

# Cylinder Management Services

Clean Harbors has provided cost-effective cylinder management services to government and industrial clients since 1996. During this time, Clean Harbors has safely handled thousands of gas cylinders nationwide. Whether the material is managed in one of our state-of-the-art facilities or on-site, Clean Harbors can provide a wide array of gas cylinder services for planned project work or emergency response situations.

Clean Harbors Cylinder Specialists have over 30 years of compressed gas cylinder and rail car experience. Our specialized equipment can be mobilized to a customer location, or our trained technicians can prepare the cylinders for shipment to one of our cylinder processing facilities. Clean Harbors can provide off-site disposal through our extensive transportation fleet and our own permitted TSDFs. This allows Clean Harbors to provide full service capabilities from pick up to final disposal.

## Cylinder Processing Facilities

### LaPorte, Texas

As our flagship facility for cylinder processing, Clean Harbors in LaPorte, Texas has the necessary permits and equipment to meet our customers' cylinder disposal needs. Some management options include:

- Simple Neutralization
- Chemical Oxidation "Hydrides / Sulfides"
- Advanced Hydrolysis "Inner Halogens, Oxides of Nitrogen, Hydrogen Cyanide"
- Unknown Sampling and Identification
- Recycling
- Bulking and Transferring
- Controlled Venting
- High Hazard Cylinders
  - Pentaborane, Tetrafluorohydrazine, Anhydrous Hydrogen Cyanide, and Hypergolic Liquids and Gases

### Deer Park, Texas

The Clean Harbors Deer Park facility is fully permitted to manage a wide variety of regulated materials including RCRA hazardous waste, PCBs, APHIS soils, and non-regulated waste material. Utilized for incineration, the Deer Park facility is self-supporting with ancillary units. It is a stand-alone disposal facility with an on-site landfill, a wastewater treatment plant and storage/processing units.



To ensure the highest degree of health and safety, our cylinder specialists process each cylinder into the rotary kiln using secondary containment. The Deer Park facility also has an EPA approved Secondary NOX and Ammonia Removal System.

## **Cylinder Field Operations**

Clean Harbors Cylinder Specialists perform on-site evaluations of cylinders to determine the safest and most cost effective method to dispose, recycle or treat each individual cylinder. Typical information gathered includes CGA valve type, cylinder color codes, dimensions, service pressure, pressure relief devices, overall condition, and any type of external markings. Prior to the beginning of operations, a thorough site evaluation is conducted to ascertain the site's overall safety.

Clean Harbors has the ability to provide our customers with an After Action Report upon request. This report summarizes each day's activities including safety meeting, material handled, stabilization or treatment methods utilized, and site restoration. This report serves as a useful tool for generators when describing their risk management practices to company officials or regulatory agencies. The report has also been used successfully as a training and feedback tool for laboratory technicians and managers.

## **Non-DOT Transportable Cylinders**

Cylinders that are leaking, bulging, fire damaged, dented, excessively corroded, contain attachments, or have non-operable valves are restricted from transportation on public roadways per 49CFR 173.301. In addition, all Phosgene cylinders are subject to a specific leak testing procedure prior to shipment on public roadways per 49CFR173.172. Non-transportable cylinders may be shipped utilizing Clean Harbors' assortment of cylinder overpacks or downloaded on-site and decommissioned.

Clean Harbors Cylinder Specialists have the training, experience, and equipment to respond, contain, and scrub vapors from cylinders that are leaking or deteriorated. They have responded to emergencies involving leaking, fire damaged, bulging, and buried cylinders all over North America and abroad. Clean Harbors currently owns the following compressed gas emergency response equipment.

## **Cylinder Taping Devices**

Clean Harbors has custom designed sidewall mount cylinder-taping saddles for use on cylinders with inoperable valves not suitable for cryogenic valve replacement. The saddles are fastened to the cylinder and the technician manually operates the drill unit. The drill bit passes through a packing gland and penetrates the sidewall of the cylinder and allows the gas stream to flow to a reactor or gas flare for final processing.

## **Remote Tapping Ring**

The Remote Tapping Ring was designed and fabricated by Clean Harbors to ensure the highest level of operator safety when managing unstable mixtures and reactive gases. This unique engineering control destructively accesses a cylinder / pressure vessel while keeping the operator at a safe distance. The target material is then managed via hydrolysis, thermal destruction or re-containerization.

## **Over-pack Units**

Over-packing devices serve as a holding chamber in situations where the containment of a leaking or damaged cylinder is required. Clean Harbors has a full complement of over-packs including over 150 “Mother Cylinders” specifically designed for leaking or damaged lecture bottles.

## **Gas Flare**

Several flares are used by Clean Harbors to manage flammable gases. Each unit is configured with both pressure and flow controls. Large quantities of liquefied gases are typically managed through our low-profile jet burner. This unit permits rapid processing of liquid phase material while still maintaining complete control over the process.

## **Glove Box**

A glove box serves as secondary containment during sampling and processing reactive gases. It allows the technician to physically manipulate valves while providing a barrier between the cylinder and the technician. Emissions are sent direct into a counter flow packed bed venturi scrubber.

## **Cylinder Management Vessel and Process Reactor**

The Cylinder Management Vessel (CMV) is an ASME certified pressure vessel designed to remove a cylinder valve, which releases the cylinder’s contents inside secondary containment. The gas is then sampled, identified and processed on-site. This vessel is utilized on compressed gas cylinders with inoperable valves that are not suitable for cryogenic valve replacement.

## **High Vacuum Wet Scrubber**

The high vacuum / low flow scrubber effectively removes residual gas and liquid from a system via a venturi suction inlet. A vacuum is created by pumping reagent through an injector, where the gas contacts a turbulent reagent stream and is subsequently neutralized.

## **High Flow Wet Scrubber**

The high flow / low vacuum WATERWEB scrubber, utilizes fine droplets of scrubbing solution in conjunction with the WATERWEB mesh to produce an inlet flow rate in excess of 250cfm. This provides a tortuous path and ensures complete mixing of liquid and gas streams.

## **Remote Valve Opener and Sample Manifold**

The Bi-Torq pneumatic actuator is designed to remotely manipulate compressed gas cylinder valves from a safe distance. This procedure may be necessary to access unstable mixtures or highly reactive materials.

## **Mobile Process Trailer (MPT) and Environmental Enclosure**

This is a stand-alone unit capable of processing virtually any compressed gas cylinder safely while on-site. The unit has all necessary reactors, scrubbers, power sources and equipment to get the job done right, day or night. The MPT is used in conjunction with an Environmental Enclosure (EE) to

enable Clean Harbors to complete projects in any weather and also provides secondary containment during an upset condition.

### **Small Environmental Enclosure and Process Reactor**

This smaller enclosure is ideal for inventories that don't require the use of our larger units. As with the MPT, this unit can create an inert atmosphere or provide secondary containment during on-site cylinder operations. Multiple access ports allow this unit to be connected to process reactors, wet scrubbers, dry scrubbers, thermal oxidation flares, or a combination of engineering controls. The enclosure and associated processing equipment provide onsite cylinder management that is efficient, safe, and final.

### **Unknown Gas Sampling and Analysis**

Cylinders with unknown contents pose the highest risks and must be handled by highly trained personnel utilizing state-of-the-art equipment. Clean Harbors utilizes a custom designed sampling manifold for this reason. All sampling operations are performed with the appropriate level of personal protective equipment.

The sampling manifold uses a series of gauges to determine pressure and a sample is captured in one of the attached sample cylinders. Once the sample has been drawn, the sample cylinder is capped and shipped out for analysis per 49 CFR 172.101 (c)(11). Mass Spectrometer data is compiled and reviewed by a Cylinder Specialist and forwarded to our customer.

### **Compressed Gas Training Services**

#### **Compressed Gas Safety and Awareness (CGSA)**

The CGSA course is a 1-day (8-hour) class designed by Clean Harbors specifically for commercial, private industry and government agencies. This awareness level course provides basic training on industrial and specialty gas safe work practices. Some topics include:

- Gas Properties and Containers
- Cylinder Movement and Storage
- DOT Regulations
- Disposal Options

#### **Compressed Gas Emergency Response Training (CGERT)**

The CGERT course is a two-day (16-hour) class designed by Clean Harbors featuring a blend of classroom presentations, case studies, and practical exercises. This program has been uniquely designed to familiarize participants with properties of compressed gases, emergency response practices, and gas-specific emergency response equipment. Some of the topics include:

- Personal Protective Equipment
- Cylinder Containment Vessels
- Chlorine Emergency Kit "A & B"

- Incident Command

### **Chlorine Gas Emergency Response Training (CGER)**

This awareness level course features a blend of classroom presentations, case studies, and comprehensive reviews designed to familiarize participants with the properties of Chlorine Gas, emergency response practices, and associated engineering controls. Some of the topics include:

- Chlorine Gas Properties
- DOT Regulations
- Emergency Response Practices
- Containment Kits (A, B, C) “Hands on”
- PPE Selection and Use

### **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
- 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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