ups" of an Army target area at the Wisconsin base. Smith's photos clearly illustrated a moonscape of craters centered on the La Crosse River, backing up his claims that eight trout-spawning tributaries and associated wetlands were being indiscriminately bombed. In response to Smith's photos, which he also published in postcard size and displayed wherever he and other local activists found viewers, the Army has agreed to establish a clearly marked buffer zone to protect the river and wetlands from future damage. Contact: Dick Smith, Citizens for Responsible Ft. McCoy Growth, Route 4, Box 290A, Sparta, WI 54656. Phone: 608/269-2694.

Overview of Health Effects of DNT's
Breast and other cancers associated with 2,4 and 2,6 DNT

Citizens for Safe Water Around Badger
E12629 Weigand's Bay South Merrimac WI 53561 (608) 643-3124

Chemical Exposures, Male Reproduction Problems Are Linked

U.S. Study at Olin Plant Ties
Low Sperm Level to TDA,
DNT; Tests to Continue

By a WALL STREET JOURNAL Staff Reporter

A federal study of certain male chemical workers at an Olin Corp. plant in Brandenburg, Ky., has turned up a possible link between exposure to two chemicals and reproductive problems.

Sperm counts of workers currently exposed to toluenediamine (TDA) and dinitrotoluene (DNT) were only one-third as high as levels in workers who never were exposed, the study by the National Institute of Occupational Safety and Health found. In addition, there were indications of abnormalities in the size and shape of the exposed workers' sperm, which also could affect reproductive ability.

Further research already has begun to determine whether TDA and DNT workers at other plants could face problems.

In reporting the results of the Brandenburg study, NIOSH cautioned that further corroboration is needed before any direct link can be proven. Dr. James Mellus, chief of NIOSH's hazard evaluation and technical assistance branch, called the results "strongly suggestive."

An Olin spokesman said the company agrees that further studies are necessary. He noted that the NIOSH study involved only a small number of workers and didn't establish any conclusive links. Exposure to the chemicals has been reduced since the study began, he said.

Thirty workers participated in the Brandenburg study: nine currently exposed, 12 previously exposed and nine with no history of exposure to TDA or DNT. There are about 550 employees at the plant, which makes urethanes and organic chemicals, including 12 employed in the TDA/DNT area. DNT is used in the manufacture of TDA, which is a raw material in flexible urethane foams.

There isn't any occupational health exposure standard for TDA. DNT levels at the Olin plant were well below the Occupational Safety and Health Administration standard.

Workers at the Brandenburg plant requested the study early in 1979 after one of them became concerned about his wife's

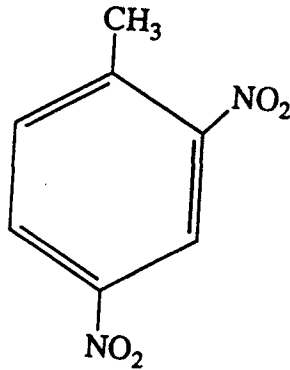
miscarriages and subsequent difficulty conceiving a child. From mid-1979 through early 1980, NIOSH investigators questioned workers about their reproductive histories and chemical exposures, conducted physical examinations and analyzed blood and semen samples. Results of the study were published in Friday's issue of *Morbidity & Mortality Weekly Report*, a publication of the Centers for Disease Control.

Among the other studies under way is one by Olin of TDA/DNT workers at its Lake Charles, La., plant. Sixty workers exposed to the two substances and 120 nonexposed workers are participating in the study. The Olin spokesman said results are expected by early next month. NIOSH has interviewed TDA/DNT workers at a Mobay Chemical Corp. plant in West Virginia, and Dr. Mellus said the agency recently received a request from the International Chemical Workers Union to study workers at an Allied Corp. plant in West Virginia.

The additional studies will indicate whether other factors besides TDA or DNT exposure could have caused the lowered sperm counts among the Brandenburg workers. If exposed workers at other plants don't have lowered counts, investigators will have to look elsewhere for the cause.

NIOSH also is considering whether to do additional animal studies of the toxic effects of TDA and DNT.

2,4-Dinitrotoluene



- EPA Reference Dose (RfD): 0.002 mg/kg/day
- EPA Cancer Classification: Group B2, probable human carcinogen; potency factor (q_1^*) = $6.8 \text{ E-1 (mg/kg/day)}^{-1}$ by the LMS2 model
- Health Advisory Values:

One-Day	0.5 mg/L
Ten-Day	0.5 mg/L
Longer-Term (child)	0.3 mg/L
Longer-Term (adult)	1.0 mg/L
Lifetime	NA

2/ Linearized Multistage

Dinitrotoluene (DNT) is a white- to buff-colored solid and commonly occurs as a mixture that may consist of up to six isomers. Uses include military munitions, dye manufacture, and toluenediamine (polyurethane intermediate) synthesis (ATSDR, 1989; NIOSH, 1985; Small and Rosenblatt, 1974). Technical grade DNT (tg-DNT) is a mixture composed of approximately 76.5% 2,4-DNT, 18.8% 2,6-DNT, and 5% other DNT isomers.

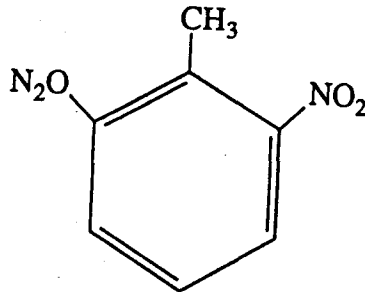
In humans, inhalation and dermal occupational exposures to 2,4- and tg-DNT suggest effects to the heart, circulatory, and central nervous systems (Etnier, 1987; U.S. EPA, 1980, 1986). Chronic exposure produces nausea, vertigo, methemoglobinemia, cyanosis, extremity pain or paresthesia, tremors, paralysis, chest pain, and unconsciousness. Rats, mice, and dogs, orally administered 2,4-DNT for 90-days to lifetime, developed severe reproductive effects in both sexes, and reduced viability and body weight in offspring (Hong et al., 1985; Lee et al., 1985; Ellis et al., 1985). It has not been shown to be a teratogen (Price et al., 1985).

The EPA One- and Ten-day HAs are based on decreased body weight and food consumption, and serum chemistry changes in male and female Sprague-Dawley rats, and testicular lesions in males fed 2,4-DNT for 14 days (LOAEL = 45 mg/kg/day) (McGowan et al., 1983). Dose-related decreases in body weight gain and food consumption in rats (LOAEL = 34 mg/kg/day) administered 2,4-DNT in the diet for 13 weeks (Lee et al., 1985), is the basis for the Longer-term HAs. The Drinking Water Equivalent Level (100 µg/L) and RfD (2E-3) are based on neurotoxicity, Heinz body formation, and biliary tract hyperplasia in dogs (NOAEL = 0.2 mg/kg/day) dosed orally with 2,4-DNT for 2 years (Ellis et al., 1985).

In *Salmonella* assays, 2,4-DNT is a weak mutagen; however, its metabolites are mutagenic (Couch et al., 1987). The DNTs are not genotoxic in mammalian cells *in vitro*, in mouse and rat dominant lethal tests, and in *Drosophila* systems (Abernethy and Couch, 1982; Styles and Cross, 1983; Rickert et al., 1984; Ellis et al., 1979; Soares and Lock, 1980).

DNT is classified B2 (probable human carcinogen) and thus a Lifetime HA is not recommended (U.S. EPA, 1992d). The cancer potency is associated with hepatocellular and mammary gland carcinogenic activity in rats after 2,4-DNT treatment (Ellis et al., 1979). 2,4-DNT also may be a promoter (Leonard et al., 1983, 1986).

2,6-Dinitrotoluene



- EPA Reference Dose (RfD): 0.001 mg/kg/day
- EPA Cancer Classification: Group B2, probable human carcinogen; potency factor (q_1^*) = $6.8 \text{ E-1 (mg/kg/day)}^{-1}$ by the LMS3 model
- Health Advisory Values:

One-Day	0.4 mg/L
Ten-Day	0.4 mg/L
Longer-Term (child)	0.4 mg/L
Longer-Term (adult)	1.0 mg/L
Lifetime	NA

Dinitrotoluene, (DNT) is a white- to buff-colored solid at room temperature and commonly occurs as a prominent component in mixtures that may consist of two or more of the six DNT isomers. It has been used in military munitions, dye manufacture, and the synthesis of toluenediamine (the organic intermediate used in the production of polyurethane). Technical grade DNT (tg-DNT) is a mixture composed of approximately 76.5% 2,4-DNT, 18.8% 2,6-DNT, and 5% other DNT isomers (2.4% 3,4-DNT, 1.5% 2,3-DNT, 0.7% 2,5-DNT, and 0.4% 3,5-DNT).

2,6-Dinitrotoluene has not been studied epidemiologically; therefore, it is uncertain as to whether it affects people in the same manner as tg- and 2,4-DNT (i.e., heart, circulatory system, and the central nervous system effects). Limited study of experimental animals (dogs, rats, mice) orally administered 2,6-DNT effected the central nervous system, blood, liver, and kidney, and caused death (Lee et al., 1976). No data on the reproductive or developmental effects of 2,6-DNT were found in the available literature.

All EPA HA values for 2,6-DNT are based on a 13-week study with dogs administered 2,6-DNT orally (Lee et al., 1976). The critical effects were neurotoxicity, Heinz bodies, bile duct hyperplasia, liver and kidney histopathology, and death. The HAs were derived from a NOAEL of 4 mg/kg/day. The 20 mg/kg/day dose level is a Frank-Effect Level (FEL) due to neurotoxicity and lethality.

The 2,6-DNT isomer is a weak mutagen in *Salmonella* test systems (Tokiwa et al., 1981; Spanggord et al., 1982; Couch et al., 1981). The DNTs are not genotoxic in mammalian cells *in vitro*, in mouse and rat dominant lethal tests, and in *Drosophila* systems (Abernethy and Couch, 1982; Styles and Cross, 1983; Rickert et al., 1984; Ellis et al., 1979; Soares and Lock, 1980).

DNT is classified B2 (probable human carcinogen) and thus a Lifetime HA is not recommended (U.S. EPA, 1992d). Leonard et al. (1987) demonstrated hepatocellular carcinoma in 85% to 100% of CDF male rats in a 12-month study. However, the cancer potency and risk estimate is associated with 2,4-DNT hepatocellular and mammary gland carcinogenic activity in rats (Ellis et al., 1979). There is some evidence which suggests that 2,6-DNT has both initiation and promotion activity and, therefore, may be a complete carcinogen (Leonard et al., 1983, 1986).

Other Risk Factors
Indirect and Multiple Exposures

Citizens for Safe Water Around Badger
E12629 Weigand's Bay South Merrimac WI 53561 (608) 643-3124

RESIDUES FROM OPEN BURNING OF ORDNANCE INGREDIENTS, COMPOSITIONS, AND RELATED CHEMICALS

Mae I. Fauth¹ and Ivan L. Tominack²¹Naval Surface Weapons Center, Silver Spring, MD 20910
(301) 743-4435²Ordnance Environmental Support Office, Indian Head, MD 20640SA
Marie
Peter
Don B.
RCMABSTRACT

A literature search and computer simulation were made to determine the expected residues from open burning of propellant, explosive and pyrotechnic (PEP) formulations and ingredients. Aluminum oxide is the major solid product from the burning of composite propellants. Small amounts of PbO are formed from propellants containing lead salts. Pyrotechnics compositions are the major source of solid residues left after combustion. These may include particulates of various metals and metal oxides. If the humidity is high, hydrogen chloride and aluminum oxide will agglomerate or decay rapidly in the atmosphere. Lead in the soil does not appear to be readily taken up in the food chain. A photographic record of a 5000-lb (2273 kg) propellant burn will be shown. The theoretical calculations of the combustion species of PEP materials in air were performed with a modified propellant evaluation program using several PEP to air ratios. The materials consisted of fourteen chemical compounds and eighteen PEP compositions.

INTRODUCTION

The objective was to evaluate open burning for the disposal of ordnance materials. Open burning of munitions wastes evolved because it is the safest, simplest and most cost-effective method of disposal. These wastes are generated in the manufacture and qualification of PEP materials and in operations associated with the supply and maintenance of the munitions inventory.

The most serious disadvantages of open burning are adverse environmental impacts. These may include air, water, or soil pollution. However, methods of minimizing these effects are available. Studies have indicated that there was little detectable downward motion of explosives and their decomposition products into subsurface soils or water, and incineration has proved effective in decontaminating sediments contaminated with explosives.

RESULTS OF LITERATURE SEARCH

Studies have indicated that clouds formed by detonations carry particles up to 2400 micrometers in size. In open burning, it is expected that the plume will likewise entrain materials of similar size. Numerous studies reveal that particles collected during rocket motor burning and then analyzed have indicated that the average particle size falls within the range of 2 micrometers. One study indicated a mean particle size of 10 micrometers and a range up to 50 micrometers. Thus, virtually all of the particulates formed during the burning will become airborne.

The results reported to date indicate that the clouds produced on open burning of PEP materials consist mainly of water, that their temperature falls very rapidly to ambient and that after one minute of each burning no undispersed heat or pollution is noted. Models for the cloud expansion after detonation of 5000 lbs. (2273 kg) of propellant predict concentrations of pollutants below the short term exposure limit by the time the cloud is eight minutes old. Data for HCl and Al_2O_3 in the atmosphere indicate that these two compounds agglomerate or decay rapidly, particularly if there is much water available in the atmosphere. Soil lead may be found at propellant burning grounds, but it does not appear to be readily taken up in the food chain.

Very little quantitative information is available on the solid products left after the open burning of PEP materials. Whether carbon particles are produced depends on the oxygen balance of the material and the completeness of combustion when it is burned. While TNT yields about 9% soot, most solid propellant and PBX compositions leave little or none. Aluminum oxide is the major solid product from the burning of composite propellants. From one such propellant, 4% of the products of combustion was Al_2O_3 and 4% was Fe_2O_3 . For a space shuttle the expected amount of Al_2O_3 was 28.5%. Small amounts of PbO are formed when propellants containing lead salts are burned.

Pyrotechnics compositions are the major source of solid residues left after combustion. For example, a cluster marker residue contained 27% ZnO, 62% rare earth oxides, and small amounts of about 20 other metal oxides. Studies of burning grounds, when only propellants and explosives are burned, have indicated that the dispersion or accumulation of solids is not a problem.

FIELD WORK ON BURNING

Observations were made of several burns of propellants and related materials. One of these involved four large propellant grains each weighing about 1250 lbs (568 kg) and 400 lbs (182 kg) of small grains and grain fragments. This burn lasted about four minutes and a timed sequence of photographs was taken. A series of photographs was taken 5 seconds after ignition time ($t + 5$) and at 10-second intervals for the duration of the burn.

The photographs showed that initially (through $t + 15$) there was some gray smoke. The sequence $t + 25$ through $t + 85$ shows only white smoke, but at $t + 95$ black smoke, presumably from liners and other carbonaceous material, appeared. This continued through $t + 205$, after which there were small amounts of white smoke. By $t + 235$, except for a small amount of smoldering residue, the burn was over.

Field work on open burning showed that the entire burn was over within five minutes. Contaminated rags, etc., and propellant liners or other carbonaceous materials make the burn more smokey than if such items are absent. While locally high values of lead may be found in the burning ground sediments, this and other metals are in highly insoluble form. Very low levels of the major explosives ingredients, except for nitroglycerin, are found in the surface or subsurface soil. Larger amounts of nitroglycerin

appear to be present in some samples both of the surface and subsurface soils. Except for ammonia in one sample, groundwater contamination does not appear to be a significant problem.

COMPUTER MODELING RESULTS

Computer simulation of the open burning process is helpful in determining whether or not an ingredient or formulation reacts to form condensable products, which may deposit on the burning ground. The simulated burning was at 1000 psi (6891 KPa) and the combustion products then expanded to one atmosphere (101.3 KPa). For most materials the following PEP:air percentages were used: 100:0, 75:25, 50:50 and 25:75. For ingredients with little or no oxygen, the initial air percentage was 10 or 15 instead of zero.

Although investigators have reported hydrocarbons of relatively high molecular weight in the residues from burning propellants, such as Polaris, the computer program was unable to handle molecules more complex than C_4N_2 .

While the 75% air concentration is needed for some propellants, other materials such as nitroglycerin and amatol 80-20 have positive oxygen balances, so it makes no difference whether air is present. For propellants containing lead compounds, e.g., H-5, a 75% air concentration is desirable to improve the oxidation of lead. For pentaerythritol tetranitrate and cyclotrimethylene trinitramine (RDX), 50% air is adequate for their destruction. For essentially complete combustion of Minol, TNT, Amatex, tetryl, smokeless powder, Compositions A-3, B, C-4, a 75% air concentration is desirable.

Lead styphnate is a special case. At zero and 25% air, the lead is about evenly divided between vapor and liquid. At 50% air, the organics have disappeared. At 75% air, the lead is present as solid Pb_3O_4 .

Black powder produces H_2S , CS_2 , CSO , and SO_2 at zero air. At 50% air, the first three are gone and SO_2 is maximum. At 75% air, most of the sulfur compounds have been converted to H_2SO_4 . Liquid K_2CO_3 is present at 50% air or less, but is solid at 75% air.

Computer simulation of the open burning of methylene chloride, trichloroethylene, ethylene oxide and unsymmetrical dimethylhydrazine indicates that these compounds should not be burned but should be recycled, as their destruction by open burning is either incomplete or yields toxic byproducts, such as HCl from the chlorinated solvents.

The modeling results included products at levels to 10^{-16} g/l concentrations. No firm conclusions can be drawn as to the applicability of the propellant computer model to predicting the existence of complex organic compounds in the products from open burning of ordnance ingredients, compositions, and related chemicals. For the more complex components produced, experimental work involving on-site sample collection followed by chemical analysis, is highly desirable.

January 22, 1993

FILE: 06/00
Copy in Guimond
(+ incinerators)

Note to: Carol Browner, Administrator

From: Richard Guimond, Acting Assistant Administrator,
Office of Solid Waste and Emergency Response

Subject: WTI Incinerator Issues

BACKGROUND: This note is to bring you up to date on the activities we have underway to evaluate the issues relative to the Waste Technologies Incorporated (WTI) incinerator in Ohio. This incinerator has obtained all of the necessary permits to conduct a trial burn. However, strong opposition from local citizen groups has led to a court hearing (which was to have been today but has been postponed until February 8) on whether a temporary restraining order should be imposed to prevent operation of the facility. WTI has verbally agreed not to commence the trial burn or limited commercial operation until after the hearing.

ISSUES: The immediate issue is whether the WTI risk assessment prepared by EPA is adequate. This assessment, which by EPA policy is site-specific, showed that risks from the incinerator emissions (including emissions of dioxins) were within the range of risks historically considered acceptable by EPA. A longer term issue, which will require Agency-wide consultation, is how to devise a national policy regarding indirect exposure assessments for dioxin. This could have major implications for numerous EPA programs and could require a reevaluation of risks at many other sources of air emissions.

The risk assessment was prepared by the Region 5 office for the WTI facility. It focused primarily on risks associated with inhalation of the emissions, an approach which the Agency has historically used in evaluating air emissions. Region 5 concluded that indirect exposure routes (e.g., consumption of food raised in the area) were not likely to present significant additional risk based on a draft dioxin risk assessment for another combustion unit.

The Office of Research and Development (ORD) has a draft document, "Estimating Exposures to Dioxin-Like Compounds," which describes a methodology and provides an example of how indirect exposures, such as exposures from soil contamination and subsequent food chain contamination resulting from air emissions, can be evaluated.

Greenpeace used a specific example from this document to attempt to show that risks from consuming products from cattle raised near the incinerator can be 10,000 times greater than the risks from inhalation and are, therefore, unacceptable. The use of the example from the ORD report in the WTI situation is not appropriate, since the risks from air emission sources are very highly dependent on site-specific factors. However, a preliminary

assessment done by ORD does show that risks from beef and milk consumption can be 1,000 times higher than risks from inhalation near the WTI facility. It is important to note that, even using the worst-case indirect exposure analysis, the risks to the public during the trial burn period would be within what has been considered acceptable. The Greenpeace submittal also contains other analyses that show very high risks. However, both the Office of Solid Waste and Emergency Response (OSWER) and ORD agree that these analyses use extreme, unrealistic assumptions.

X There are very significant implications associated with adopting risk assessment procedures based on indirect exposure routes for air emission sources. These analyses have a much greater degree of uncertainty because they involve a large number of exposure-related assumptions. If conservative assumptions are used for all exposure related parameters, risk estimates can be unrealistically high. The analyses of the WTI situation show that many air emission sources could be affected if EPA were to adopt the indirect exposure analysis procedures in assessing exposure risks.

ACTIVITIES UNDERWAY: My staff met with ORD on Friday, January 22 to discuss the analytical steps that must be undertaken in preparation for the upcoming District Court hearing. In addition, my staff is reviewing all of the risk assessment efforts related to WTI and the ORD report on dioxin exposures to ensure that any differences can be explained. Staff are also working with ORD to collect relevant data on dioxin emissions from different sources and on risk assessments which have been done on those sources. Finally, the Agency must address the court's question concerning why we need the trial burn data in order to prepare a more comprehensive risk assessment.

For the immediate future, we have scheduled a technical meeting on Monday, the 25th, which will include personnel from Region 5 to review all of the risk assessment issues. We will then hold a management level meeting on Tuesday, the 26th, to develop recommendations on how we should proceed.

We are also developing an in-depth briefing for you on the WTI issues. We will work with your staff to schedule the meeting. Please let me know if you have any questions or need any other information.

cc: Linda Fisher
Dick Morgenstern
Mike Vandenberg
Loretta Ucelli
Diane Regas

TCHES



LANDMARKS

Are You Sure the Kennedys Live Around Here?

After 62 years of shelling on New England's summer playground, the EPA orders the military to hold its fire

IT'S A SUNNY DAY ON CAPE COD, SEA AIR WAFTING IN ON A gentle breeze, and a military jeep lumbers along "Tank Alley." Howitzer fire has torn up the road; the ground all around is cratered from blasts. Shells protrude from the soil like rocks, and the scrub pines are scorched from burn after burn. Just ahead lie a blown-up tank, and a crane in shards, and a pile of spent howitzer shells. A red flag indicates an undetonated mortar round. The driver, a professional military man, says he's been giving a lot of tours lately and jokes that if he could get \$50 a head for this, he'd be rich.

Surprisingly, the sudden interest has come not from military buffs, but from concerned citizens, environmentalists, and local media. Tank Alley, a part of the so-called Impact Area, and all other weapons ranges in the Massachusetts Military Reservation, which sits on 22,000 acres in the western part of Cape Cod, have been under a cease-fire since the Environmental Protection Agency issued an order late in the spring to halt the use of live ammunition and explosives on the base. Though this may not at first glance seem like major news, both the Pentagon and environmentalists say that this

is a noteworthy event indeed. After all, the EPA order is unprecedented—it's believed that no government agency has ever before restricted military training, certainly not for environmental reasons. The military, of course, has cried foul, arguing that its ability to conduct operations at the reservation—the primary weapons-training facility for National Guard troops from all six New England states—is vital to national security; the Guard is considering an appeal to Attorney General Janet Reno, arguing that the EPA overstepped its jurisdiction. Environmentalists, meanwhile, are seizing on the EPA's action, vowing to use it as precedent in fights to shut down weapons training in such far-flung locales as Michigan's Camp Grayling and California's Fort Ord. "In the post-Cold War world," says Lenny Siegel, a military analyst at San Francisco State University and head of a watchdog group involved with military-base environmental projects, "the military is going to have to realize that its needs are no longer the top priority."

But while the Massachusetts Military Reservation is similar to many other bases, it's also somewhat unusual, because



THE
RD

Chalk

Over the next two months, 16-year-old Chris Sharma plans to prove beyond all doubt that he's the world's best rock climber. First he'll take a crack at Germany's Action Directe, widely considered to be one of the planet's five hardest routes. Then it's on to September's World Cup opener in Italy, where he'll try to pick up where he left off at sport climbing's world championships last February, in which he finished a close second to perennial French champion François Petit in just his second international contest. But despite the challenges of the near future, Sharma would prefer to dwell on his recent past—specifically his ascent last spring of Just Do It in Oregon's Smith Rock State Park, the consensus pick for the hardest route in the country. "It was the raddest thing you've ever seen," says Sharma, who nonetheless aced the 5.14c route—never before climbed by an American—in just three days, a week faster than any of the three other climbers who've managed it. "On the second day I got up to the last bolt and was just screaming, 'Eh! Agh!'" he says, with characteristic exuberance. "But the third day was actually anticlimactic. I was in control the whole way."

A Bitter Pill Indeed

"As far as I knew, nobody else was trying for the record," says Karen Thorndike, who left San Diego last August in hopes of becoming the first American woman to sail solo around the world. "Apparently, I was wrong." Yes, the news last May couldn't have been much worse for Thorndike, 54, who had just resumed her storm-stalled trip when she learned that another sailor, Pat Henry, had uninten-

tionally sits atop the largest aquifer on the Cape, which supplies water to six towns, some 70,000 households and businesses, and an estimated 200,000 people during the summer months. The EPA wants to use the cease-fire to conduct the most thorough ground test the agency has ever performed, attempting to determine whether the use of live weaponry over the last 62 years has polluted the soil and, by extension, the groundwater—a discovery that would be none too surprising, given the base's history. The reservation has been a national Superfund site since 1989, though the focus has been not on the artillery ranges, but on the southern part of the base around its airfields, where despite the \$165 million that has so far been spent on cleanup efforts, 79 hazardous waste sites and 11 underground toxic plumes (slow-moving chemical masses) still foul the landscape. One plume, which has spread from the base's landfill, has enveloped two municipal wells. In the town of Falmouth, 250 private wells have been spoiled, and at least another 220 in Mashpee. The military has paid to connect some homes to untainted municipal water supplies and donated bottled water to others. All told, an estimated three million gallons of water are polluted daily. Then there's the matter of elevated cancer rates in towns around the base—16 percent higher than the Massachusetts average for cancer of all types on the Upper Cape, a 300 percent higher rate of pancreatic cancer in men in parts of Buzzards Bay.

As a result, the military now finds itself with a rather uncomfortable mission: giving citizen tours of the Impact Area. On this bright summer day, a convoy of three vehicles moves along the dirt roads in the northern part of the base. John DeVillars, the EPA's New England regional administrator and the man most directly responsible for the shutdown, is in one of the vehicles, sitting directly behind base commander Colonel Gregory Dadak.

The trucks stop at CS-18 (Chemical Spill 18), a firing site where substances associated with the propellant DNT were found in a concentration of 17,000 parts per billion. "The EPA considers one part per billion worthy of

attention," DeVillars says. His look is direct, his eyes a robin's-egg blue. He combines an astute intelligence with a laid-back manner, and he seems to be capable of making inflammatory statements without inflammatory effect. Colonel Dadak has come along because of DeVillars, whom he regards politely yet with a slight air of suspicion.

The group moves along to CS-19, a rocket dump in the Impact Area where test wells have already been drilled. Here RDX, or Royal Dutch Explosive, has been found in groundwater at 11 times the levels considered hazardous by the EPA. "I do not disagree with the concept that we have to be environmentally safe," Colonel Dadak says. But he believes that much of the effort is the result of antimilitary politics clothed in environmentalism, that the true goal is the nationwide closure of bases. Dadak maintains that "these are the cleanest 22,000 acres on Cape Cod," and though he may not look it in his battle fatigues, he is a 25-year resident of the Cape who owns a house outside the base, runs a small cranberry bog—and doesn't drink the tap water. Still, he says with a chuckle, his oft-repeated remarks about the base's cleanliness have earned him an invitation to the army's Environmental Communication Training, involving simulated New England town meetings complete with simulated ranting-and-raving townspeople. "It's been quite antagonistic," he explains.

DeVillars vows that this will soon change. He says that the EPA order has shifted the burden of proof to the military and thus will bring a sort of glasnost regarding future use of the base. "Of course," he says, "with the military mentality for secrecy, this is just the sort of thing that makes their skin crawl."

Nonetheless, in this there is perhaps the kernel of what could be a growing trend: an attempt to force the military to manage its vast bases as natural resources. "The military needs to develop a sustainable approach to firing-range management," explains Siegel. "They can no longer be held to a different standard than those who cut down trees or fish for cod." —DOUGLAS WHYNOTT

EAR TO THE GROUND

"The warmer-climate community just hasn't found the colder climate that attractive. It's an area of America that has simply never attracted the Afro-American or the Hispanic."

—Idaho Congresswoman Helen Chenoweth, on why the U.S. Forest Service should stop trying to recruit minorities for jobs in her district



JIM THORNBURG. ILLUSTRATION BY ADAM MCCAULEY.