Munitions Items Disposition Action System (MIDAS) Program

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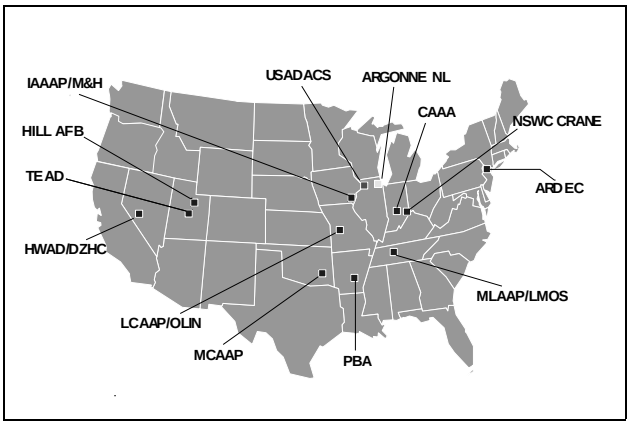
INTRODUCTION

The MIDAS Program was established in 1992 to identify alternatives to open burning and open detonation, and to provide a systematic approach to the disposition of unwanted munitions items. Over four hundred thousand tons of excess, obsolete, or unserviceable dissimilar munitions, ranging from small caliber cartridges to complex cluster bomb units, await disposal. Characterization of munition's components and constituents is essential to support the four MIDAS Program thrust areas: demil execution, resource recovery and recycling (R3), research and development technology application, and environmental permitting. Centrally located MIDAS data is available to Government, Industry, and Academia; as a management tool to respond to these thrust areas.

DEVELOPMENT

The MIDAS Program is managed at the U.S. Army Defense Ammunition Center (DAC) located on the Savanna Army Depot in Northwestern Illinois. Argonne National Laboratory is developing the data base programming. Ten DOD munitions plants, depots, and engineering centers were added to the MIDAS Team to assist in munition's characterization. This business efficiency utilizes their unique munitions and engineering expertise.



RESEARCH

Munitions characterization includes research of technical data packages, engineering drawings, specifications, standards, and other sources; to determine all components and constituents of a munition. All inert and explosive materials are identified by name, specification, weight, and composition. This information is entered into relational data bases that link the components and constituents in a hierarchical listing. Characterization is the key in determining the best demil and/or disposal alternatives for specific munitions. Knowledge of constituents will allow selection of the best candidates for open burning, open detonation, incineration, resource recovery and recycling, or new technology development. The knowledge of recyclable ingredients will also enhance the marketability of recovered materials.

FEATURES

Features demonstrating the usability of MIDAS are the view, query, and report capabilities. From a library menu, users may choose from munitions, components, parts, materials, bulk items, scanned images or the Resource Recovery and Disposition Inventory libraries. The user may browse through the list of munitions, or use the search function to query a specific NSN or DODIC. By selecting one of the munitions from the pick list, detailed component and constituent data may be viewed in a hierarchical order. Without knowledge of specific supply nomenclature a search by generic name, size, or model number may be performed. Although the list to pick from may be more comprehensive, the number of entries is limited by the query parameters. Similar queries may be performed on components, parts and materials. Searches by part number, material, or specification were added to the parts library to improve utility. An enormous amount of information may be accessed in minutes versus hours, without the need to store volumes of data. The propellant, explosives and pyrotechnics, or PEP Materials Library contains more than 1,000 PEP formulations.

Two unique features of the program are the USAGE and SCANNED IMAGE functions. The usage function allows tracking of a component (example, an M557 fuze) or PEP material (such as M30A1 propellant) to end item munitions which contain the element. The usage feature is extremely valuable in determining munitions which contain elements with unique disposal alternatives, e.g., explosive "D", submunitions or depleted uranium. To gain an appreciation for the munition's relative size and configuration, scanned images are easily viewed.

Twelve Standard Reports are tailored to specific needs, MIDAS enables users to quickly extract comprehensive information in various formats. A MIDAS Detailed Structure Report contains all components and constituents for a selected munition in a hierarchical listing, with part numbers, material compositions, compounds, specifications, and weights. Variations of this report remove selected entries to focus on designated areas, such as a listing of all PEP materials, or identification of RCRA-regulated materials; e.g., lead, mercury, barium, chromium or cadmium; in addition to all reactive PEP materials. This information has been used in preparation of environmental assessments, impact statements, and permit applications; and will play a vital role in land disposal restrictions. The TDP List and Primary Component and Parts reports are effective planning tools for initial demil and/or maintenance projects. Queries of the current Resource Recovery and Disposition inventory may be performed through the Search RRD Inventory report. Similar to the other libraries, this report may be ordered by NSN, DODIC, generic name, or storage location.

WASTE STREAM CHARACTERIZATION

Permitting of APE 1236, Deactivation Furnace, is very critical as open detonation and burning becomes more restricted. Through the MIDAS Program, the Ammunition Equipment Directorate at Tooele Army Depot has developed a waste characterization and prediction program called "Merlin". In order to speed up the permitting process Merlin imports munitions component descriptions from MIDAS and uses comprehensive chemical and thermodynamic calculations to predict the combustion products, chemical elements, metal parts, and ash products resulting from munitions incineration. Merlin generates documentation for the APE 1236 Trial Test Burn EPA Permit submission, and will allow the user to vary operational parameters such as: furnace temperature, residence time, and feed rates. The program is useful for any waste process, but has been used primarily for combustion and other thermal treatment methods.

DISPOSITION ALTERNATIVES

Alternatives for demilitarization, disposal, resource recovery, and recycling are being assembled into a feature called Disposition Alternatives. The information, in the form of text files or data bases, will be available for viewing, printing or copying in a windows environment. Primary topics included are Munitions Alternative Procedures, Alternative Processes, MIDAS Support Information, and Capabilities. Examples of specific topics include environmental rules impacting on demil and disposal, explosive and personnel safety requirements, Penta treated wood alternatives, and data bases of DMWRs, new technologies, and DoD installation capabilities .

WEIGHT ESTIMATION

To overcome missing part or surface coating weights in technical data packages, a standard system for estimating weights was incorporated into MIDAS. Mathematical representations for 32 shapes are used to estimate explosives (pressed into a confined area), metal platings, paint finishes, and metal brazes. Given dimensions from the engineering drawing, and densities from specifications, the system instantly calculates the volume and weight of the material. The standard weight estimation system has been very useful in MIDAS research and may have further applications in safety, R&D, production, or environmental calculations.

TECHNICAL ASSISTANCE

Examples of MIDAS support include use of MIDAS reports in Army demil contract solicitations in the Continental United States, Europe, and the Pacific. Industry has been highly complimentary of the MIDAS data used in estimating and planning R3 proposals. Installations with access to MIDAS data routinely use the information for demil, disposal, maintenance, and recycling planning. A pleasant surprise has been the use of MIDAS data to support environmental permitting.

IMPLEMENTATION PLAN

The current implementation plan for the MIDAS Program includes a BULLETIN BOARD, which was established in March 1995, and has over 100 subscribers. An INTERACTIVE MIDAS Program is networked to the MIDAS Team at 14 locations. The introductory CD-ROM version of MIDAS was distributed in May 1996, and an INTERNET version will be on-line in 1997. The use of several formats gives MIDAS a wider application.

The MIDAS compact disk (CD) has been developed by the Defense Ammunition Center, to provide a hands-on introduction to the MIDAS Program. Operation of the program is simplified by using menus and point-and-click selections. Help menus and a Users Guide are available, however no formal training is required. The program offers six unrestricted applications which may be accessed from the CD-ROM or downloaded to your hard drive.

- **MIDAS databases**. Relational databases of munitions, components , constituents, and inventories. User-friendly menus and search functions are combined with standard reports.
- **Disposition alternatives.** Demil, recovery, and recycling alternatives are given in menu-driven lists that allow quick access to a variety of information.
- **Munition images.** Cutaway views detailing configuration and relative size (a limited number of images are currently available).
- **Weight estimation.** Mathematical representations for 28 shapes to estimate weights of explosives, parts, metal platings, and paint finishes.
- **Existing capabilities.** A database of installation OB/OD, incineration, removal, and permit data.
- **Emerging technologies.** A database of 85 disassembly, removal, recovery/reuse, waste stream treatment, and/or destructive research and development technologies.

The three restricted applications apply to MIDAS data input, incineration waste characterization, and connecting to the network. These applications require additional justification to obtain password. The information is current as of 24 April 1996. New munitions are added to the MIDAS databases daily and new features are routinely incorporated.

CONCLUSION

The MIDAS Program provides a wide variety of information to make better disposition decisions on the RRD stockpile. Business efficiencies were designed to utilize existing expertise, to unify research and data collection, and to standardize the outputs of munitions disposal information. The MIDAS Team is confident that the products of MIDAS will actively support demil planning, execution, resource recovery and recycling, and technology development. More importantly, MIDAS tools focus industry, government and academic efforts to more effective use of demil dollars.

Please contact the MIDAS Team for further information on the MIDAS Program.

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MIDAS TEAM

U.S. Army Armament Research, Development and Engineering Center
Fuzes and Propellants.

Defense Ammunition Center
Various Items, Program Management.

Argonne National Laboratory
Software Development.

Crane AAA
Pyrotechnic Munitions.

Hawthorne AD/Day & Zimmerman Hawthorne Corp
Rockets.

OO/ALC/LIWOR, Hill AFB
Air Force Peculiar Munitions.

Iowa AAP/Mason & Hanger Inc.
Army Artillery Ammunition.

Lake City AAP/Olin Corporation
Small Caliber Ammunition.

McAlester AAP
Bombs.

Milan AAP/Lockheed Martin Ordnance Systems
Cluster Bomb Unit Munitions.

Naval Surface Warfare Center-Crane Division
Navy Gun Ammunition and MIDAS Procedures.

Pine Bluff Arsenal
WP, HC and Colored Smoke Munitions.

Tooele Army Depot
Waste Stream Characterization.