

Reactive Material Services

REMOTE OPENING AND STABILIZATION SERVICES

Clean Harbors' Reactive Material Services provide on-site remediation and stabilization services for our customers that have potentially unstable, shock sensitive, or explosive materials. This team has provided safe and cost effective energetic material management services to our clients since 1996. Our extensive transportation fleet and permitted Transfer Storage & Disposal Facilities enable us to provide full service capabilities, from pick-up to the final disposal of potentially unstable materials.

Services and features include:

- Evaluation of Potential Reactive Materials
- Remote Container Opening
- Remote Drum Opening
- Unknown Fingerprint Analysis
- Proven Stabilization Techniques
- Use of Specialized, State-of-the-Art Equipment
- Strict Training Standards

In addition to the above services, Clean Harbors can help solve complex remediation problems or unusual projects involving reactive chemicals and materials.

Evaluation of Potential Reactive Materials

The first step in managing potentially reactive or unstable material is the proper identification and evaluation of the material. This has led to the development of standard operating procedures for the evaluation of shock sensitive, reactive, peroxidizable, and unknown materials. Because these materials are typically located at colleges and universities, R&D facilities, hospitals and manufacturing facilities, each member of our CleanPack® organization has been highly trained in the recognition and evaluation of "High Hazard" material as part of their lab pack orientation and training. Once a potentially reactive or unstable material has been identified, Clean Harbors Reactive Material Services is notified and all disposal options are discussed with the customer. In the majority of cases, the cause of a potentially unstable or reactive material is due to the inappropriate and improper storage of the material for a prolonged period of time

The evaluation criterion consists of a visual inspection of the container, its integrity and contents. Age, storage conditions, and whether the material has been opened, are all factors which lead to the determination of whether the material is safe to package or needs to be tested and/or stabilized. Interaction with the generator is very important to determine if contaminants could have been mixed



with the material, which would increase the material's instability or reactivity. Throughout the evaluation process, physical contact with the container is kept to an absolute minimum.

Remote Container Opening

Clean Harbors utilizes specially designed equipment for all reactive remediation/stabilization projects. This equipment includes remotely operated, pneumatically-driven machinery that can drill a hole in a container cap or twist off the cap. In some peroxidizable, shock sensitive and unknown materials, twisting the cap could potentially cause a container to detonate if peroxide or other shock sensitive type crystals are in between the cap threads and the cap. Remote opening equipment allows for the access to these materials to be performed away from people, buildings and other property. As added protection, Clean Harbors has internalized the remote opening equipment into a Type II magazine as specified by the ATF. This equipment is designed for outdoor use to protect our customers' property and the environment. It also enables safe operation in densely populated areas.

Personal protective equipment includes riot helmets, Kevlar vests and aluminized flash suits to protect Reactive Material personnel against a flash fire or explosion. Clean Harbors also utilizes specially designed grappling devices when moving potentially unstable containers. The grappling devices provide more distance and protection between the container and the technician. Blaster's Dayboxes are used when moving containers from an inside area to the outside work zone. The ATF Type III Daybox is specially designed to carry and transport explosive materials while on a job site without disturbing the identified container(s). Our Reactive Material Specialists will attempt to retrieve any available information from existing labels, markings, and generator information. A literature search will be done to obtain necessary background information on the compounds identified. Information obtained from the literature search will allow the Reactive Material Specialists to make an accurate hazard assessment and determine the appropriate deactivation solution for each compound(s) prior to arriving on site the day the stabilization is scheduled.

Container Evaluation

Much of the evaluation consists of a visual inspection of the container, its integrity and contents. Age, storage conditions, and whether the material has been opened, are all factors which lead to the determination of whether the container is safe to package or needs to be tested and/or stabilized. Discussion with the generator is very important to determine if contaminants could have been mixed with the material, which would increase the material's instability or reactivity. Throughout the evaluation, physical contact with the container is kept to an absolute minimum.

Container Handling

To the maximum extent possible, the Reactive Material Specialists will limit the handling or manipulation of the potentially shock sensitive container. Once all of the equipment is staged and personnel have donned their PPE, they will enter the storage area or laboratory where the container(s) are located. Each chemical will be placed into the Blaster's Daybox that contains vermiculite to cushion the containers from any sources of shock or disturbance. Once the material is secure, it will be brought to the exclusion zone by the Reactive Material Specialists and placed into the remote opener.

Sampling / Opening

Because friction and shock caused by removing the cap can potentially initiate an explosive reaction, the Reactive Material Specialists will utilize a specially designed, remote-opening device to access the container(s) from a safe distance. An ATF Type II magazine is used to contain any reaction or explosion during the opening process. This chamber is trailer mounted, has a fire-suppression system, and is designed to withstand the explosive force of one pound of military grade C4 explosive. Once the container is remotely opened, our Reactive Material Specialists can initiate one or more stabilization techniques to deactivate the designated material.

Stabilization Techniques

Clean Harbors applies sound and proven chemical stabilization techniques utilizing documented, chemistry-based procedures for the following types of compounds.

- Peroxide Forming Compounds
- Temperature Sensitive Compounds
- Organic Peroxides
- Shock Sensitive Compounds
- Multi-nitrated Compounds
- Azides

Materials not contained in this list are handled on a case-by-case basis. Stabilization techniques are researched using numerous chemical databases and references as well as consultation with High Hazard and reactive chemical consultants and Ph.D. chemists.

Remote Drum Opening

In addition to smaller chemical containers, our highly trained team is capable of remotely opening larger sized shipping containers. Prolonged storage can result in the contents becoming unstable resulting from lack of inhibitor, temperature fluctuations, or failure to properly maintain the chemicals. Our remote drum opening device is nitrogen driven. It has been designed to open one of the bungs of the shipping container, which in many cases, eliminates the need to transfer the drum contents to another shipping container (a common occurrence when using a penetrating style device). These engineering controls have been developed to minimize impact to personnel and property. The greatest hazard when working with a potentially unstable substance is the process of opening the container. Once the container has been opened, the contents can be evaluated, inhibited and stabilized. This will allow the container to be shipped for disposal along with the other waste streams.

Unknown Fingerprint Analysis

Our chemists can provide fingerprint analysis of unknown compounds of lab pack size containers provided the materials pass our evaluation for fingerprint analysis. If these materials fail our evaluation and are suspected to be shock sensitive, unstable, or reactive, they will need to be remotely opened. After the remote opening procedure is complete, Reactive Material personnel can test to determine if the material is radioactive, water reactive, acidic, basic, a cyanide, sulfide, or an oxidizing agent. This compatibility testing allows the technicians to determine and segregate incompatible material and package them accordingly.

Container Examination

Once on site personnel have been briefed on the potential chemical and physical hazards associated with the handling of a particular compound, the Reactive Material Specialists will make a physical evaluation of the containers and note the following information:

- Type of container (glass, plastic, metal)
- Type of lid or cap (screw cap, stopper, rubber, plastic, glass)
- Physical condition / integrity of the container and its cap

The Reactive Material Specialists will also evaluate the contents of the container to obtain the following information:

- Physical State (solid, liquid, bi-phase)
- Color of the material
- Evidence of peroxidation or contamination

Use of Specialized Equipment

Trailer Mounted Blast Deflection Unit (BDU)

This is an ATF Type II explosive magazine that was originally intended for the safe storage of explosives. It has been modified for the remote access of potentially explosive or unstable material. This unit has undergone explosive testing at the China Lake Naval Research and Testing Facility.

Some additional features of the BDU:

- Side over-pressure vents
- An internal fire suppression system
- Slide tray
- Wrist-grounding straps

Portable Remote Opener with Bomb Blanket and Safety Circle

The Portable Remote Opener can be rapidly mobilized for the safe management of energetic materials. Constructed of Kevlar and a fire resistant coating, the Portable Remote Opener is designed to capture fragments traveling up to 2,150 ft./sec.

Custom Designed Remote Drum Opener (RDO)

The RDO is a pneumatically driven remote opening device designed to remove the bung or to penetrate the container lid to remotely access the contents of a bulk container.

ATF Type III Daybox

This piece of equipment will be utilized for the movement of all potentially reactive materials from their storage location to the BDU. The magazine is constructed of 1/8-inch thick aluminum and is coal tar lined to aid in the dissipation of static electricity. The unit is also padded inside to add additional cushioning to the materials during movement.

Personal Protective & Handling Equipment

- Series 700 proximity suits
- Kevlar vest and leg protection
- Nomex fire suits
- Riot helmets with face shield
- Remote grappling arms

Strict Training Standards

Clean Harbors utilizes in-house, on-the-job and industry leading external training curriculums to ensure that only the most professional and qualified personnel work on our clients' sites. Our training programs start before personnel reach the field and continue throughout their career at Clean Harbors. Some examples of training are listed below and resumes can be provided upon request.

Personnel Qualifications & Training

- 40-Hour OSHA
- OSHA HAZCOM
- 40-Hour Lab-pack Training
- 24-Hour Specialty Gas Emergency Response Training
- 16-Hour Unknown Material and Explosive Chemical Recognition
- Explosive Handler Safety Course
- Phosgene Leak Test Training
- Radiation Worker II Training, DOE
- First Aid & CPR

Summary

Clean Harbors Environmental Services is the nation's leading provider of environmental services. Our methodologies combine a wide range of transportation and disposal options, laboratory chemical packing and disposal, and onsite services with in-house technical expertise to provide our customers with cost effective "turnkey" services to meet any environmental challenge that arises.

Contact Information

Please contact us for a quotation or see your local sales agent for additional information.

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