



DEPARTMENT OF THE NAVY

CRANE DIVISION
NAVAL SURFACE WARFARE CENTER
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CRANE, INDIANA 47522-5000

N00164.AR.000193
NSWC CRANE
5090.3a

IN REPLY REFER TO:
5090
Ser 095/6289

05 NOV 1996

MEMORANDUM

From: Installation Co-Chair
To: Restoration Advisory Board Members and Attendees
Subj: RESTORATION ADVISORY BOARD (RAB) MEETING AGENDA
Encl: (1) Minutes for the 22 October 1996 RAB Meeting

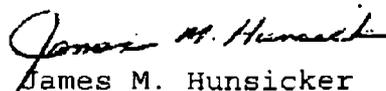
Crane Division, Naval Surface Warfare Center (NAVSURFWARCENDIV Crane) conducted, on center, a Restoration Advisory Board (RAB) meeting on Tuesday, 22 October 1996. Enclosure (1) is a copy of the minutes from that meeting.

The next NAVSURFWARCENDIV Crane RAB meeting is scheduled for January 28, 1997. The meeting will take place on Center at Building 3241 in conference room B from 1200 to 1600. A reminder and an agenda will be sent about one week prior to the meeting. Your ideas and input for additional topics to or presentations for the agenda would be especially welcome.

Currently, the proposed agenda for the January meeting includes presentations concerning construction completion and operation of the Bioremediation Facility (which might include another tour of the completed facility), status of interim measures work being performed at the Dye Burial Ground (SWMU 2/11), and other interim measures reports that are currently being reviewed.

Also, plans are underway to hold a ribbon cutting ceremony for the Bioremediation Facility. The ceremony is tentatively scheduled for sometime in mid December. The uncertainty of this date is due to possible construction delays. Any of the community RAB members wishing to attend this ribbon cutting ceremony must notify the below mentioned point of contact (POC) for specific time and date information.

For questions, comments, or information, please contact NAVSURFWARCENDIV Crane POC, Ms. Christine D. Freeman, Code 09511, telephone 812-854-4423.


James M. Hunsicker

Director, Environmental Protection Dept.

Subj: RESTORATION ADVISORY BOARD (RAB) MEETING AGENDA

Distribution:

COMMUNITY MEMBERS

David R. Cox
Teresa A. Ellis
Larry G. Hazelwood
John H. Longfellow
Thomas P. Medina
Jeffery A. Myers
James Parker
Karmen D. Wagler
IDEM (John Manley)
SOUTHNAVFACENCOM (CODE 1864)
USEPA Region V (DRP-8J)

Copy to:

ADMINISTRATIVE RECORD
Environmental Hydrology (S. Mitchell-Bruker)
Morrison Knudsen (Steve Downey)
NAVSEASYS COM (SEA 07E)
NAVSURFWARCENDIV Crane (09)
NAVSURFWARCENDIV Crane (OICC)
NAVSURFWARCENDIV Crane (ROICC)
NAVSURFWARCENDIV Crane (PA)
NAVSURFWARCENDIV Crane (PPO)
SIOCN-SF (D. Johnson)
USCEWES (GG)

**Restoration Advisory Board
Meeting Minutes
October 22, 1996**

Crane Division, Naval Surface Warfare Center (NAVSURFWARCENDIV Crane) conducted a Restoration Advisory Board meeting, Tuesday, October 22, 1996, on Center in Crane, IN, at Building 3241 in conference room B. From 1200 to 1600 hours an informal meeting was called to order. See Attachment (1) for the list of attendees. Members were given the opportunity to ask questions during and after each presentation.

The meeting was opened by Mr. Jim Hunsicker, Installation Co-chair and Environmental Protection Department Manager, who went over the agenda of the meeting. Attendees were given a packet containing information concerning the meeting topics and much of that same information material was introduced during the presentations. The first three items of the agenda addressed the availability of documents and reports for review, called for the signing of the RAB Charter, addressed the request for comments on the RAB Proposed Rule.

Mr. Hunsicker then turned the floor over to Mr. Thomas Brent, Environmental Protection Specialist for NAVSURFWARCENDIV Crane, who discussed the Non-Stockpile Chemical Materiel Program (NSCMP) Programmatic Environmental Impact Statement (PEIS). The briefing packet distributed at the meeting contained an informational brochure on the NSCMP, a summary of the National Environmental Policy Act (NEPA), and a summary of the PEIS and Notice of Intent that describes the process as well as the proposed destruction strategies. Mr. Brent explained that NAVSURFWARCENDIV Crane is included in the PEIS statement as a location with known or possible buried chemical warfare materiel. Chemical weapons were known to be disposed of on this site, but period literature indicates that the site was cleared. The period definition of cleared, and the technology for clearing such locations at the time, may lead to the conclusion that not everything was removed. Also, Mr. Brent gave information pertaining to the public scoping meeting scheduled for December 5, 1996 at the Clinton Library from 1500 to 2100 hours.

Mr. Hunsicker then introduced Dr. James May, Hydrogeologist, from the U.S. Army Corps of Engineers Waterways Experiment Station. The presentation given by Dr. May was entitled the *Natural and Enhanced Attenuation of Groundwater Contaminants at NAVSURFWARCENDIV Crane Ammunition Burning Grounds*. Natural Attenuation of Explosives (NAX) is defined as the permanent reduction of contaminant concentrations to environmentally benign levels due to natural processes. The objectives for natural attenuation is to develop a protocol for selection and implementation as a remedial alternative and to demonstrate its use for the reduction of explosives. The natural attenuation approach involves protocol development, groundwater monitoring, groundwater modeling, biomarkers, stable isotopes, and spatial characterization. At the conclusion of Dr. May's presentation a short break was taken.

When the meeting was reconvened at 1315, a short videotape entitled Installation Restoration - *A Navy Pledge to the Future* was viewed. The video reinforced the Navy's desire to maintain an open dialogue with local communities about the IR process through the use of RABs. The video presented a general overview of the Navy's IRP and encouraged

community members to support and participate in the RAB because they play a vital part supporting the Navy in achieving its IR goals.

After the video, Mr. Hunsicker introduced Mr. Steve Downey, Project Manager from Morrison Knudsen Corporation. Mr. Downey gave his presentation on the Interim Measures work being performed at the Dye Burial Grounds. Mr. Downey went over background information concerning the site and describe the changes in the field conditions due to the discovery of additional dye once the interim measures cap process was started. Through cooperation between the Navy, EPA, IDEM, MK, and Smith Environmental, further investigations were performed to assess site conditions by doing soil borings to mark the extent of the dye. The revised plan, that was discussed, involves enlarging the original cap and moving some of the dye to the cap area. Construction on the redesigned cap was schedule to start and did in fact start in late October.

The scheduled break at 1400 was not taken and Mr. Downey continued with his presentation on the Bioremediation Facility. Mr. Downey spoke about background information on the four sites that are to be remediated, bench scale testing, and the fact that composting has been found to be more cost effective and environmentally accepted than incineration and other bioremediation technologies. Prior to entering into full scale remediation, a pilot scale composting operation will be conducted. The cleanup approach for remediation will involve explosive contaminated soil being blended with a mixture of manure (cow or chicken) and a bulking agent (alfalfa hay, straw, wood chips, or corn stalks). In the pilot scale at least eight different mixtures will be used to find the optimum mixture for full scale operation. The mixture will be formed into windrows and turned daily with a specialized piece of equipment. Water will be added to the compost mixture as required to maintain optimum moisture conditions. Extensive monitoring of temperature, moisture, oxygen, pH, nitrite, and explosives will be performed throughout the pilot operation. It is expected that composting will take approximately 3 to 4 weeks to achieve the cleanup goals depending on outside temperature and level of contamination. Once the cleanup goals are reached, the composted material is essentially a rick fertile topsoil. A minor modification to the NAVSURFWARCENDIV Crane landfill permit for using the composted material as landfill cover will be issued to save in the costs of managing the landfill. Mr. Downey reported that based on current estimated quantities, remediation of explosives contaminated soils at NAVSURFWARCENDIV Crane will take approximately seven years at a total cost of \$21,000,000.

A short break was taken before leaving for the Bioremediation Facility tour. By this time, the first official RAB Charter had been signed. The parties involved in signing the RAB Charter were Ms. Teresa A. Ellis, Mr. James M. Hunsicker, Mr. John J. Manley Jr., Ms. Adrienne Townsel Wilson, and Ms. Carol Ann Witt-Smith.

The final activity for the day was the tour to the Bioremediation Facility. The tour included a visit to see the equipment purchased for use at the Bioremediation Facility and the construction site of the facility. At the time of the visit, the concrete barrier wall and the asphalt for the amendment storage area were in place, the concrete slab for the third building was poured, the foundations for the first and second buildings were in place, and the truck wash building walls were standing. The tour returned to Building 3241 and the RAB meeting was adjourned at 1600 hours.

**RESTORATION ADVISORY BOARD
MEETING ATTENDEES LIST
FOR OCTOBER 22, 1996**

NAME	TELEPHONE & FAX	ORGANIZATION REPRESENTED AND MAILING ADDRESS
Christine D. Freeman	812 854-4473 4177	NSWC Crane (code 09511) Env. Protection Dept.
Alicia Marie Thomas Wilson	803-830-5582	South Atlantic EDGCOM Code 1864
Carol W. H. Smith	312 8846146 FAX 312 3534788	U.S. EPA 77 W. Jackson DRP-8J Chicago IL 60604
James May	601-634-3395 FAX 601-634-3139	Waterways Experiment Station
JOHN MAWLEY	(317) 308-3132 FAX (317) 308-3833	IOEM 100 N. SUMMIT INDIANAPOLIS, IN 46206-6015
Sherry Mitchell-Bruker	812-834-6015 FAX 812-834-6015	ENVIRONMENTAL HYDROLOGY RT 1 BOX 444 MELTONVILLE, IN 47436
Jeff Myers	812 659-3788 659-9955	Greene Co. Solid Waste Dist. R 1 Box 61A Switz City, IN 47465
Steve Downey	812-854-6941 812-854-6944	Morrison Knudsen NSWC Crane CTR 12
Cathy Andrews	812-854-3391 FAX -3781	NSWC Crane Code PPO B3D 2 120
Teresa Ellis	812- 384-3087	Community of Bloomfield RT 1 Box 353 Bloomfield, IN 47424
THOMAS J. BRENT	812-854-6160 -4177	CRANE NSWC CODE 09510 8-3260 - ENVIRONMENTAL
FRED SMITH	812-854- 1344	NSWC CRANE CODE 09
DAVID R. LEE	812-254-1500 254-2550	DCGC P.O. Box 191 Washington - IN 47501
Doug Johnson	812 854-1461 3407	Crane Army Ammunition Activity STONSF

**RESTORATION ADVISORY BOARD
MEETING ATTENDEES LIST
FOR OCTOBER 22, 1996**

NAME	TELEPHONE & FAX	ORGANIZATION REPRESENTED AND MAILING ADDRESS
Jim Hunsicker	854-3233	ORF
Brent Robertson	854-3319/5800	NSWC ROICL
Lou Carriello	854-3278/3044	NSWC OICC

APPROVED

CRANE DIVISION, NAVAL SURFACE WARFARE CENTER
(NAVSURFWARCENDIV Crane)



RESTORATION ADVISORY BOARD
(RAB)
CHARTER

22 October 1996

CRANE DIVISION, NAVAL SURFACE WARFARE CENTER
(NAVSURFWARCENDIV Crane)

RESTORATION ADVISORY BOARD
(RAB)

CHARTER

MISSION AND GOAL STATEMENTS

MISSION: To establish a body, hereafter referred to as the Restoration Advisory Board or RAB, which will facilitate communications and coordination between the community and governmental agencies in the environmental restoration of Crane Division, Naval Surface Warfare Center (NAVSURFWARCENDIV Crane), Crane, Indiana. Through the RAB, stakeholders may review progress and give advice relating to the decision making process.

GOAL: Bring together people who reflect the diverse interests within the local community, enabling the early and continued flow of information between the affected community, NAVSURFWARCENDIV Crane, and environmental regulatory agencies. The RAB will ensure that all stakeholders have a voice and can actively participate in a timely and thorough manner in the review of restoration documents. It is a forum to be used for the expression and careful consideration of diverse points of view to provide high quality and timely public participation in decisions regarding environmental restoration at NAVSURFWARCENDIV Crane.

**CRANE DIVISION, NAVAL SURFACE WARFARE CENTER
(NAVSURFWARCENDIV Crane)**

**RESTORATION ADVISORY BOARD
BY-LAWS**

NAME The organization shall be known as the Crane Division, Naval Surface Warfare Center Restoration Advisory Board or RAB.

Article I: AUTHORITY FOR CHARTER

The authority for this charter is based on the Deputy Secretary of Defense policy memorandum of 9 September 1993 (subj: FAST TRACK CLEANUP AT CLOSING INSTALLATIONS) and the Chief of Naval Operations policy memorandum of 9 February 1994 (subj: ESTABLISHMENT OF RESTORATION ADVISORY BOARDS.) Additional authority is derived from the provision of the Resource Conservation and Recovery Act (RCRA), the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), as amended by the Superfund Amendments and Reauthorizaion Act of 1986 (SARA), particularly sections 120(a), 120(f), and 121(f), and 10 USC 2705, enacted by section 211 of SARA.

Article II: STATEMENTS OF PURPOSE

- Section 1** Work in partnership with the NAVSURFWARCENDIV Crane employees and regulatory agencies to study cleanup issues and related matters. Request training and seek additional information when necessary to understand complex/technical issues.
- Section 2** Provide advice on environmental restoration policy and technical matters to support NAVSURFWARCENDIV Crane Installation Restoration programs.
- Section 3** Provide recommendations on cleanup priorities in relation to regional public concerns.
- Section 4** Provide opportunities for the public to comment at appropriate agenda points during meetings, including a provision for written comments.

- Section 5** Assist in identifying federal, state, and local standards, requirements, criteria, or limitations that are legally relevant to the environmental restoration process.
- Section 6** Meet the requirements of 10 USC 2705 (c), Department of Defense Environmental Restoration Program, which directs the establishment of Technical Review Committees/RABs.

Article III: ORGANIZATION

- Section 1** A Community Co-Chair will be elected by community RAB members. The RAB will be chaired by the Navy selected Co-Chair.
- Section 2** Initial RAB members will be assigned by the Commanding Officer, NAVSURFWARCENDIV Crane, under Chief of Naval Operations (CNO) guidance. In keeping with the RAB mission, most RAB members will represent community interests (Community Members). Members will serve on a strictly voluntary basis without compensation for expenses incidental to serving on the RAB (unless specifically approved by higher authority).
- Section 3** The Navy will provide administrative support to the RAB, including: preparing and distributing meeting minutes and agendas, scheduling meeting locations, contacting newspapers regarding public meetings, and required recordkeeping.
- Section 4** The NAVSURFWARCENDIV Crane Library will maintain an Administrative Record which will include all RAB correspondence and documents. The Administrative Record also contains any correspondence, documents, or reports involving the Installation Restoration projects at NAVSURFWARCENDIV Crane.
- Section 5** Sub-committees may be established as deemed necessary to facilitate RAB activities.

Article IV: FUNCTIONS/OPERATING PROCEDURES

- Section 1** **FREQUENCY/LOCATION:** Conduct regular meetings, at least quarterly, open to the public to facilitate discussion and exchange of environmental cleanup information between governmental agencies and the public. The RAB will normally meet on Center at NAVSURFWARCENDIV Crane.

- Section 2** MEMBERSHIP: Maintain RAB membership in accordance with the CNO and CO, Public Works Center guidance. Terms for all members (including organizational positions) shall be three years and may be renewed for a one year period under the supervision of a Membership Subcommittee. The RAB membership shall be limited to eleven (11) community members. New membership additions shall meet the RAB needs of unaddressed socio-economic or geographic representation. New members can be added to the RAB at any time, with a simple majority vote of the standing RAB members. New membership applications shall be reviewed to ensure that no conflicts of interest exist. A list of the RAB members can be found as Appendix 1.
- Section 3** NAVY CO-CHAIR: The Navy Co-Chair will be the Navy Environmental Protection Department Manager and will act as "primary" chair with duties including:
- ensure Navy response to public comments
 - ensure adequate time is provided to present community concerns
 - provide administrative support for the RAB
 - provide documents for RAB review
 - responsible for developing and maintaining a mailing list of names and addresses of those who wish to receive information on the environmental cleanup program.
- Section 4** COMMUNITY CO-CHAIR: A Community Co-Chair will be elected by RAB community members and serve a one year term that can be renewed indefinitely. The Community Co-Chair will act as "secondary" chair with duties that will include:
- ensure community concerns and issues are heard
 - ensure technical information is communicated in understandable terms
 - ensure public remains informed
 - communicate priorities and recommendations via a memorandum or other formal document to the NAVSURFWARCENDIV Crane Environmental Protection Department
 - prepare RAB meeting agenda
 - ensure minutes are reviewed and distributed
- Section 5** ATTENDANCE: It is essential that all RAB members be present at each meeting. Attendance is not mandatory because the RAB has a voluntary membership. However, after missing two consecutive meetings, without prior notification, the RAB co-chairs may ask the member to relinquish their membership. After missing four consecutive meetings, even with prior notification, the RAB co-chairs may ask the member to resign.

chairs may ask the member to resign.

Section 6 RESIGNATION/REMOVAL: If after selection, a RAB member is unable to fully participate, then the RAB member, should submit his/her resignation in writing to either of the RAB co-chairpersons. If after selection, a RAB member (including co-chair positions) is unwilling to fully participate or is a disruption to the RAB, then the RAB, after a 75% majority vote, shall remove the member from the RAB. The decision by the RAB to remove a member will be received in writing and signed by both the community and installation co-chairs.

Section 7 VOTING: Vote, when necessary, as follows: all Community members receive one vote, regardless of elected position or group representation. A Community Member must be present at the meeting to cast a vote; proxy votes expressly are not allowed. Because the RAB is advisory in nature, there is no minimum attendance requirement to conduct business. A simple majority of the standing community RAB members in attendance at any meeting shall be used for all decisions except charter amendment and RAB disestablishment.

Section 8 DISPUTE RESOLUTION: Resolution of Disputes is addressed in Section VII.I.2.c. of the Crane Division, Naval Surface Warfare Center (NAVSURFWARCENDIV Crane) Federal Portion of the Final Resource Conservation and Recovery Act permit renewal.

Article V: DISESTABLISHMENT

RAB disestablishment shall occur not earlier than base closure and normally not earlier than final disposition of all real property. A 75% vote of the membership is required for disestablishment.

Article VI: AMENDMENTS TO THE CHARTER

The charter may be amended at any time with a majority vote of all the RAB Community Members. The revised charter shall be published and distributed within 30 days of amendment.

Article VII: RAB CHARTER EXECUTION

By signature of the Community Co-Chair, NAVSURFWARCENDIV Crane Co-Chair, NAVFACENGCOM representative, U. S. EPA representative, and IDEM representative below, this charter has received RAB membership approval and is executed.

Teresa A. Ellis
Ms. Teresa A. Ellis, Community Co-Chair

10/22/96
Date

James M. Hunsicker
Mr. James M. Hunsicker, Navy Co-Chair
NAVSURFWARCENDIV Crane

10/22/96
Date

Adrienne Townsel Wilson
Ms. Adrienne Townsel Wilson,
NAVFACENGCOM, Southern Division
Environmental, Remedial Project Manager

10/22/96
Date

Carol Ann Witt-Smith
Ms. Carol Ann Witt-Smith,
United States Environmental Protection
Agency, Region V Representative

10/22/96
Date

John Manley
Mr. John Manley, Indiana Department of
Environmental Management Representative

10/22/96
Date

Appendix 1

RESTORATION ADVISORY BOARD MEMBERS

Community RAB Members

Mr. David Cox

Daviess County Growth Council
P.O. Box 191
Washington, IN 47501
Phone: (812) 254-1508
Fax: (812) 254-2550

Ms. Teresa A. Ellis

(Community Co-Chair)
R.R. #1 Box 353
Bloomfield, IN 47424
Phone: (812) 384-3087

Mr. Larry G. Hazelwood

105 Crestview Dr.
Loogootee, IN 47533
Phone: (812) 295-3575

Mr. John H. Longfellow

USA Brokers and General
Acceptance Corporation
1025 Acuff Road
Bloomington, IN 47404
Phone: (812) 337-6000 x1253
Fax: (812) 337-6020

Mr. Thomas P. Medina

Ellen Enterprises, Inc.
P.O. Box 100
Scotland, IN 47457
Phone: (812) 295-4189
Fax: (812) 295-9418

Mr. Jeffery A. Myers

Greene County Solid Waste District
R.R. #1 Box 61A
Switz City, IN 47465
Phone: (812) 659-3788

Mr. James Parker

Lawrence County Solid Waste District
819 16th Street
Bedford, IN 47421
Phone: (812) 275-4178
Fax: (812) 275-4131

Ms. Karmen D. Wagler, RN BSN

Martin County Health Department
P.O. Box 368
Shoals, IN 47581
Phone: (812) 247-2273/3621
Fax: (812) 247-2210

Government RAB Representatives

Ms. Carol Witt-Smith

U.S. Environmental Protection Agency,
Region V
Waste, Pesticides, and Toxics Division
Waste Management Branch
Illinois, Indiana, and Michigan Section
Attn: Ms. Carol Witt-Smith (DRP-8J)
77 West Jackson Blvd.
Chicago, IL 60604
Phone: (312) 886-6146
Fax: (312) 353-4788

Ms. Adrienne Townsel-Wilson

Department of the Navy
South NAVFACENGCOM Environmental
Attn: Code 1864
P.O. Box 190010
N. Charleston, SC 29419-9010
Phone: (803) 820-5582
Fax: (803) 743-0465

Mr. John Manley
Indiana Department of Environmental
Management
Defense Environmental Restoration
Program
Attn: Mr. John Manley
P.O. Box 6015 (Room N-1255)
100 N. Senate Ave.
Indianapolis, IN 46206-6015
Phone: (317) 308-3132

NAVSURFWARCENDIV Crane
RAB Representatives

Installation Co-Chair
Mr. James M. Hunsicker
Environmental Protection Dept. Dir.
Address: Commander
Code 095 Bldg. 3260
NAVSURFWARCENDIV
300 Highway 361
Crane, IN 47522-5001
Phone: (812) 854-3233
Fax: (812) 854-4177

Additional Points of Contact:

Mr. Thomas J. Brent
Environmental Protection Department
Code 09510 Bldg. 3260
Phone: (812) 854-6160
Fax: (812) 854-4177

Ms. Christine D. Freeman
Environmental Protection Department
Code 09511 Bldg. 3260
Phone: (812) 854-4423
Fax: (812) 854-4177



U.S. ARMY NON-STOCKPILE CHEMICAL MATERIEL PROJECT

INFORMATION

National Environmental Policy Act

◆
This information is provided by the Office of the Project Manager for Non-Stockpile Chemical Materiel.

For additional information, please contact

Ms. Louise Dyson at 1-800-488-0648 or 410-671-3445.

Or, you may write the Public Affairs Office, Program

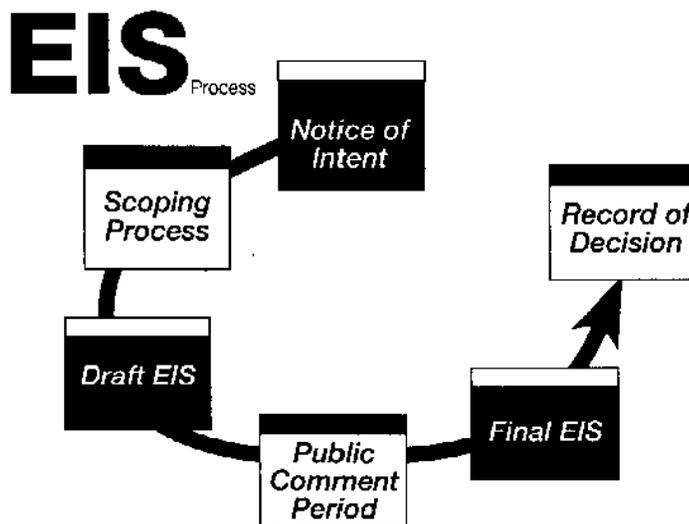
Manager for Chemical Demilitarization, Aberdeen Proving Ground, Maryland 21010-5401.

The National Environmental Policy Act (NEPA) is our nation's charter for the protection of the environment. NEPA ensures that, when major federal actions are planned: (1) environmental impact evaluations are done, (2) the public is involved, and (3) federal officials make decisions based on an understanding of environmental consequences.

NEPA was signed into law in 1970. It requires the preparation of an Environmental Impact Statement (EIS) prior to any major action by federal agencies if the action has the potential to

significantly impact the environment. The EIS examines those impacts and assesses their effect on public health and safety.

Under NEPA, the term "environment" includes the natural and physical environment (air, water, biological resources, geography, geology) as well as the relationship of people with that environment (social economics). An "impact" is a change or consequence that results from an activity. An EIS describes impacts as well as ways to "mitigate" (lessen or remove) adverse impacts.





National Environmental Policy Act

An EIS is prepared in a series of steps: gathering comments from federal, state and local agencies, and the public to define issues and alternatives important for analysis (a process known as "scoping"); preparing the draft EIS; receiving and responding to public comments on the draft EIS and preparing the final EIS. An EIS does not make decisions; it provides information officials use when making decisions.

Agencies begin the scoping process by publishing a Notice of Intent (NOI) in the *Federal Register*. The NOI describes the action the agency is considering and provides background information on the action, possible alternatives and potential impacts. The scoping process is a period of time when the public can provide comments to help define the issues that should be covered and to help determine the alternatives to be analyzed. The public, as well as federal, state and local agencies, and Tribal Governments are asked to provide input.

Next, the draft Environmental Impact Statement (DEIS) is written and made available for public review and comment. NEPA requires a minimum 45-day public comment period. Important issues and reasonable alternatives raised by the public and agencies during the scoping process are addressed in the DEIS.

The final EIS contains responses to comments received during the public comment period, written and oral, as well as the revised EIS text.

Once the final EIS is published, a minimum 30-day waiting period is required before a decision can be made. A Record of Decision (ROD) notifies the public of the decision made on the proposed action and the reasons for that decision. After the ROD is published, agencies may proceed with the action.

The NEPA process promotes public awareness at the earliest planning stages and provides opportunities for the public to be involved in the process by participating early in the scoping phase and during the public comment periods.

U.S. ARMY NON-STOCKPILE CHEMICAL MATERIEL PROGRAM

PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT INFORMATION PAPER



The mission of the Non-Stockpile Chemical Materiel Program (NSCMP) is to provide centralized management and direction to the Department of Defense for disposal of Non-Stockpile Chemical Materiel in a safe, environmentally sound, and cost effective manner.

Beginning with World War I, the United States has produced a variety of chemical warfare materiel (CWM). Much of this materiel comprise what is called the national "chemical stockpile." The stockpile includes a variety of pre-mixed, or unitary, chemical warfare agents (for example, nerve and blistering agents) in different types of munitions and in bulk quantities. The stockpile is stored at eight Army installations in the U.S. and Johnston Island in the Pacific.

In the Department of Defense Authorization Act of 1986, Congress directed the U.S. Army to destroy this portion of the national chemical stockpile. Following the completion of the final Programmatic Environmental Impact Statement, the Army decided in 1988 to destroy the stockpile at the locations where the stockpile is being stored.

In addition to the national chemical stockpile, there are other chemical warfare materiel called "non-stockpile chemical materiel" or NSCM. NSCM includes: 1) chemical warfare materiel that was previously disposed of by burial, and which may have to be excavated from burial sites in the future; 2) chemical

warfare materiel recovered from firing ranges and former burial sites; 3) binary chemical weapons; 4) former chemical weapon production facilities; and 5) miscellaneous chemical warfare materiel.

Buried CWM can be dated back to World War I. The practice of burying leaking or obsolete CWM in the past was an acceptable method of disposal. Often burial was accompanied by draining and decontamination. Therefore, the CWM underwent a form of destruction. In other cases, intact munitions were simply buried. These techniques reduced the risk to the public. These approaches sometimes resulted in incomplete and/or partial destruction. Even today, in certain situations, based on site-specific determinations and current technological limitations, leaving the buried CWM in the ground may pose less risk to health and safety and the environment compared to excavation and destruction.

Although there are a large number of locations with possible buried NSCM, the NSCM Project Manager for the Program is only responsible for buried NSCM once it has been excavated from a burial site. The Program is not responsible for determining whether or not buried NSCM should be removed or how a burial site should be cleaned up. Overall responsibility for the cleanup of burial sites rests with other Department of Defense (DoD) organizations that must perform site-specific analyses to determine whether and how burial sites should be cleaned up. The goal of the Non-

Stockpile Chemical Materiel Program is to provide for the safe destruction of U.S. NSCM in accordance with Federal, state, and local safety, health, and environmental requirements.

In October 1992, Congress directed the Army to submit a plan for destroying NSCM after the Chemical Weapons Convention (CWC) becomes effective. The CWC requires each signatory nation to destroy all chemical warfare related materiel meeting criteria in the CWC. The U.S. and 150 nations signed the CWC on January 13, 1993 and they and the U.S. are working towards ratification.

The NSCM Project Manager has identified 65 locations in 31 states and the Virgin Islands as having 170 burial sites that may contain buried NSCM. This number of locations and burial sites will likely change as site-specific investigations and cleanup actions are conducted. Another 31 locations with 54 burial sites have been found not to contain buried NSCM or require no further cleanup. Other NSCM, such as recovered and contaminated miscellaneous chemical warfare materiel, are located at 12 of the 65 locations. In addition there are 3 other locations which have no burial sites but have recovered or miscellaneous chemical warfare materiel.

The number of locations with NSCM is substantially greater than the number of locations with chemical stockpile materiel; however, the currently known quantities of NSCM are substantially smaller than the quantity of stockpile materiel. NSCM is also much more diverse in its characteristics than the chemical stockpile (for example, NSCM includes many more types of chemical weapons, different types of chemical warfare agents, and weapons in various conditions).

PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT

The destruction of lethal chemical warfare agents in NSCM is the most challenging of all the NSCM to be destroyed. NSCM containing chemical agents include buried NSCM that may be excavated as part of future burial site clean-ups; recovered chemical warfare materiel; and

research, development, test, and evaluation (RDT&E) quantities of chemical agents. These types of NSCM are located, or could be located at the 68 locations listed on page three.

Other types of uncontaminated NSCM such as equipment and munitions not containing explosive material can be destroyed by using scrapping and recycling technologies. Former production facilities and binary chemical weapons and components, can also be destroyed using available destruction technologies; however, site-specific conditions need to be considered prior to selecting a particular destruction technology or approach.

Currently, there are two general methods available for destroying chemical agents. These methods are 1) thermal destruction in which chemical agents are destroyed by high temperature; and 2) chemical treatment (neutralization) in which chemical agents are reacted with other chemicals to render the agents less toxic. Some destruction methods developed by private industry use a combination of both thermal destruction and chemical treatment; however, these "combination" methods have currently not been used or fully demonstrated for the destruction of chemical warfare agents.

Prior to proceeding with the destruction of chemical agents in NSCM, the Army will prepare a Programmatic Environmental Impact Statement (PEIS). The PEIS will evaluate and compare the environmental consequences of alternative destruction strategies. The PEIS will be used by the Army in making informed decisions on destruction strategies that consider environmental concerns, along with cost and public policy.

Following the Army's selection of strategies, subsequent site-specific environmental reviews and studies will be conducted with stakeholder involvement. These site-specific environmental reviews will determine whether or not a selected strategy is appropriate for each location.

PROPOSED ACTION AND POSSIBLE ALTERNATIVES

To achieve the destruction of chemical agents contained in the non-stockpile CWM,

**LOCATIONS WITH KNOWN OR POSSIBLE BURIED CHEMICAL
WARFARE MATERIEL**

<p>Alabama Camp Sibert Fort McClellan Redstone Arsenal</p> <p>Alaska Cape Yakak Radio Station Chichagof Harbor Fort Wainwright Gerstle River Expansion Area Gerstle River Test Site Unalaska Island</p> <p>Arizona Camp Navajo Yuma Proving Ground</p> <p>Arkansas Fort Chaffee Pine Bluff Arsenal Southwestern Proving Ground</p> <p>California Edwards Air Force Base Fort Ord Santa Rosa Army Air Field</p> <p>Colorado Pueblo Army Activity Rocky Mountain Arsenal</p> <p>Florida Brooksville Army Air Field MacDill Air Force Base Withlacoochee</p> <p>Georgia Fort Benning Fort Gillem</p> <p>Hawaii Kipapa Ammunition Storage Schofield Army Barracks</p>	<p>Illinois Fort Sheridan Savanna Army Depot Activity</p> <p>Indiana Camp Atterbury Naval Surface Warfare Center, Crane Division Newport Chemical Activity</p> <p>Iowa Camp Dodge</p> <p>Kentucky Blue Grass Army Depot Fort Knox</p> <p>Louisiana Camp Claiborne England Air Force Base Fort Polk</p> <p>Maryland Aberdeen Proving Ground Fort Meade</p> <p>Massachusetts Fort Devens</p> <p>Michigan Chemical Warfare Development Division</p> <p>Mississippi Camp Van Dorn Columbus Army Airfield</p> <p>Missouri Camp Crowder</p> <p>Nevada Hawthorne Army Depot</p> <p>New Jersey Fort Hancock Naval Air Warfare Center, Lakehurst Raritan Arsenal</p>	<p>New Mexico Fort Wingate Depot Activity</p> <p>New York Camp Hero</p> <p>North Carolina Camp Lejeune Laurinburg-Maxton Army Air Base</p> <p>Ohio Cleveland Plant Ravenna Army Ammunition Plant</p> <p>Oregon Umatilla Depot Activity</p> <p>South Carolina Charleston Naval Weapons Station</p> <p>South Dakota Black Hills Ordnance Depot</p> <p>Tennessee Defense Depot Memphis</p> <p>Texas Camp Bullis Camp Stanley Storage Activity</p> <p>U.S. Virgin Islands Water Island</p> <p>Utah Dugway Proving Ground (Formerly Used Defense Site) Dugway Proving Ground Tooele Army Depot Wendover Bombing and Gunnery Range</p>
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**LOCATIONS WITH RECOVERED CHEMICAL WARFARE MATERIEL
AND RESEARCH, DEMONSTRATION, TESTING, AND EVALUATION
MATERIEL**

<p>Alabama Anniston Army Depot Redstone Arsenal</p> <p>Alaska Fort Richardson</p> <p>Arkansas Pine Bluff Arsenal</p>	<p>Colorado Pueblo Army Activity Rocky Mountain Arsenal</p> <p>Johnston Island</p> <p>Kentucky Blue Grass Army Depot</p> <p>Maryland Aberdeen Proving Ground</p>	<p>Oregon Umatilla Depot Activity</p> <p>Texas Camp Bullis</p> <p>Utah Dugway Proving Ground Tooele Army Depot</p>
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Source: Based on a U.S. Army Non-Stockpile Chemical Materiel Program Survey and Analysis Report, November 1993 data base, updated and unpublished.

the Army proposes to select one or more strategies that (1) provide the highest level of protection for human health, safety, and the environment and (2) enable the U.S. to comply with the requirements of the Chemical Weapons Convention. The selection of one or more strategies is needed by the Army in order to focus resources on and provide for a future destruction capability.

Each of the possible alternative destruction strategies may include: treatment, transportation, and or destruction/disposal. The alternative destruction strategies that have currently been identified are those that are considered "reasonable" and are intended as a starting point. The alternative strategies will evolve and become more defined, and other alternative strategies may be added, or current alternatives removed, as a result of the scoping process. The PEIS will address the alternative strategies in detail.

The PEIS will not evaluate specific offsite locations for destruction under these strategies. Should the Army select an offsite destruction strategy, further NEPA documentation will be prepared, as required, to identify the specific offsite locations that would be used. In evaluating the environmental impacts of different destruction strategies, the PEIS will base its evaluation of impacts on those destruction technologies that can be implemented from a technical and economic standpoint.

PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT PREPARATION

The PEIS will be prepared in several major steps as follows:

Notice of Intent - The Army will notify the public that it intends to prepare the PEIS in a Notice of Intent (NOI). The NOI, which is published in the *Federal Register*, will briefly identify the proposed action and possible alternatives to be evaluated. In addition, the NOI will describe the agency's proposed scoping process

Scoping Process - The general public, inter-

ALTERNATIVE DESTRUCTION STRATEGIES

1. Onsite Chemical Treatment and Offsite Destruction of Chemical Treatment Waste

Chemical agents in NSCM would be chemically treated onsite. Liquid waste from chemical treatment would be packaged in accordance with appropriate transport regulations and the waste would then be transported offsite for destruction or disposal.

2. Onsite Thermal Destruction

Chemical agents in NSCM would be thermally destroyed onsite. Any residual waste from thermal destruction would be packaged in accordance with appropriate transport regulations and the waste would then be transported offsite for disposal.

3. Onsite Chemical Treatment and Destruction of Chemical Treatment Waste

Chemical agents in NSCM would be chemically treated onsite. Liquid waste from chemical treatment would also be destroyed onsite. Any residual waste from the onsite destruction of liquid waste would be packaged in accordance with appropriate transport regulations and then transported offsite for disposal.

4. Offsite Chemical Treatment and/or Thermal Destruction.

NSCM containing chemical agents would be packaged in accordance with appropriate transport regulations and then transported to an offsite location. The NSCM containing chemical agents would then be either chemically treated or thermally destroyed at the offsite location.

5. No Action

Continue the storage of recovered and RDT&E materiel, and the safe packaging, transportation, and storage of buried CWM at permitted locations.

ested governmental agencies, and Tribal Governments as appropriate, will be invited to submit comments on the environmental issues and alternatives that should be evaluated in the PEIS. The Army will consider the comments received and determine the scope of issues and alternatives to be addressed in the draft PEIS in a publicly available document called a "Statement of Scope."

Draft PEIS - A draft PEIS will be prepared based on results of the scoping process and NEPA requirements. The draft PEIS will be distributed to the public and all interested agencies.

Public Comment Period - After the draft PEIS has been distributed, the public and interested agencies will be invited to submit comments on the adequacy of the draft PEIS and the merits of the alternatives evaluated.

Final PEIS - Each of the comments on the draft PEIS will be considered by the Army, modifications to the draft PEIS identified, and the final PEIS prepared and distributed.

Record of Decision - The Army will document its selection of one or more strategies in a publicly available Record of Decision, or ROD. The ROD will also identify the environmentally preferred strategy(ies), and briefly discuss those factors that led to the agency's decision.

impacts to public health from the implementation of the destruction technologies; (3) the potential impacts to public health and safety from accidents that could occur during the handling, transport, storage, and destruction of CWM; and (4) the potential socio-economic impacts of the alternative strategies.



SCOPING

During the scoping process, comments are specifically invited on the proposed alternative strategies identified in the previous section. Recommendations on other alternative strategies that should be evaluated in the PEIS are also invited. Alternatives must be technically and economically feasible.

In addition, comments are invited on the important environmental issues that should be evaluated for the proposed action and alternative strategies. The important environmental issues that have been identified on a preliminary basis for evaluation and analysis in the PEIS are: (1) the potential impacts of the alternative strategies on air quality, water resources, and land resources; (2) the potential



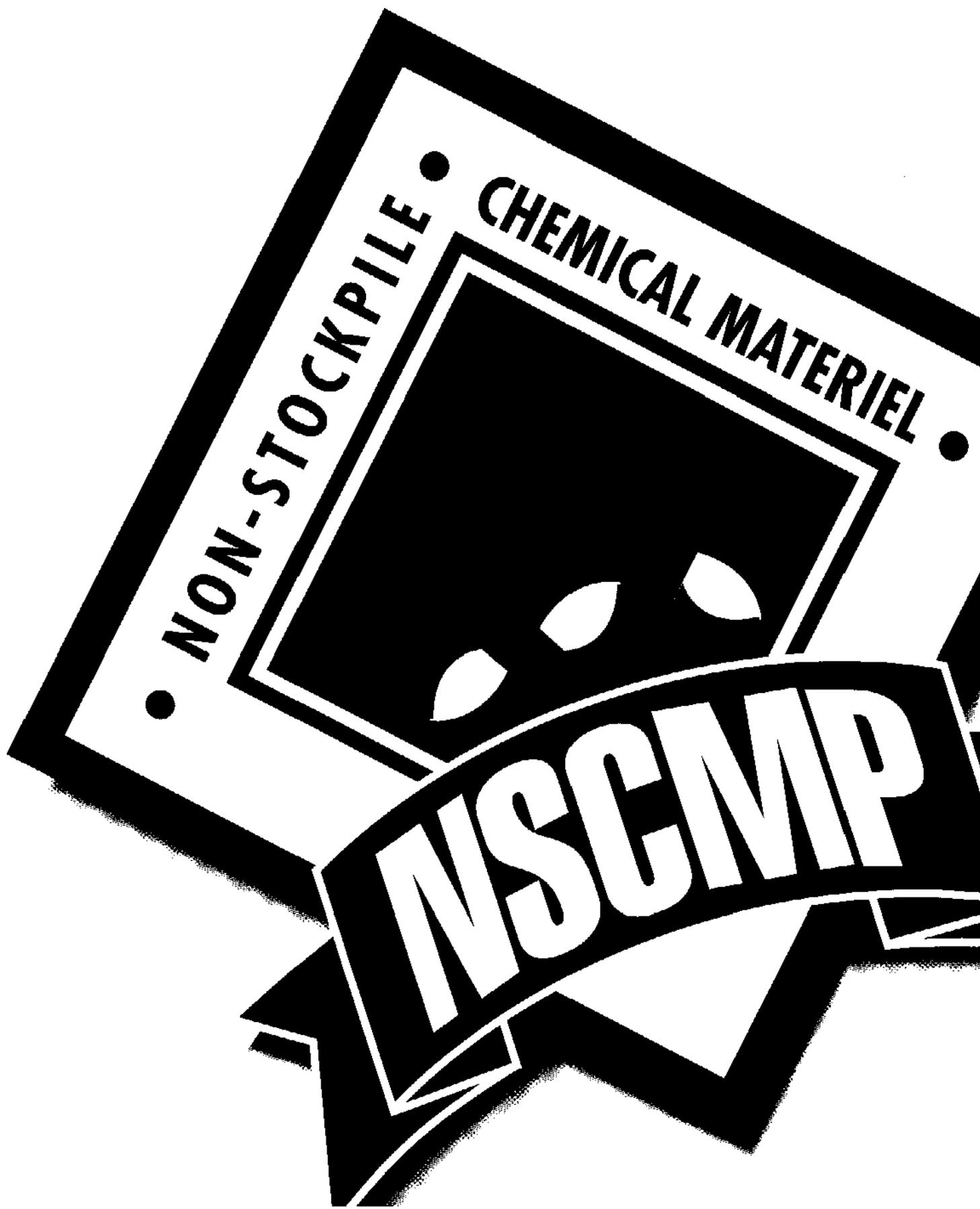
**This information has been provided by the Office of the
Project Manager for Non-Stockpile Chemical Materiel.**

**For additional information, please call the toll-free
PEIS telephone number, 1-800-410-9901. Or, you may
send written comments on the scope of the PEIS to:**

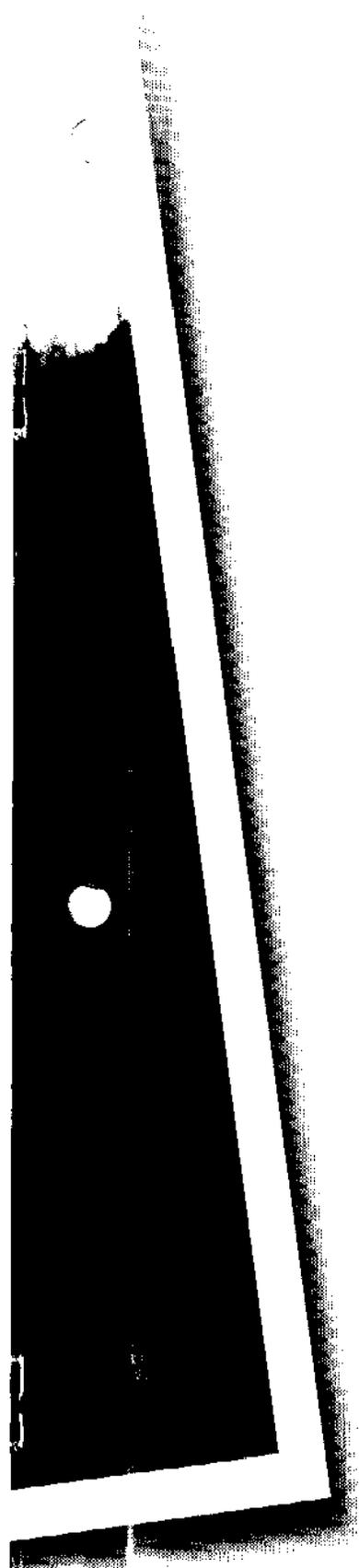
**Program Manager for Chemical Demilitarization
ATTN: SFAE-CD-NP (Mr. Dragunas/PEIS)
Aberdeen Proving Ground, MD 21010-5401**



NON-STOCKPILE CHEMICAL MATERIEL PROGRAM







PROGRAM OVERVIEW

For nearly 70 years, the United States produced and stored chemical weapons to deter others from using them against United States and allied troops.

Fortunately, the United States has never used chemical weapons in battle.

However, research, development, and testing of these chemical weapons has created a dynamic recovery and cleanup challenge for the U.S. Army. To manage and direct this effort, the Non-Stockpile Chemical Materiel Program (NSCMP) was created to

oversee the disposal of all non-stockpile chemical materiel (NSCM) in a safe, environmentally sound, and cost-effective manner.

The Army is committed to working with Congress, federal agencies, and state and local officials to develop destruction plans and identify resources for safe destruction operations.

In 1993, a homebuilder in the Spring Valley area of Washington, D.C., accidentally discovered old munitions. After the discovery, the U.S. Army moved in to conduct additional excavations.



WHAT IS NON-STOCKPILE CHEMICAL MATERIEL?

NSCM includes buried chemical warfare materiel (CWM), binary chemical weapons, recovered chemical weapons, former production facilities, and miscellaneous CWM. This materiel was used as far back as World War I during the development and production of chemical weapons.

These materials were often buried, and available records indicate that some land burials may still contain chemical agent.

Most potential burial sites are still under military control. However, some sites are located on formerly used defense sites (FUDS), which the

Department of Defense no longer controls.

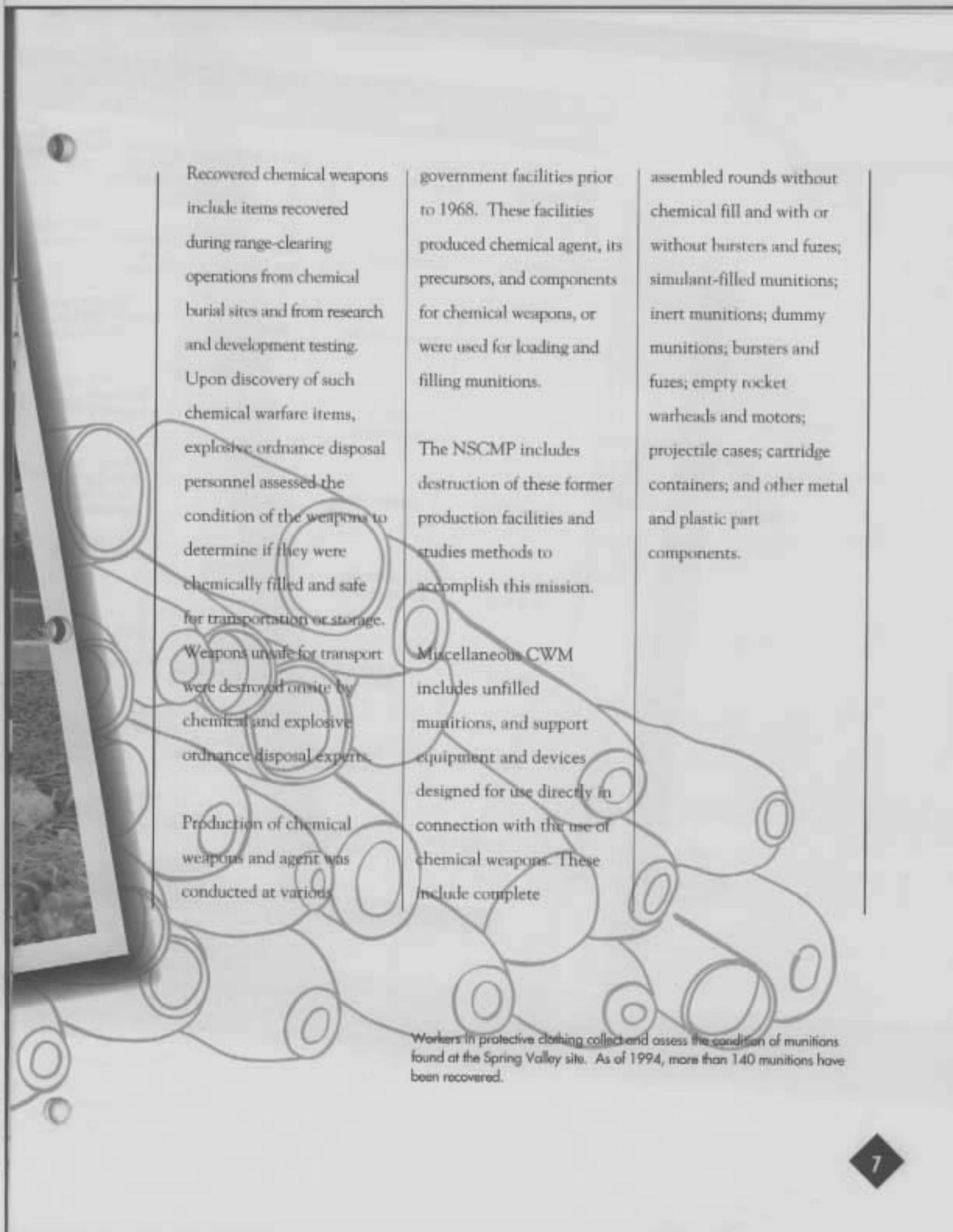
Binary chemical weapons are part of the U.S. stockpile. A binary munition is one that forms a lethal chemical agent from nonlethal elements through a chemical reaction. This reaction occurs as the weapon flies to its target.

Army policy called for the second binary component to be loaded into the munition only at the battlefield. As a result, binary components were manufactured, stored, and transported independently. As with buried CWM, no formal destruction plan has been developed.

continued on page 7

This former chemical weapons production facility is located at the Edgewood Area of Aberdeen Proving Ground in Maryland. The pilot plant facility, encircled with a double security fence, has been unused since 1986.





Recovered chemical weapons include items recovered during range-clearing operations from chemical burial sites and from research and development testing.

Upon discovery of such chemical warfare items, explosive ordnance disposal personnel assessed the condition of the weapons to determine if they were chemically filled and safe for transportation or storage.

Weapons unsafe for transport were destroyed onsite by chemical and explosive ordnance disposal experts.

Production of chemical weapons and agent was conducted at various

government facilities prior to 1968. These facilities produced chemical agent, its precursors, and components for chemical weapons, or were used for loading and filling munitions.

The NSCMP includes destruction of these former production facilities and studies methods to accomplish this mission.

Miscellaneous CWM includes unfilled munitions, and support equipment and devices designed for use directly in connection with the use of chemical weapons. These include complete

assembled rounds without chemical fill and with or without bursters and fuzes; simulant-filled munitions; inert munitions; dummy munitions; bursters and fuzes; empty rocket warheads and motors; projectile cases; cartridge containers; and other metal and plastic part components.

Workers in protective clothing collect and assess the condition of munitions found at the Spring Valley site. As of 1994, more than 140 munitions have been recovered.

AGENT	COLOR	ODOR	RATE OF ACTION
Chloroacetophenone (CN) (tear gas)	Colorless to Gray Solid	Apple Blossoms	Very Rapid - Practically Instantaneous
Sarin (GB)	Colorless Liquid	None in Pure Form	Very Rapid - Seconds to Minutes
Chlorine	Yellow-Green Gas	Bleach	Delayed - Hours
VX	Colorless to Amber Liquid	None	Very Rapid - Seconds to Minutes
Phosgene (CG)	Colorless Gas	New Mown Hay	Immediate to Delayed - Depending on Concentration
Lewisite (L or M-1)	Colorless to Amber Liquid	Geraniums	Rapid - Minutes
Mustard	Colorless to Pale Yellow Liquid	Garlic or Horse Radish	Delayed - Hours
Adamsite (DM)	Yellow to Green Solid	None in Pure Form	Very Rapid - Seconds to Minutes
Distilled Sulfur Mustard (HD)	Colorless to Pale Yellow Liquid	Garlic	Delayed - Hours

EFFECT ON BODY

Irritates Eyes and Upper Respiratory Tract, Causing Tearing

Inhibits Nerve Conduction

Nausea; Vomiting; Irritates Eyes, Nose, and Respiratory Tract

Inhibits Nerve Conduction

Impairs Breathing; Fluid Buildup in Lungs

Irritates Eyes and Skin

Irritates Skin, Eyes, and Respiratory Tract

Eye Irritation; Nausea; Vomiting

Irritates Skin, Eyes, and Respiratory Tract

CHEMICAL AGENTS

In the effort to locate and recover these weapons, research indicates that Army officials could encounter chemical agents in a variety of forms with very distinct characteristics. The chart on the left summarizes agent characteristics.

References:

Potential Military Chemical/Biological Agents and Compounds, Army Field Manual No. 3-9, Department of the Army, Washington, D.C., 12 December 1990. Material Safety Data Sheets.

NIOSH Pocket Guide to Chemical Hazards, U.S. Department of Health and Human Services, June 1990.

Recovered Chemical Weapons Storage Locations



- Aberdeen Proving Ground, MD
- Aniston Army Depot, AL
- Pine Bluff Arsenal, AR
- Dugway Proving Ground, UT
- Tooele Army Depot, UT
- Johnston Island, Pacific Ocean

Polen



Miscellaneous Chemical Warfare Material Storage Facilities



- Aberdeen Proving Ground, MD
- Aniston Army Depot, AL
- Blue Grass Army Depot, KY
- McSparran Army Ammunition Plant, WI
- Pine Bluff Arsenal, AR
- Pueblo Depot Activity, CO
- Rocky Mountain Arsenal, CO
- Tooele Army Depot, UT
- Umatilla Army Depot Activity, OR
- Johnston Island, Pacific Ocean

SCOPE OF THE PROBLEM

To identify the locations, types, and quantities of NSCM, explain destruction methods, and provide cost and schedule estimates for their destruction, the NSCMP produced the "Survey and Analysis Report." As of November 1993, findings indicate potential burial sites at 82 locations in 33 states, the U.S. Virgin Islands, and the District of Columbia. Of these 82 locations, 48 are military installations and 34 are FUDS. Information used to produce the report was based on document

surveys from Aberdeen Proving Ground, MD; the National Archives, Washington, D.C.; and other available data.

A destruction program for all categories of NSCM has never been developed. The Army will continue to gather information, identify destruction processes, and refine cost estimates as the program grows.

Chemical Warfare Materiel Burial Locations*



* A complete list of potential chemical warfare materiel burial locations and sites can be obtained by calling the number or writing to the address on Page 16.





DISPOSAL PROCESS

The NSCMP is currently developing environmentally acceptable and safe disposal systems for the destruction of Chemical Agent Identification Sets (CAIS), small non-explosive CWM burials, small explosive CWM burials, and former chemical weapons test ranges.

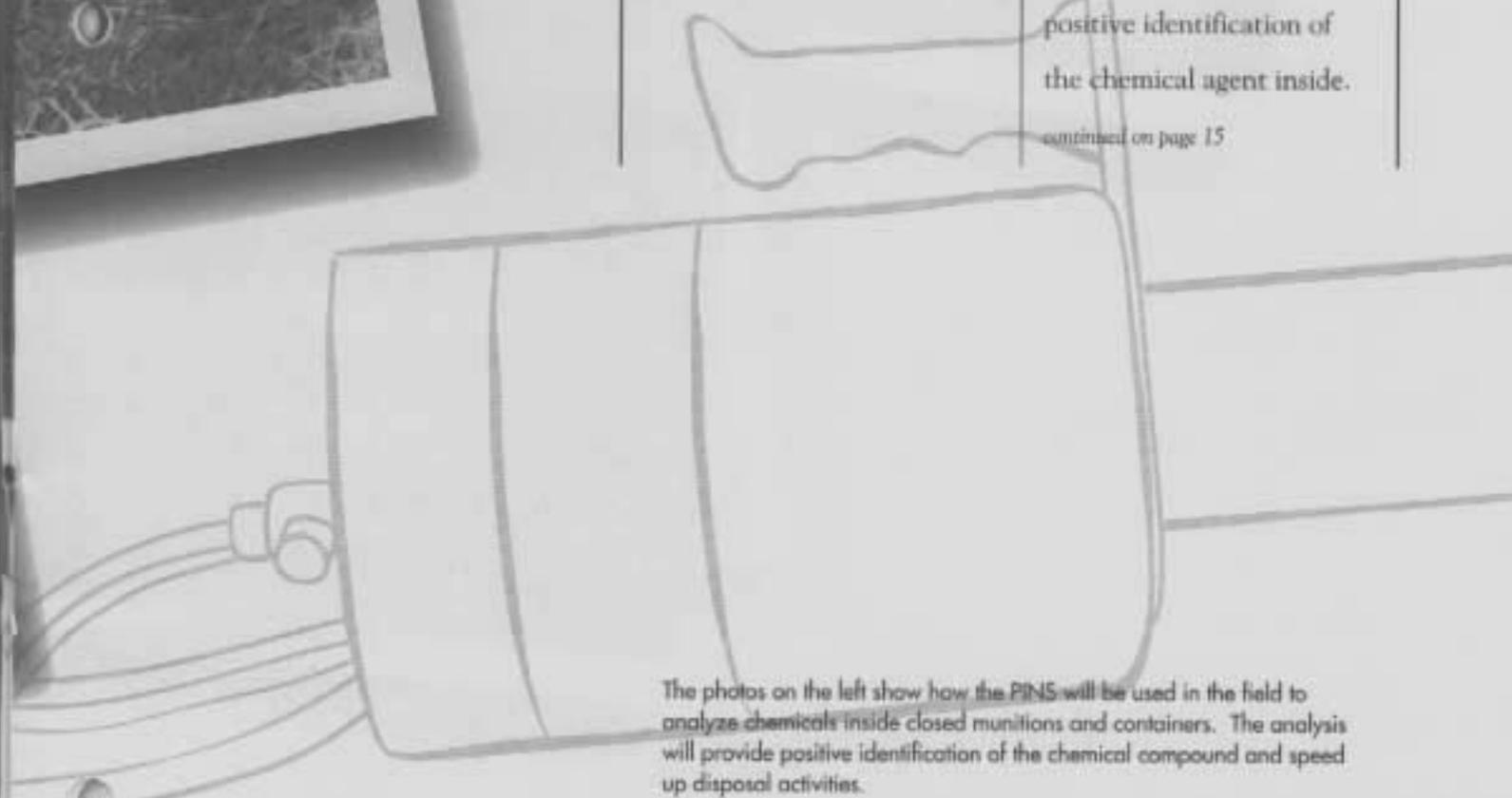
Portable Isotopic Neutron Spectroscopy (PINS)

PINS identifies specific chemical agents within a closed munition by analyzing its gamma rays.

Raman Spectrophotometer

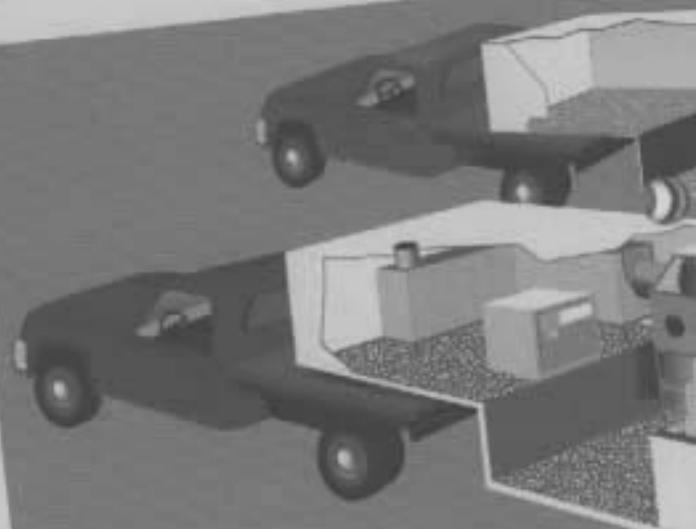
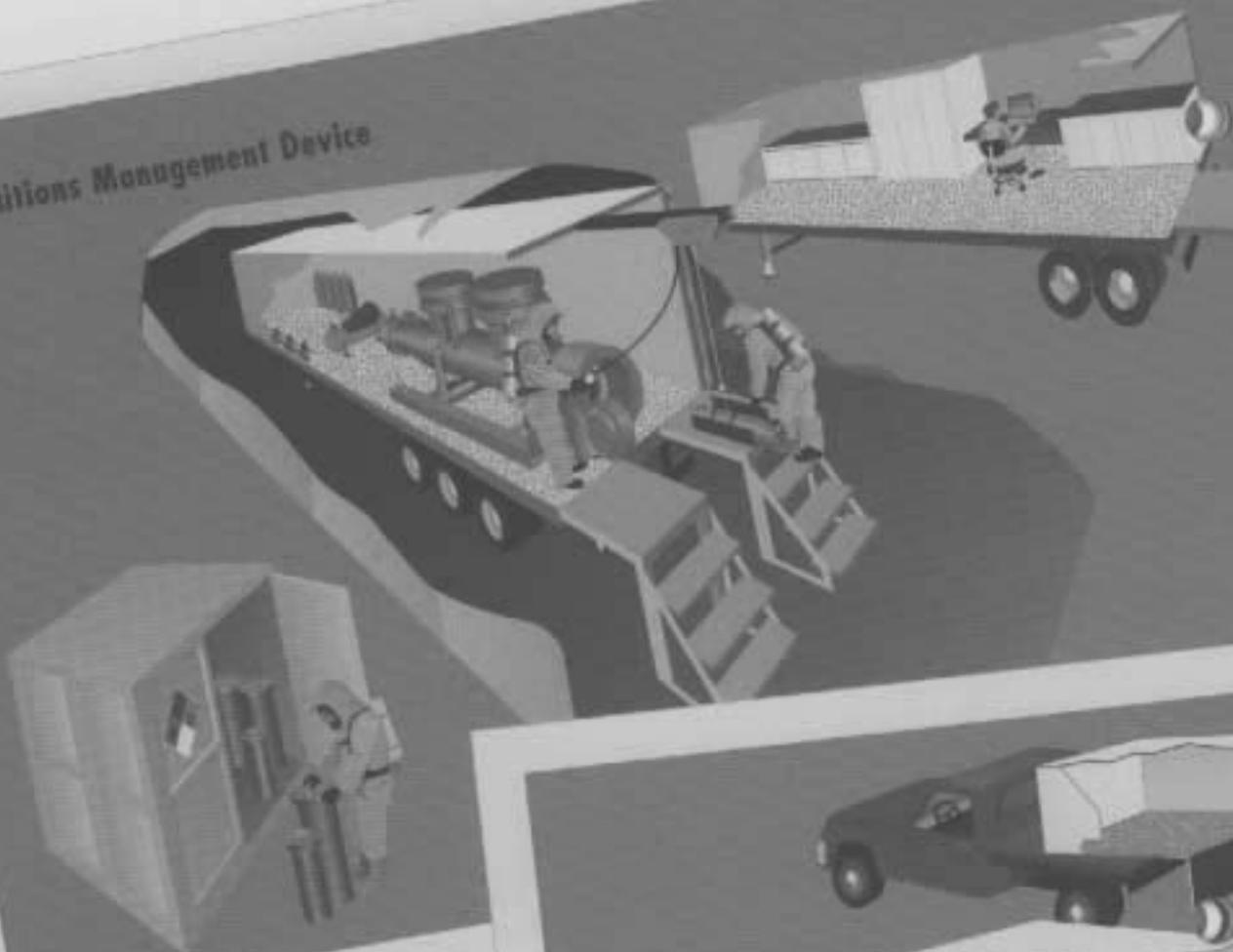
The Raman Spectrophotometer is a device which "sees" through CAIS glass vials to allow for positive identification of the chemical agent inside.

continued on page 15

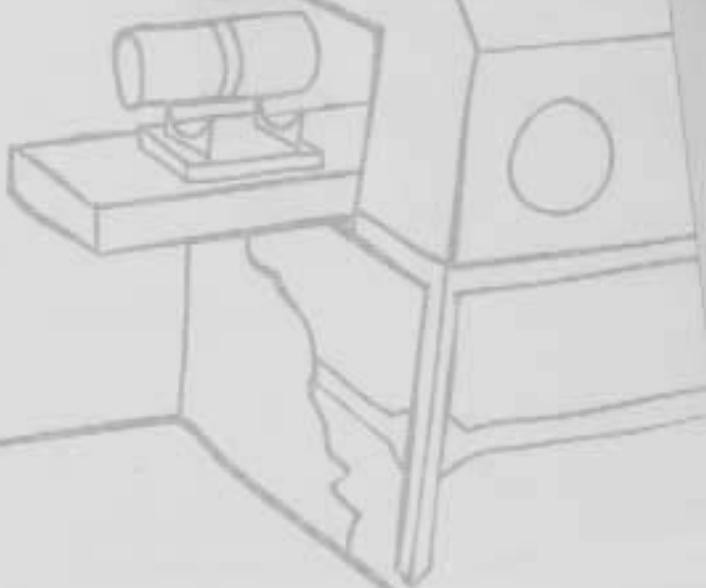


The photos on the left show how the PINS will be used in the field to analyze chemicals inside closed munitions and containers. The analysis will provide positive identification of the chemical compound and speed up disposal activities.

Munitions Management Device



Rapid Response System



Munition Management Devices (MMDs)

The MMDs are a planned family of portable disposal systems capable of receiving, containing, monitoring, and treating explosive and nonexplosive chemical warfare munitions and bulk agent containers.

Rapid Response System (RRS)

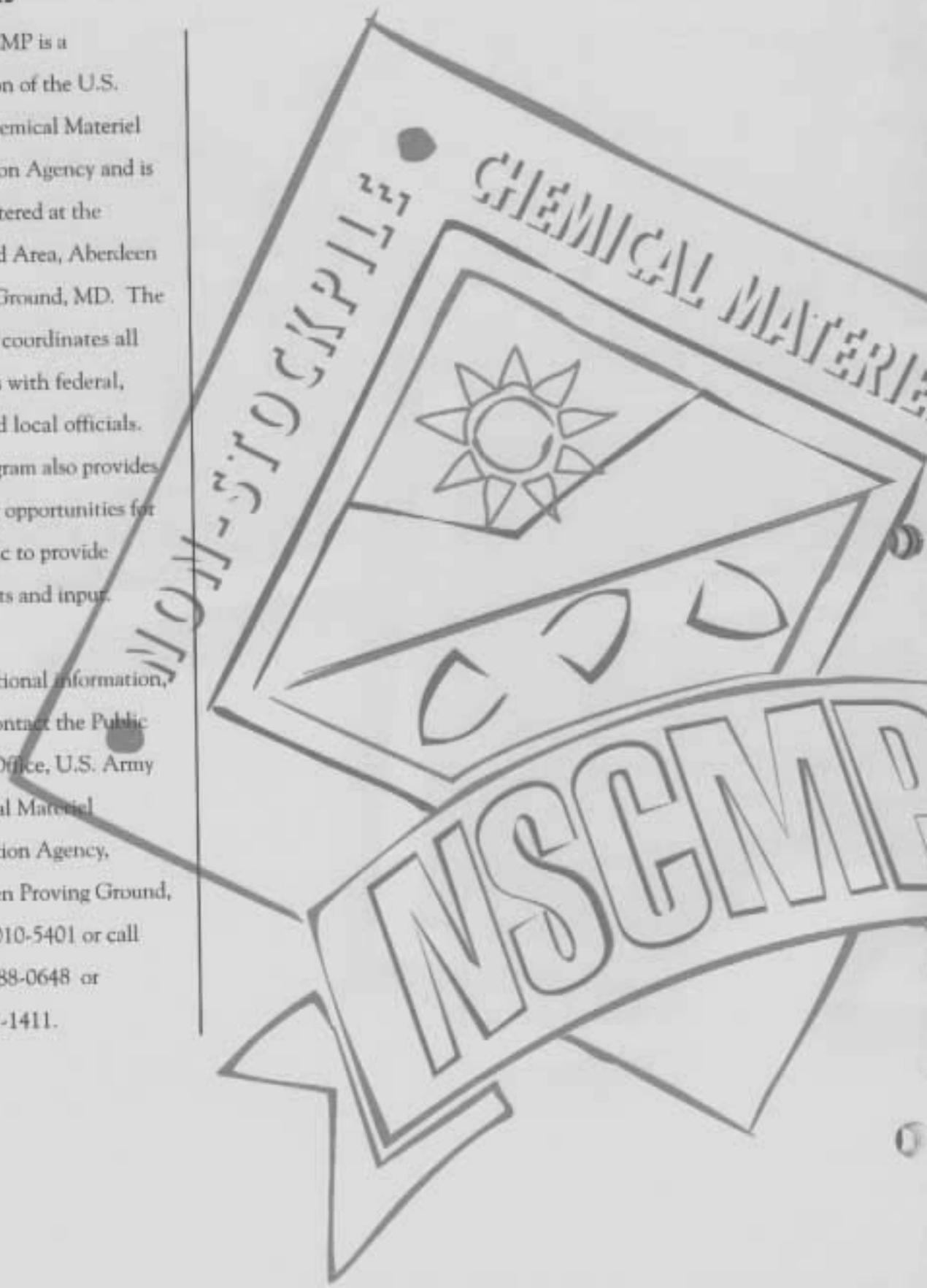
The RRS is a portable system designed to access, neutralize, and containerize treated waste from CAIS.



PARTNERS

The NSCMP is a subdivision of the U.S. Army Chemical Materiel Destruction Agency and is headquartered at the Edgewood Area, Aberdeen Proving Ground, MD. The NSCMP coordinates all activities with federal, state, and local officials. The program also provides on-going opportunities for the public to provide comments and input.

For additional information, please contact the Public Affairs Office, U.S. Army Chemical Materiel Destruction Agency, Aberdeen Proving Ground, MD 21010-5401 or call 1-800-488-0648 or 410-671-1411.



**NATURAL AND ENHANCED ATTENUATION
OF GROUNDWATER CONTAMINANTS
AT THE CRANE DIVISION, NAVAL SURFACE WARFARE CENTER
AMMUNITION BURNING GROUNDS (ABG)**

Presented by Dr. James May, Hydrogeologist
Waterways Experiment Station (WES)

- I. Definition of Natural and Enhanced Attenuation
- II. Overview of Ongoing Research at WES
- III. Hydrogeological Conceptual Model of ABG
- IV. Applicability of WES Protocol to ABG
- V. Summary



Define Natural Attenuation of Explosives (NAX)

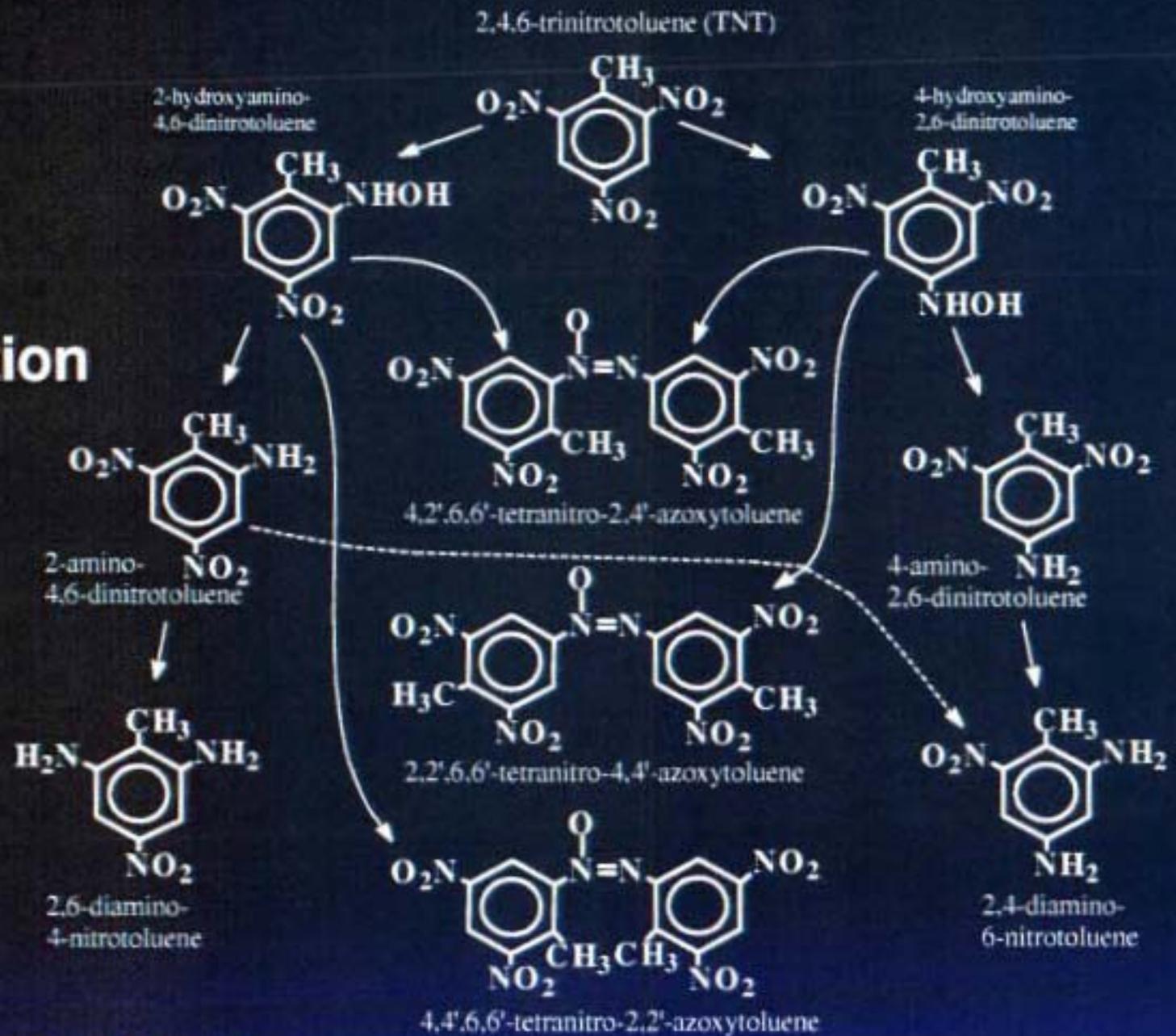
Permanent reduction of contaminant concentrations to environmentally benign levels by natural processes, dispersion, degradation, conjugation, binding

TNT: Reduction and Binding

RDX: Microbial breakdown (mineralization)



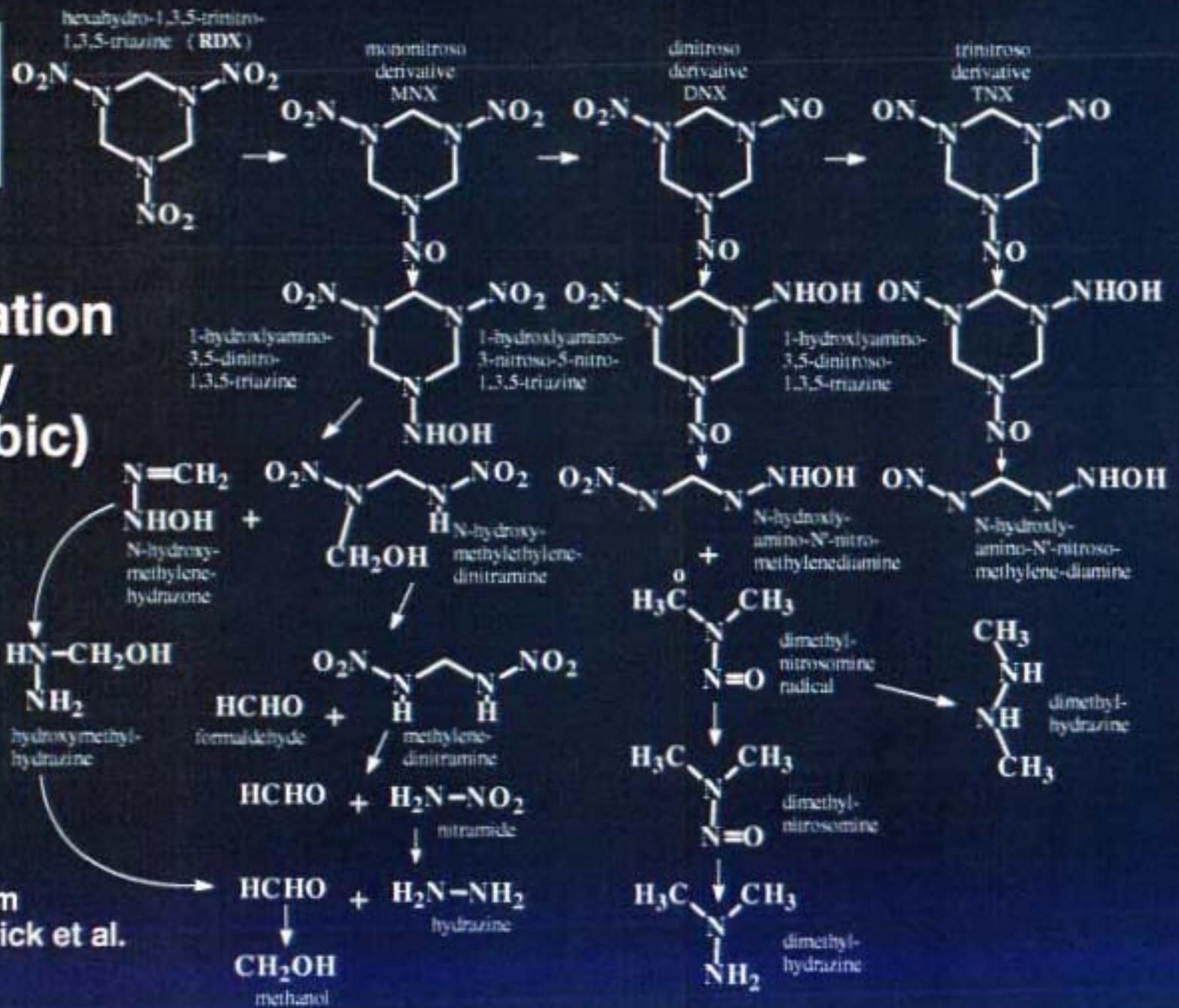
TNT Degradation Pathway



Adapted from Kaplan and Kaplan
(1982)



RDX Degradation Pathway (anaerobic)

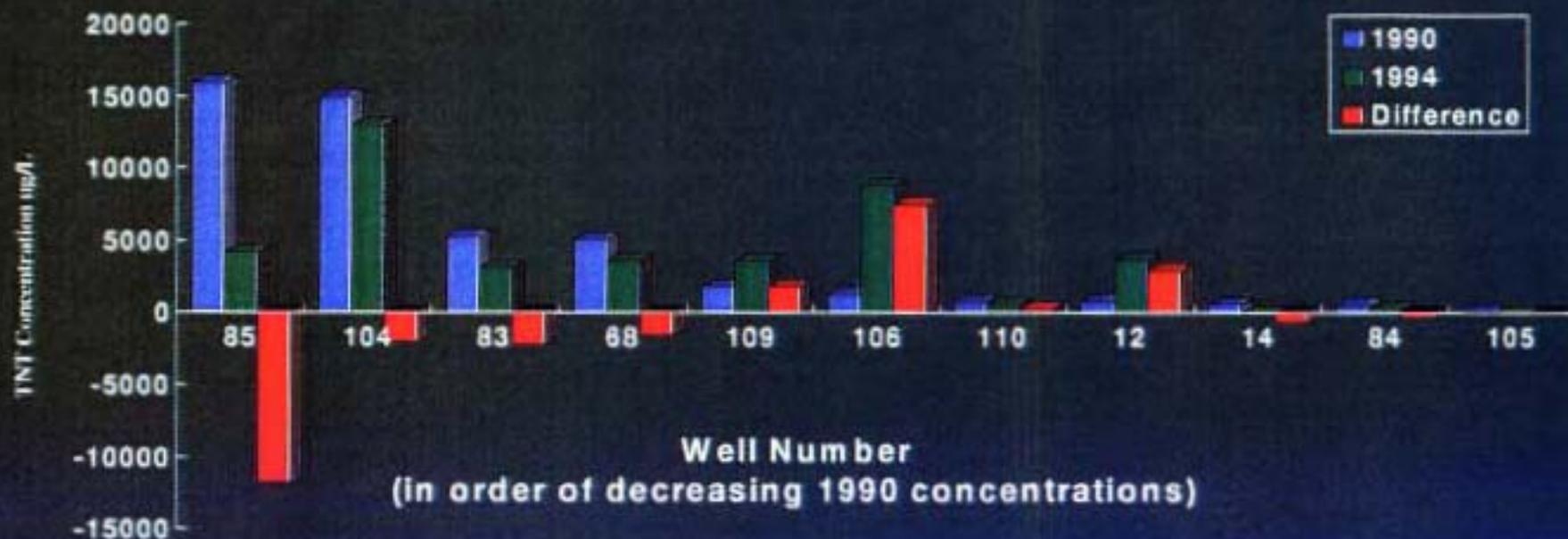


Adapted from
McCormick et al.
(1981)



TNT Concentrations at LAAP

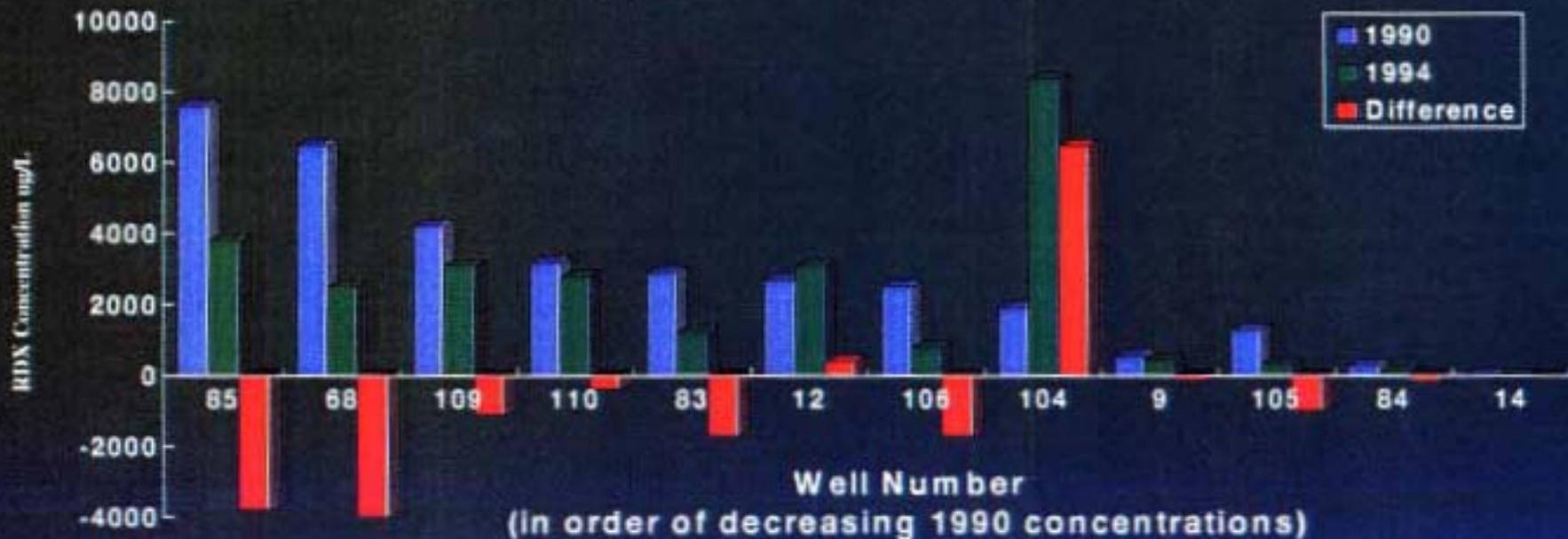
- General decreases in groundwater TNT under Area P (lagoons) from 1990 to 1994





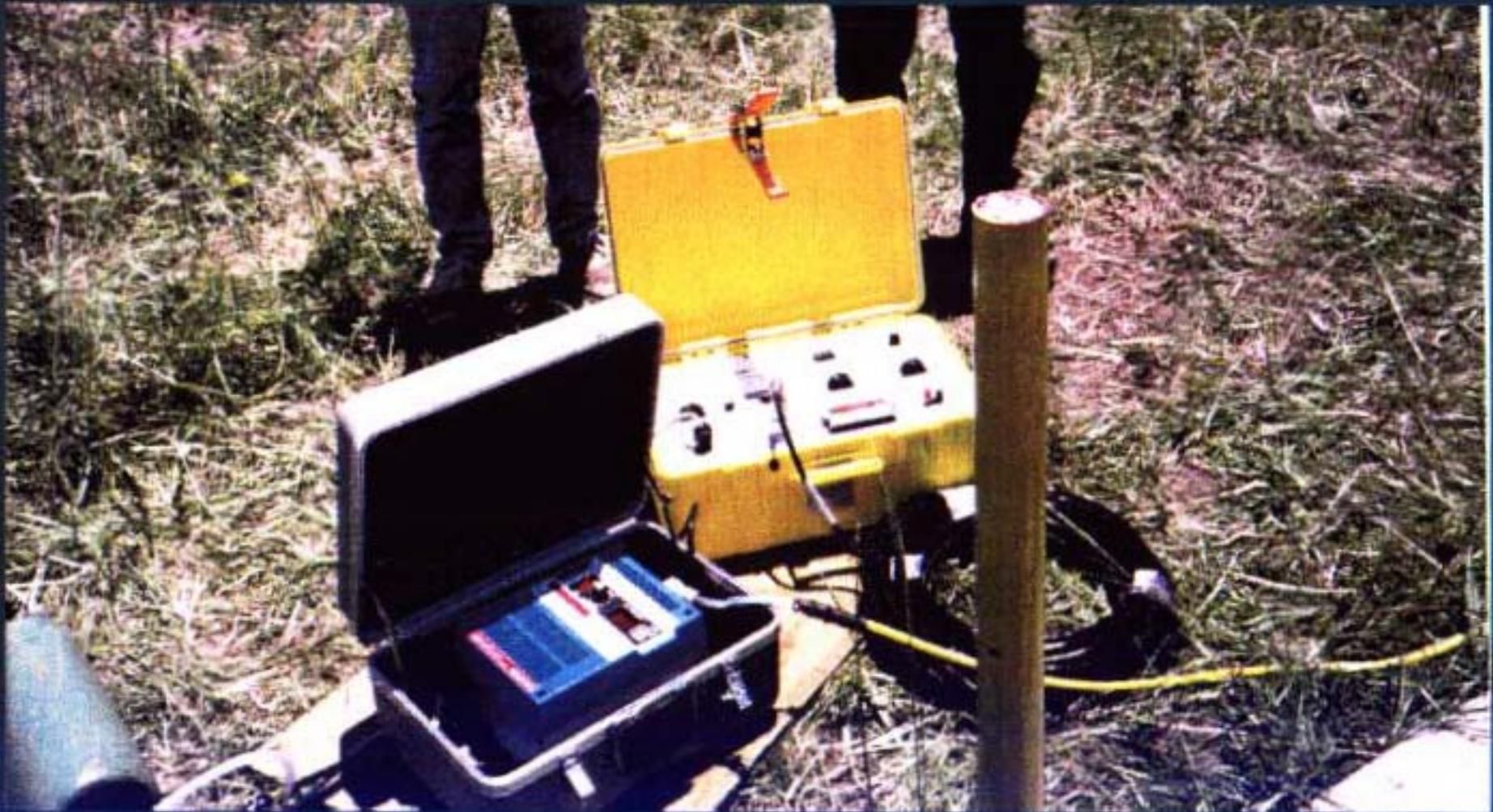
RDX Concentrations at LAAP

- General decrease in RDX concentrations 1990 to 1994

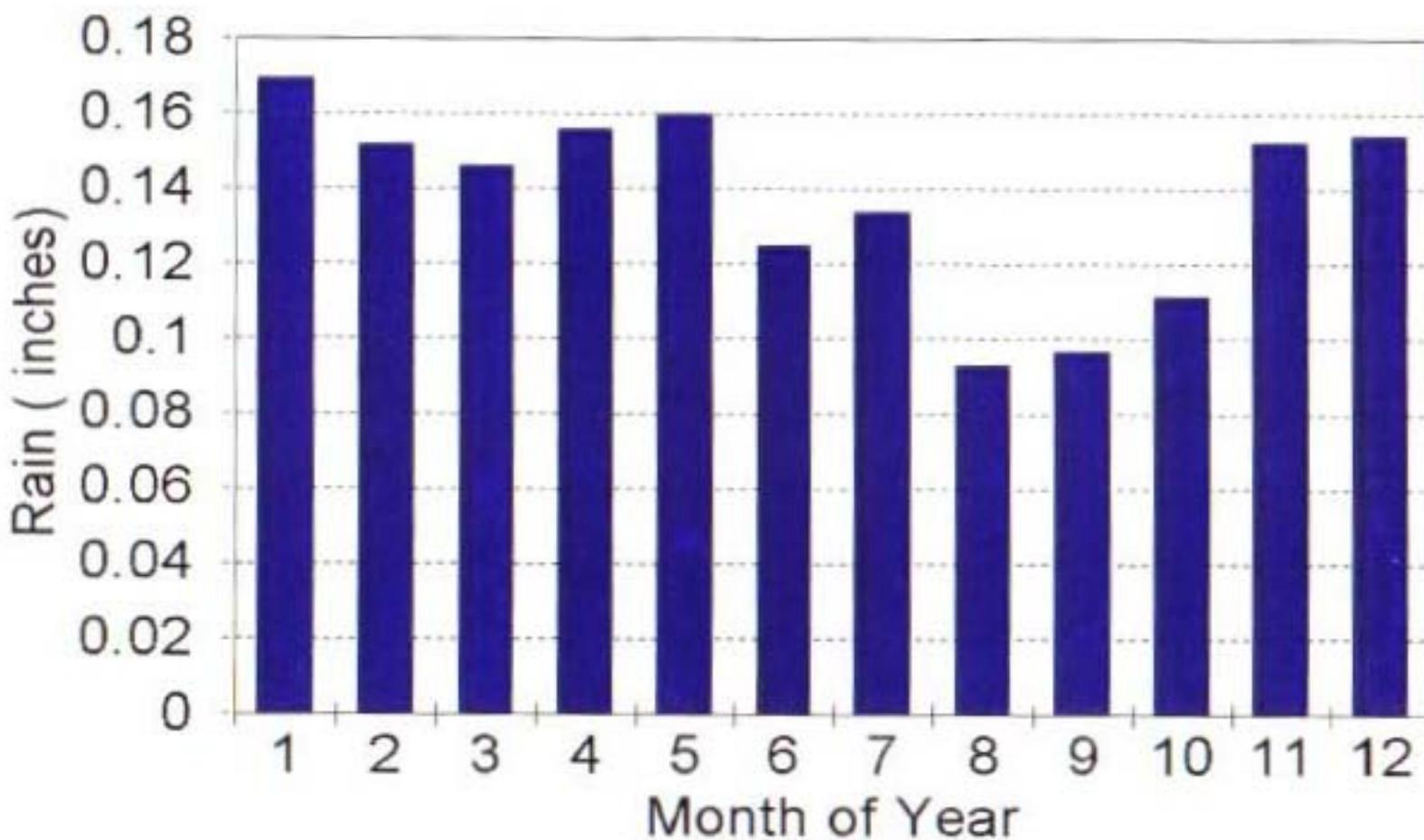




Borehole Flowmeter Devices



Daily Average Rainfall



DYE BURIAL GROUNDS CAP AT NSWC CRANE
MORRISON KNUDSEN CORPORATION

STEVEN T. DOWNEY

10/22/96

OUTLINE

- **BACKGROUND**
- **CHANGES IN FIELD CONDITIONS**
- **REVISED PLAN**
- **SUMMARY**

BACKGROUND

- **SWMU 02/11 (DYE BURIAL GROUNDS) IS LOCATED IN THE NORTH EAST QUADRANT OF NSWC CRANE.**
- **THE DYE BURIAL GROUNDS WERE BELIEVED TO BE A SERIES OF THREE TRENCHES, EACH APPROXIMATELY 50 FEET LONG, 10 FEET WIDE AND 6 FEET DEEP.**
- **THESE TRENCHES WERE USED TO DISPOSE OF DYES AND DYE-CONTAMINATED MATERIAL (BOXES, RAGS AND DRUMS OF DYES).**
- **REMEDICATION METHOD PLANNED WAS ENCAPSULATION BY INSTALLATION OF A MULTI-LAYER CAP OVER THE TRENCHES.**
- **REMEDICATION WAS INITIATED IN JUNE OF THIS YEAR.**

CHANGES IN FIELD CONDITIONS

- **CLEARED OF TREES AND SITE GRADING IN THE CAP AREA WAS PERFORMED IN JUNE, 1996.**
- **DURING THE CLEARING AND GRADING ACTIVITIES, ADDITIONAL DYE MATERIAL WAS DISCOVERED APPROXIMATELY FIFTY FEET AWAY FROM THE DYE TRENCHES.**
- **THIS DISCOVERY OF ADDITIONAL DYE PROMPTED ADDITIONAL INVESTIGATION OF THE AREA WHICH WAS COORDINATED BY THE IDEM, THE EPA AND CRANE EPD.**
- **THIS INVESTIGATION REVEALED DYE MATERIAL WEST, NORTH AND EAST OF THE ORIGINAL CAP AREA.**



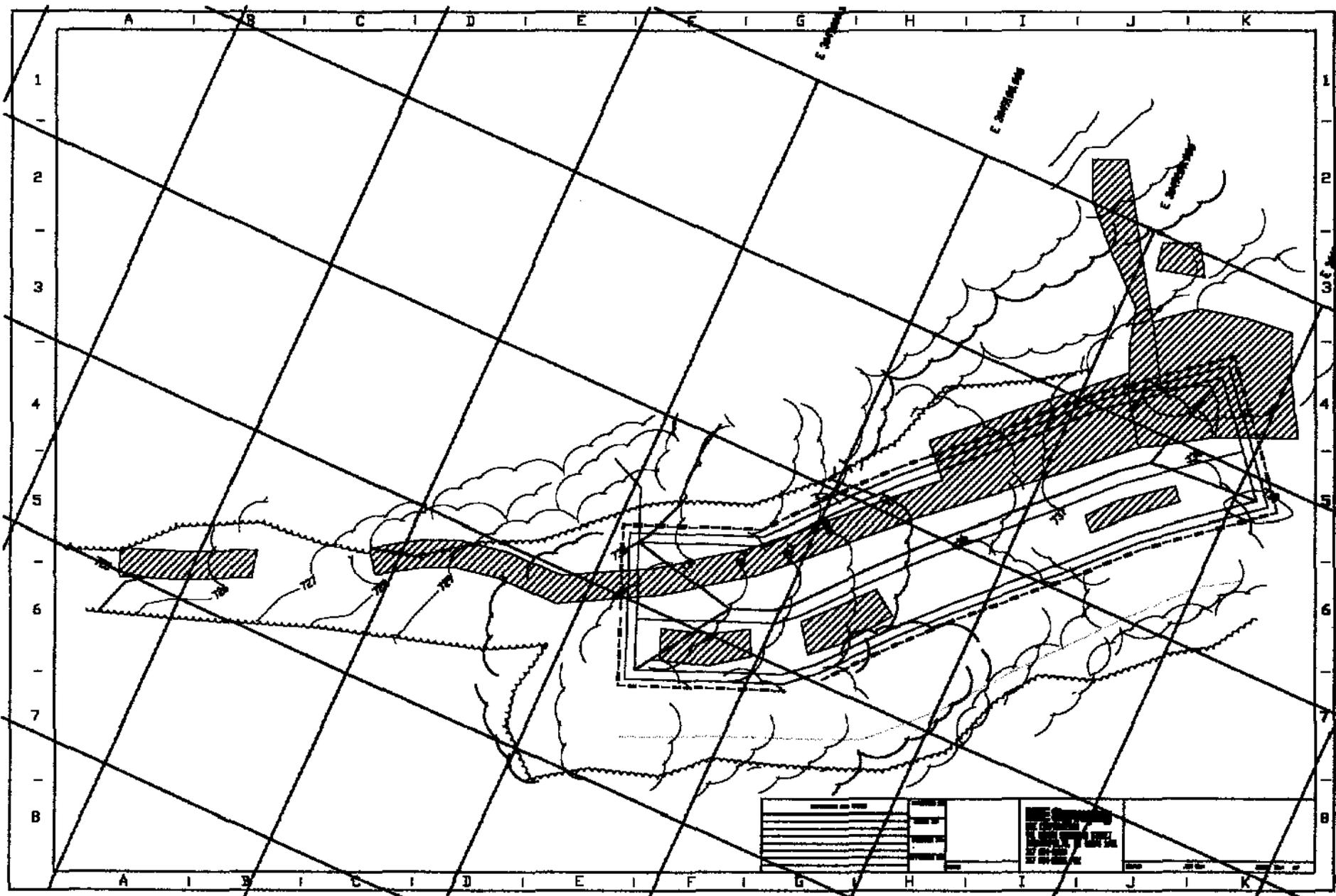




8 23 '96

REVISED PLAN

- **A REVISED PLAN WAS DEVELOPED IN RESPONSE TO THE ADDITIONAL DYE MATERIAL.**
- **DYE MATERIAL WHICH IS LOCATED WEST AND NORTH-EAST OF THE ORIGINAL CAP AREA WILL BE MOVED TO THE CAP AREA.**
- **THE SIZE OF THE CAP WILL BE EXPANDED TO THE NORTH RESULTING IN A NEW CAP SIZE APPROXIMATELY DOUBLE THE ORIGINAL.**
- **EXISTING MONITORING WELLS WHICH WILL BE AFFECTED BY THE EXPANDED CAP WILL BE INCORPORATED INTO THE CAP.**
- **PRELIMINARY DESIGN OF THE NEW CAP IS COMPLETE AND FINAL DETAILS ARE UNDER PREPARATION.**
- **CONSTRUCTION WILL RESUME THIS MONTH.**



SUMMARY

- **THROUGH COOPERATION BETWEEN THE NAVY, IDEM, EPA, MK AND SMITH ENVIRONMENTAL (SUBCONTRACTOR TO MK), ADDITIONAL INVESTIGATIONS WERE PERFORMED TO FURTHER ASSESS SITE CONDITIONS.**
- **THIS TEAM EFFORT RESULTED IN AN EXPEDIENT RESOLUTION WHICH WILL ALLOW REMEDIATION OF THIS SWMU TO CONTINUE TO COMPLETION THIS YEAR.**

**REMEDICATION OF EXPLOSIVES CONTAMINATED SOIL
AT NSWC CRANE
MORRISON KNUDSEN CORPORATION**

STEVEN T. DOWNEY

10/22/96

OUTLINE

- **BACKGROUND**
- **CLEANUP APPROACH**
- **PILOT SCALE OPERATION**
- **FULL SCALE OPERATION**
- **SUMMARY**

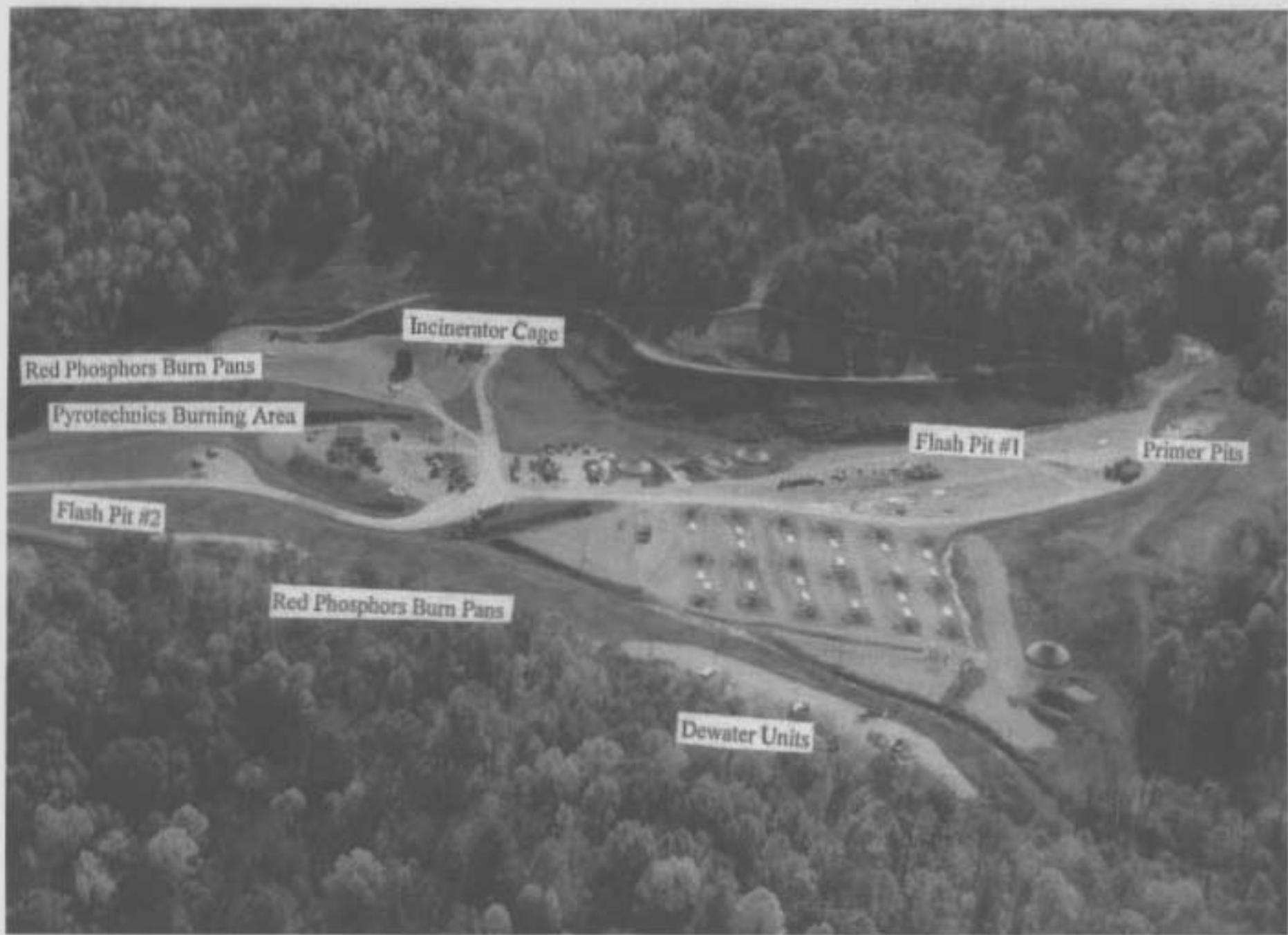
BACKGROUND

- **FOUR SOLID WASTE MANAGEMENT UNITS (SWMUs) HAVE BEEN IDENTIFIED FOR INTERIM MEASURES CLEANUP ASSOCIATED WITH EXPLOSIVES CONTAMINATION:**
 - **SWMU 03/10 - AMMUNITION BURNING GROUND (11 ACRES)**
 - **SWMU 10/15 - ROCKEYE MUNITIONS (1 ACRE)**
 - **SWMU 12/14 - MINE FILL "A" (2 ACRES)**
 - **SWMU 13/14 - MINE FILL "B" (2 ACRES)**
- **PRIMARY EXPLOSIVE CONTAMINANTS AT THESE FOUR AREAS ARE HMX, RDX AND TNT.**
- **THE AMMUNITION BURNING GROUND (ABG) HAS BEEN USED TO DESTROY EXPLOSIVE MATERIALS SINCE THE 1940s.**
- **PRIOR TO 1960 THESE MATERIALS WERE BURNED DIRECTLY ON THE SOIL SURFACE AT THE ABG; CLAY LINED STEEL PANS ARE NOW USED.**
- **MAXIMUM CONCENTRATIONS OF HMX, RDX AND TNT AT ABG ARE 223 mg/kg, 1,820 mg/kg AND 136 mg/kg RESPECTIVELY.**

BACKGROUND

(CONTINUED)

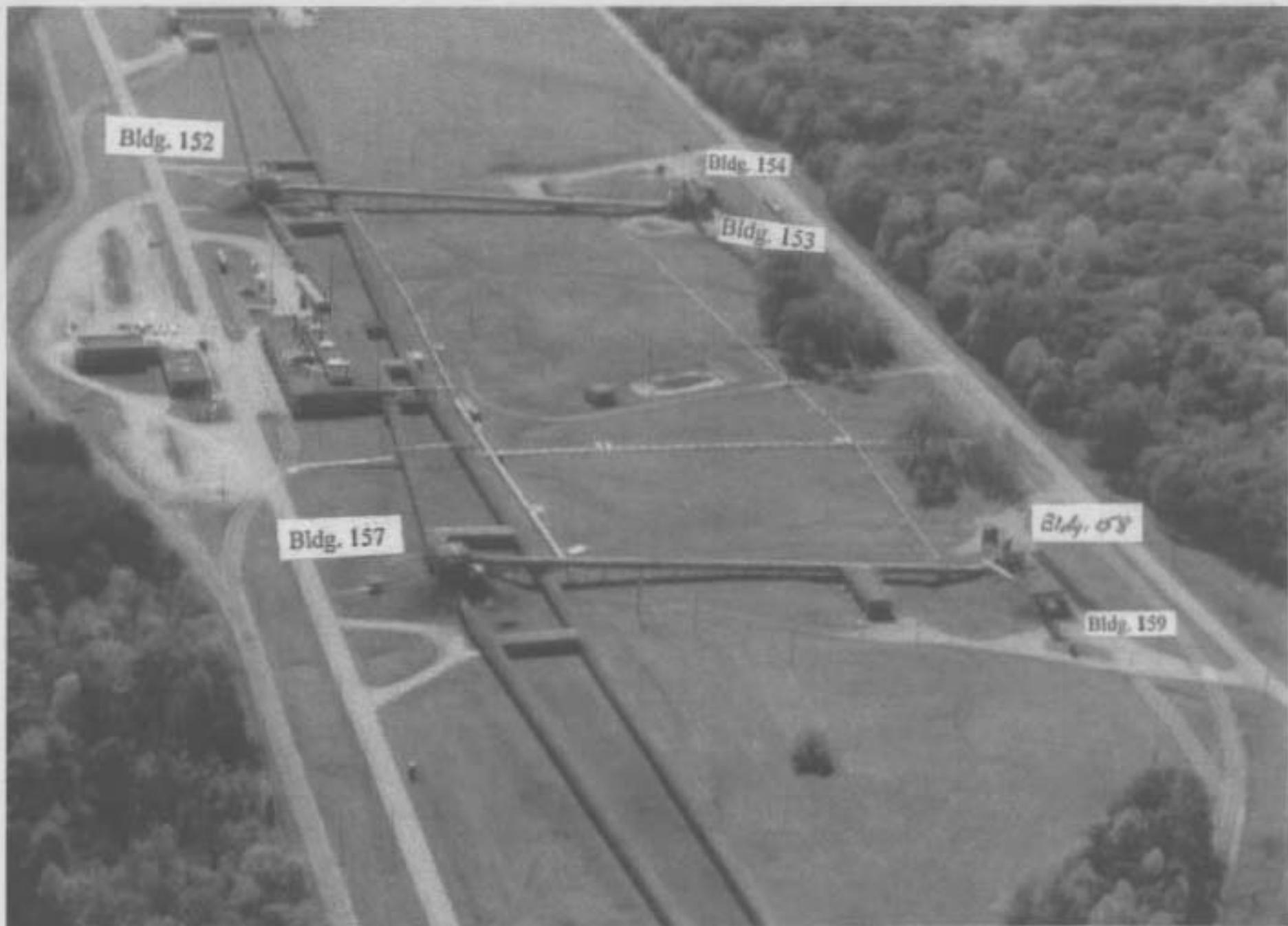
- **ROCKEYE MUNITIONS WAS FORMERLY A PRESS-LOADING FACILITY THAT WAS LATER CONVERTED TO A CASE-FILLING OPERATION.**
- **HMX, RDX AND TNT WERE FOUND IN THE SOIL AT ROCKEYE WITH CONCENTRATIONS OF 10,400 mg/kg, 3,350 mg/kg AND 295 mg/kg RESPECTIVELY.**
- **MINE FILLS A AND B WERE USED TO MANUFACTURE MINES, DEPTH CHARGES, AERIAL BOMBS, ETC.**
- **THE MAJOR SOURCES OF CONTAMINATION AT THE MINE FILLS WERE PAST WASHDOWN OPERATIONS AND THE EXHAUST VENTILATION SYSTEM.**
- **THE MINE FILLS HAVE CONCENTRATIONS OF HMX, RDX AND TNT AS HIGH AS 2,020mg/kg, 24,000 mg/kg AND 3,790 mg/kg RESPECTIVELY.**

















BACKGROUND

(CONTINUED)

- **BENCH SCALE TESTING WAS PERFORMED BY THE US ARMY CORPS OF ENGINEERS, WATERWAYS EXPERIMENTAL STATION (WES).**
- **THE TESTING PERFORMED BY WES EMPLOYED COMPOSTING OF VARIOUS ORGANIC AMENDMENTS TO ACTUAL SOILS FROM CRANE.**
- **THE BENCH SCALE TESTING PROVED THE VIABILITY OF COMPOSTING TO REMEDIATE CRANE SOILS CONTAMINATED WITH EXPLOSIVES.**
- **ADDITIONALLY SOILS WITH SIMILAR CONTAMINANTS HAVE BEEN SUCCESSFULLY TREATED (FULL SCALE) BY COMPOSTING AT AN ARMY DEPOT IN UMATILLA, OREGON.**
- **BIOREMEDIATION OF CONTAMINATED SOILS WAS FOUND TO BE MORE COST EFFECTIVE AND ENVIRONMENTALLY ACCEPTED THAN INCINERATION.**
- **A DETAILED COMPARISON OF COMPOSTING TO THREE OTHER BIOREMEDIATION TECHNOLOGIES WAS PERFORMED AND COMPOSTING WAS FOUND TO BE THE MOST COST EFFECTIVE.**

CLEANUP APPROACH

- **SOILS WHICH ARE CONTAMINATED WITH EXPLOSIVES WILL BE TREATED THROUGH A BIOREMEDIATION PROCESS.**
- **THE BIOREMEDIATION PROCESS TO BE USED IS COMPOSTING.**
- **CONTAMINATED SOIL WILL BE BLENDED WITH A MIXTURE OF MANURE AND A BULKING AGENT.**
- **THIS MIXTURE WILL BE FORMED INTO WINDROWS INSIDE EACH OF THREE 300' X 70' OPEN-SIDED BUILDINGS.**
- **THERE WILL BE TWO WINDROWS IN EACH BUILDING; EACH WINDROW WILL BE 20' WIDE, 7.5' TALL AND 270' LONG.**
- **THE WINDROWS WILL BE TURNED DAILY WITH A SPECIALIZED PIECE OF EQUIPMENT.**
- **WATER WILL BE ADDED TO THE COMPOST MIXTURE AS REQUIRED TO MAINTAIN OPTIMUM MOISTURE CONDITIONS.**
- **COMPOSTING WILL TAKE APPROXIMATELY 3 TO 4 WEEKS TO ACHIEVE CLEANUP GOALS DEPENDING ON OUTSIDE TEMPERATURE.**



PILOT SCALE OPERATIONS

- **PRIOR TO ENTERING INTO FULL SCALE REMEDIATION, A PILOT SCALE COMPOSTING OPERATION WILL BE CONDUCTED.**
- **THE PILOT SCALE OPERATION WILL DEMONSTRATE THE EFFECTIVENESS OF THE COMPOSTING AT A LARGE SCALE AND WILL ALLOW FOR OPTIMIZATION OF THE COMPOST MIX AND OPERATIONAL PARAMETERS.**
- **EIGHT DIFFERENT MIXES WILL BE USED IN THE PILOT SCALE AS FOLLOWS:**
 - **ALFALFA HAY, COW MANURE, STRAW AND SOIL**
 - **ALFALFA HAY, COW MANURE, STRAW, WOOD CHIPS AND SOIL**
 - **CHICKEN MANURE, STRAW AND SOIL**
 - **CHICKEN MANURE, CORN STALKS AND SOIL**
 - **COW MANURE, STRAW AND SOIL**
 - **COW MANURE, CORN AND SOIL**
 - **COW & CHICKEN MANURE, STRAW AND SOIL**
 - **COW & CHICKEN MANURE, CORN, WOOD CHIPS ALFALFA AND SOIL**

PILOT SCALE OPERATION

(CONTINUED)

- **THE SOIL CONTENT OF EACH MIX WILL INITIALLY BE 25%; ADDITIONAL TESTING WITH 30% SOIL WILL BE CONDUCTED ON SELECTED MIXES.**
- **EACH BATCH WILL CONSIST OF A WINDROW OF FULL CROSS SECTION WITH A LENGTH OF APPROXIMATELY 25'.**
- **ADDITIONAL MIXES MAY BE ADDED.**
- **SOIL FROM MINE FILL A WILL BE USED FOR THE PILOT SCALE BECAUSE THIS AREA EXHIBITS ONE OF THE HIGHEST LEVELS OF CONTAMINATION.**
- **OPERATION DURING THE PILOT SCALE WILL SIMULATE FULL SCALE OPERATION IN ALL ASPECTS.**
- **EXTENSIVE MONITORING OF TEMPERATURE, MOISTURE, OXYGEN, pH, NITRITE AND EXPLOSIVES WILL BE PERFORMED THROUGHOUT THE PILOT OPERATION.**

PILOT SCALE OPERATION

(CONTINUED)

- **CLEANUP GOALS FOR THE PILOT SCALE WILL BE 30 mg/kg FOR TNT AND RDX AND 3,300 mg/kg FOR HMX.**
- **AT THE CONCLUSION OF THE PILOT SCALE, SAMPLES WILL BE SENT TO A LABORATORY FOR ANALYSIS.**
- **ANALYTICAL RESULTS WILL BE USED FOR APPLICATION FOR A SPECIAL WASTE PERMIT FOR DEPOSITION OF THE FINISHED COMPOST IN THE CRANE LANDFILL.**
- **THESE RESULTS WILL ALSO BE USED TO OBTAIN A MINOR MODIFICATION TO THE CRANE LANDFILL PERMIT FOR USING THE COMPOST AS LANDFILL COVER.**
- **PILOT SCALE OPERATIONS ARE EXPECTED TO BEGIN EARLY NOVEMBER.**

FULL SCALE OPERATION

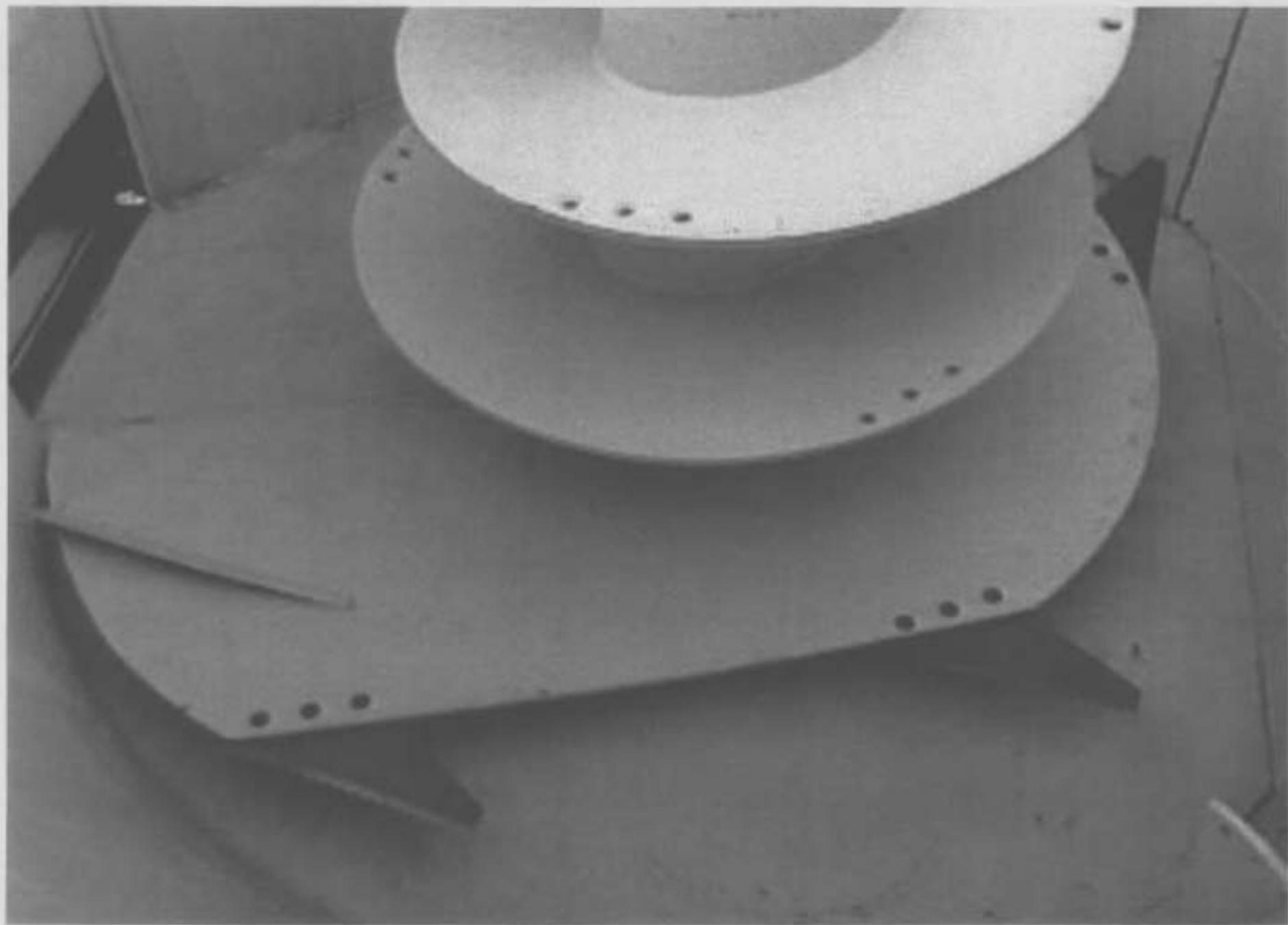
- **FULL SCALE OPERATION WILL COMMENCE UPON SUCCESSFUL COMPLETION OF THE PILOT SCALE.**
- **EACH BUILDING WILL BE LOADED WITH TWO 270' LONG WINDROWS OF THE SELECTED MIXTURE (1800 CY TOTAL).**
- **THE THREE BUILDINGS WILL BE SEQUENCED WITH A ONE WEEK STAGGER.**
- **ROCKEYE MUNITIONS AREA WILL BE THE FIRST AREA REMEDIATED THROUGH THE BIOREMEDIATION FACILITY.**
- **DURATION OF REMEDIATION OF THIS AREA IS EXPECTED TO BE ONE YEAR.**
- **EQUIPMENT TO BE USED FOR COMPOSTING INCLUDES A BACKHOE, FRONT END LOADER, SOIL SCREENER, FARM TRACTOR, SKID STEER LOADER, GRINDER/MIXER, HOPPER/CONVEYOR AND WINDROW TURNER.**
- **TWO TRACTORS WITH LIVE-BOTTOM TRAILERS WILL BE USED TO TRANSPORT CONTAMINATED SOIL AND FINISHED COMPOST.**















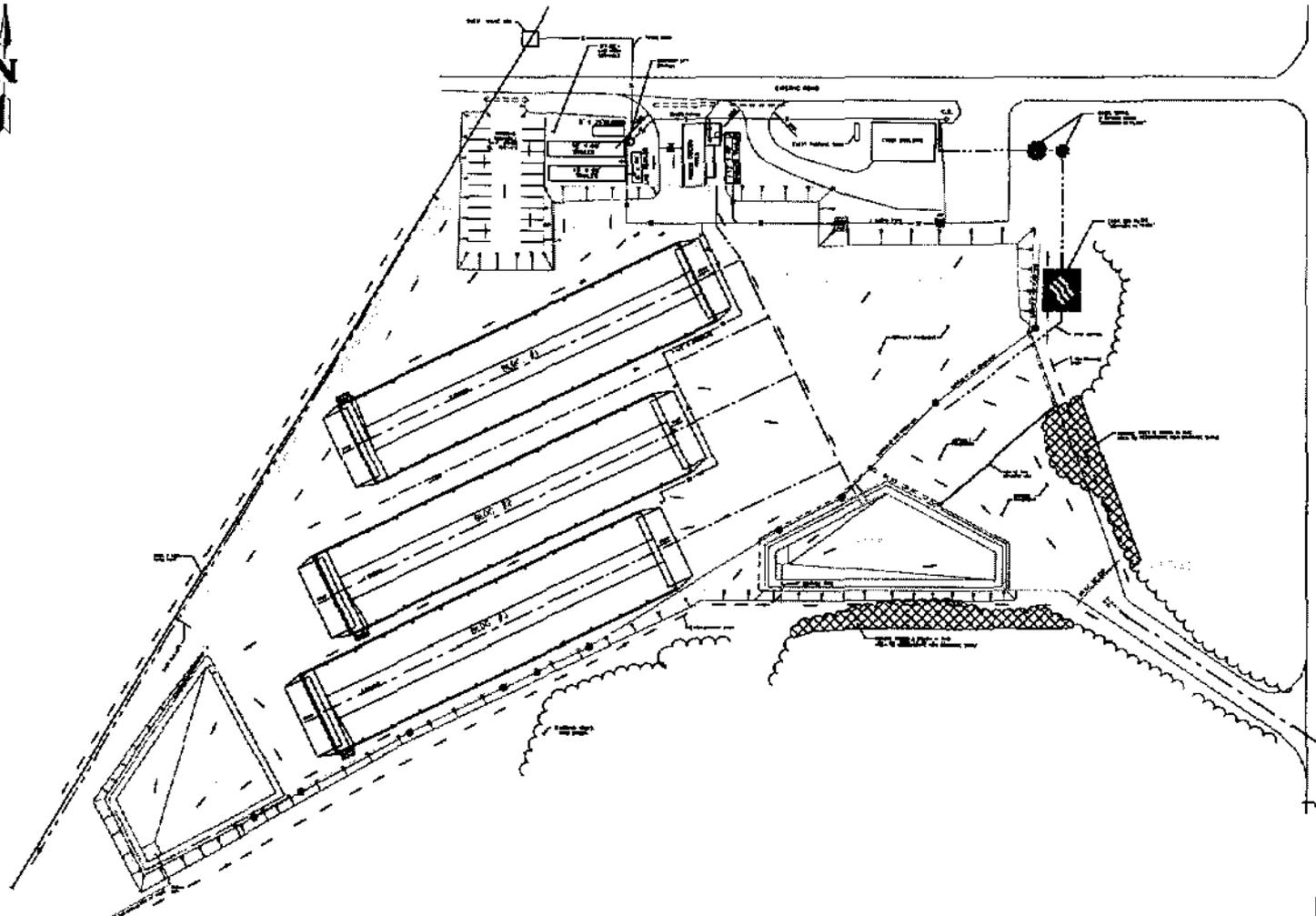
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- SYMBOLS**
- DENSITES DRAINAGE FLOW
 - DENSITES NEW ASPHALT DRIVE
 - DENSITES EXISTING PAVED POLE
 - DENSITES EXISTING SANITARY MANHOLE
 - DENSITES NEW MANHOLE (INSTALL 2' BELOW GRADE)
 - SANITARY SEWER LINE

BLOCK NAME - 08102 NEW/201/08/18

MORRISON KNUDSEN
ENVIRONMENTAL GROUP

JE Jacobs Engineering Group Inc.
Central Region Baton Rouge, Louisiana

CONTRACT NO. 106175-21 SHEET NO. C-100 REV. NO. 2 DATE 11-16-95

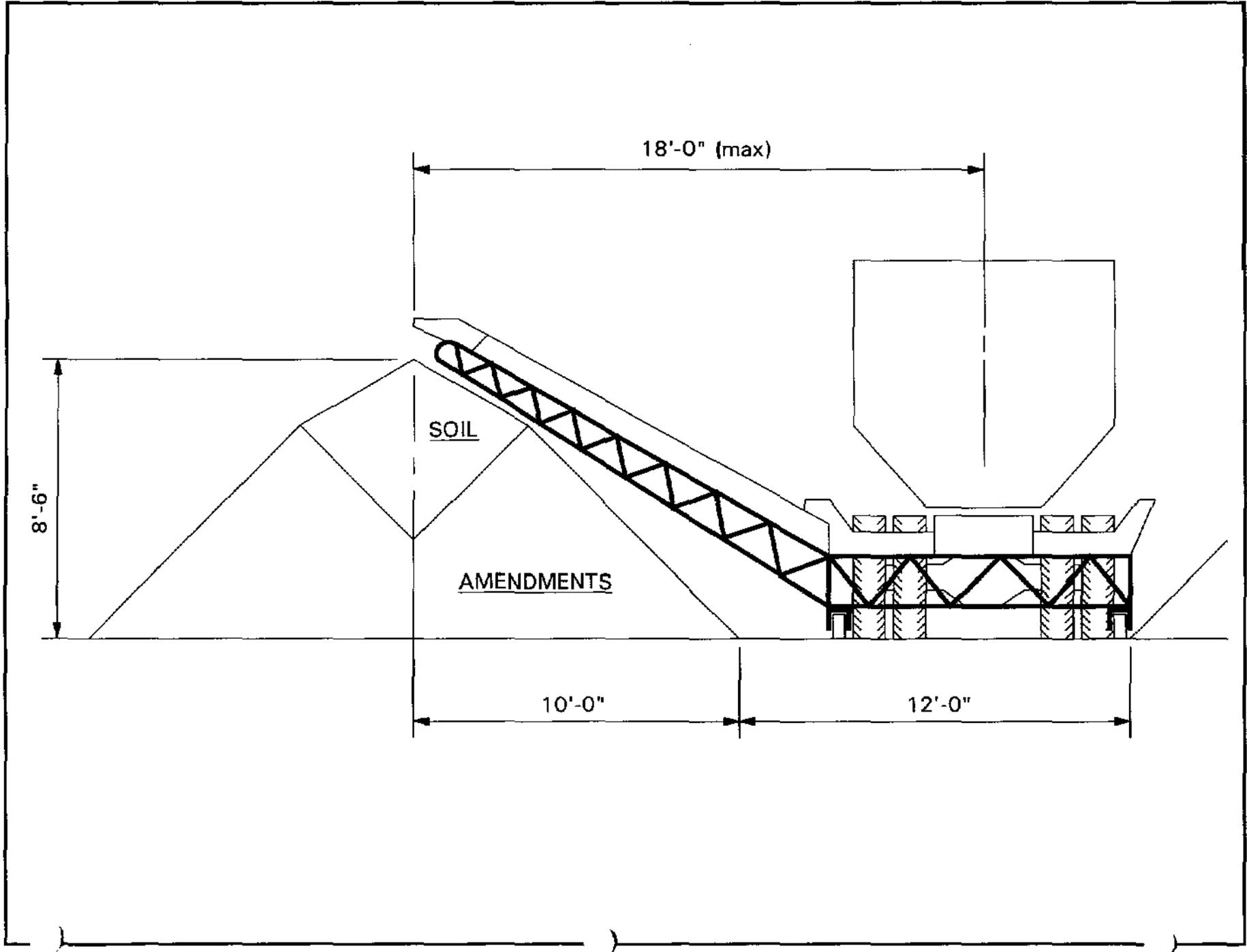
BIDREMEDICATION FACILITY
CRANE N.S.W.C.
MASTER SITE/DRAINAGE PLAN

REV. NO.	DATE	DESCRIPTION	BY	CHKD.	APP.	SCALE	DATE
2		REL. BLDGS. #2 & #3, RE-ROUTED SEWER LINE FROM EXIST. BLDG.	CL	GL		1/96	
1		DELETED ORARD POSTS	CM	GL	FR	9/96	
0		ISSUED FOR CONSTRUCTION	CA	GL	FR	7/96	

FULL SCALE OPERATION

(CONTINUED)

- **SEQUENCE OF ACTIVITIES FOR A TYPICAL FULL SCALE BATCH IS AS FOLLOWS:**
 - **LOAD MANURE AND BULKING AGENT (HAY, STRAW OR CORN STALKS) INTO GRINDER/MIXER FOR CHOPPING AND BLENDING.**
 - **DISCHARGE AMENDMENT MIXTURE INTO BUILDING IN A WINDROW CONFIGURATION.**
 - **EXCAVATE AND SCREEN SOIL.**
 - **TRANSPORT SOIL TO BIOREMEDIATION FACILITY.**
 - **DISCHARGE SOIL INTO CENTER OF WINDROW.**
 - **MIX SOIL INTO AMENDMENT MIXTURE WITH WINDROW TURNER.**
 - **ADD WATER TO ADJUST MOISTURE CONTENT.**
 - **CONTINUE DAILY TURNING OF WINDROWS AND MONITORING DEGRADATION OF EXPLOSIVES UNTIL CLEANUP LEVELS ARE ATTAINED.**
 - **TRANSPORT FINISHED COMPOST TO THE CRANE LANDFILL.**



SUMMARY

- **COMPOSTING IS A COST EFFECTIVE AND ENVIRONMENTALLY FRIENDLY MEANS OF TREATING SOILS CONTAMINATED WITH EXPLOSIVES.**
- **FINISHED COMPOST MATERIAL IS ESSENTIALLY RICH FERTILE TOPSOIL.**
- **UNIT COSTS ARE EXPECTED TO BE APPROXIMATELY \$140/TON.**
- **TOTAL ESTIMATED VOLUME OF MATERIAL TO BE PROCESSED IS 111,000 CY (150,000 TONS) WHICH WILL YIELD 200,000 CY OF COMPOST.**
- **PILOT SCALE OPERATION WILL BEGIN IN EARLY NOVEMBER, 1996.**
- **FULL SCALE REMEDIATION WILL BEGIN UPON SUCCESSFUL COMPLETION OF THE PILOT SCALE (EXPECTED TO BEGIN IN JANUARY, 1997).**
- **BASED ON CURRENT ESTIMATED QUANTITIES, REMEDIATION OF EXPLOSIVES CONTAMINATED SOILS AT CRANE WILL TAKE APPROXIMATELY SEVEN YEARS AT A TOTAL COST OF \$21,000,000.**

SUMMARY

(CONTINUED)

- **PROJECT IS CURRENTLY FUNDED THROUGH FY97.**
- **FUNDING HAS BEEN REQUESTED THROUGH FY2003.**