NM1 - ___6____

CONTINGENCY PLAN

Date:

__April 21, 2009_

Hansen, Edward J., EMNRD

From: Hansen, Edward J., EMNRD
Sent: Tuesday, April 21, 2009 5:48 PM
To: 'John Barnidge'
Cc: 'Keith Gordon'
Subject: Contingency Plan for CRI (NM1-6)

Dear Mr. Barnidge:

The New Mexico Oil Conservation Division (OCD) has received your Contingency Plan for the Controlled Recovery, Inc. Facility (NM1-6) revised, May 19, 2009, and re-codified, April 20, 2009. The Plan appears to meet requirements of Subsections N of 19.15.36.13 NMAC. Therefore, the OCD will place your Plan on file. Please to sure to provide copies as specified in the Plan in accordance with Paragraph (7) of Subsection N of 19.15.36.13 NMAC within 30 days.

Please be advised that OCD acceptance of this Plan does not relieve the owner/operator of responsibility should operations pose a threat to ground water, surface water, human health or the environment. In addition, OCD approval does not relieve the owner/operator of responsibility for compliance with any OCD, federal, state, or local laws and/or regulations.

If you have any questions regarding this matter, please contact me at 505-476-3489.

Edward J. Hansen
Hydrologist
Environmental Bureau

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NM1-6

CONTINGENCY PLAN

CONTROLLED RECOVERY, INC. FACILITY
US 62/NM 180, Lea County, NM

Revised May 19, 2008
Recodification: April 20, 2009

Prepared For:
Controlled Recovery, Inc.
P.O. Box 388
Hobbs, NM 88241
(505) 393-1079

CONTROLLED RECOVERY INCORPORATED

Prepared By:
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CONTROLLED RECOVERY, INC.
CONTINGENCY PLAN

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1.0 INTRODUCTION

1.1 Site Information

The Controlled Recovery, Inc. (CRI) site is located in unincorporated Lea County, New Mexico (NM), near Halfway, NM. Gated access to the site is provided off of US Highway 62/NM 180 and County Road C-29. A Site Location Map is provided as **Figure 1**. CRI provides comprehensive processing, recycling and disposal services for the oil and gas industry and other commercial customers. The CRI site consists of ±284 acres and is transected by US Highway 62/NM180; the two portions of the site are referred to as the "North Site" (±65 acres) and the "South Site" (±219 acres) as shown on **Figure 2**.

Facility Name and Address
Controlled Recovery Inc.
US 62/NM 180
Halfway, NM 88241
Contact: Mr. Robert Whittemore
Director of Sales
Phone: (575)393-1079

Facility Owner, Operator, and Permittee:
Controlled Recovery Inc.
P.O. Box 388
Hobbs, NM 88241
Contact: Mr. Robert Whittemore
Director of Sales
Phone: (575)393-1079

The North Site is comprised of a New Mexico Environment Department (NMED) Ground Water Quality Bureau (GWQB) approved landfarm consisting of ±65 acres. The discharge permit (DP-818) was issued by NMED in 1991 and is on a 5-year renewal cycle; the permit was last renewed in 2004. The North Site landfarm is used for the remediation of light hydrocarbons in soil contaminated by leaking underground storage tanks (petroleum contaminated soils, or "PCS"). The Site Plan (**Figure 2**) identifies existing features and potential improvements for the CRI site.

The South Site includes several active areas as shown on **Figure 2**:

- Liquids receiving, processing, and disposal area (±36 acres).
- Oil recovery plant (±8 acres).
- Lease property (±10 acres) used by third parties for an asphalt batch plant.

- Oil Conservation Division (OCD) landfarm; currently active for remediation of oilfield wastes, or future landfill (12.4 acres).
- Current OCD landfill; with active, closed, and future cells.
- Future landfill; development of designated areas as landfill cells.

1.2 OCD Permit

CRI operates a "Surface Waste Management Facility" as defined in 19.15.2.7.S(11) NMAC. It is permitted by the Oil Conservation Division (OCD) of the New Mexico Energy, Minerals and Natural Resources Department under Order R9166 to receive for collection, disposal, evaporation, remediation, reclamation, treatment or storage of any produced water, drilling fluids, drill cuttings, completion fluids, contaminated soils, bottom sediment and water, tank bottoms, waste oil or, upon written approval by the division, other oilfield related waste. The existing operation consists of both a "landfarm" and a "landfill" as defined in 19.15.36.7.A(3), (4) NMAC, both located on the South Site; as well as a crude oil recycling plant. Approval was issued as part of a settlement agreement dated January 13, 2004.

1.3 Contingency Plan Requirements

This document has been prepared to address the requirements of 19.15.36.13.N NMAC which specifies that each operator of a surface waste management facility must prepare and have available a Contingency Plan (the Plan). This Plan is designed to minimize hazards to fresh water, public health, safety or the environment from fires, explosions or an unplanned sudden or non-sudden release of contaminants or oil field waste to air, soil, surface water or ground water. Applicable provisions of this Plan will be implemented immediately whenever there is a fire, explosion or release of contaminants or oil field waste constituents that could threaten fresh water, public health, safety or the environment.

This Plan is organized for easy reference by site personnel, all of whom will be required to read it. Figures are provided at the end of the text, as well as Tables 1-6. Tables A, B, C, and D are included within the text for ease of reference. Copies of

this Plan will be maintained in a readily accessible location at the Site Office and the CRI Office in Hobbs. In addition, copies of the Plan will be made available to the emergency agencies identified in **Table 1**. Agencies listed on **Table 1** will be invited to the site for the purposes of familiarizing themselves with the facility and reviewing the Plan's contents with CRI [19.15.36.13.N(2) NMAC]. As detailed in Section 10 of this Plan, whenever significant changes to the Plan are made, revised copies of the Plan will replace existing copies, and the agencies listed in **Table 1** will be provided with the most recent Plan updates. Several definitions pertinent to this Contingency Plan are provided in **Table 2**. The definitions are provided as specified in 19.15.2.7 NMAC.

2.0 EMERGENCY COORDINATORS

CRI has designated specific individuals with the responsibility and authority to implement response measures in the event of an emergency which threatens freshwater, public health, safety or the environment [19.15.36.13.N(3) NMAC]. The Primary, Alternate, and On-site Emergency Coordinators (ECs; **Table 3**) will be thoroughly familiar with all aspects of this Plan; operations and activities at the facility; location and characteristics of waste to be managed; the location of all records within the facility; and the facility layout. **Table 3** lists the names, designations, titles, home addresses, and office, home, and cellular phone numbers for each EC.

The ECs are responsible for coordinating emergency response measures and have the authority to commit the resources required for implementation of this Plan. A designated EC is available to respond to emergencies 24 hours a day, 7 days a week. The CRI employee who identifies an emergency situation will contact an EC directly or via phone. Contact will be attempted with each EC (Primary, Alternate, and the On-site) until communication is achieved (**Table 3**). Upon arrival at the scene of an emergency, the first EC to arrive will assume responsibility for initiated response measures. If more than one EC responds, authority is given to the Primary EC.

In the rare case that an EC cannot be contacted in an emergency, the CRI employee who identifies the situation should make every effort to follow the emergency procedures outlined in this Plan until an EC or emergency authority (local, state, or federal; **Table 1**) arrives to assist. Duties of the ECs are addressed within this Plan in detail. The term "EC" as used throughout this Plan, references the responsible EC at the scene of an emergency regardless of whether that EC is the Primary, Alternate or On-site EC, or designee. If the list of ECs changes, this Plan will be amended as described in Section 10.0.

3.0 PREVENTION MEASURES

3.1 Waste Inspection and Screening

CRI accepts non-hazardous oil field wastes at the South Site, and accepts petroleum contaminated soils, car wash wastes, etc., at the NMED permitted landfarm located on the North site. It is unlikely that hazardous wastes would be delivered to the facility, however, CRI has implemented a waste inspection and screening program at the site office on a random basis in an effort to preclude acceptance of unauthorized wastes. It is also possible that hazardous materials could become a concern if they arrive with other waste materials [19.15.36.13.N(6) NMAC]. Hot or smoldering loads are also a potential problem that can be identified through inspection and screening procedures (also see Section 5.0 regarding control procedures). A typical Waste Inspection Form is provided as **Attachment A**. The waste inspection and screening program has been established in order to identify hazardous materials or hot loads before they become an operational liability.

3.2 Fire Prevention and Preparedness

CRI implements a variety of fire preventative and preparedness measures, as well as employee training. Preventive measures taken to avoid fire emergencies include regular inspections of incoming vehicles to identify "hot loads" or problem wastes.

A list of available emergency response equipment is provided in **Table 6** in accordance with the requirements of 19.15.36.13.N(4) NMAC. Control preparation procedures for potential fire emergencies include:

- Placement and maintenance of ABC type fire extinguishers in structures and equipment.
- Locating cover material stockpiles near the disposal area that can be used to smother fires.
- Implementation of a site-wide communication network to optimize mobilization of appropriate response personnel and equipment.
- Well established emergency response procedures, documented and posted.

Employee fire prevention and preparedness training may include the following:

- Training of equipment operators to identify suspect "hot" loads and measures for mitigation (e.g., cover smoldering waste with stockpiled soil; also see Section 5.1.1)
- Training of site personnel in waste screening (see Section 3.1), flammables identification, etc.
- Training on fire response technique, notification procedures, fire response equipment, etc.

4.0 IMPLEMENTATION, ASSESSMENT, AND NOTIFICATION

The following subsections present a series of procedures for implementation, assessment, and notification of appropriate authorities in the event that a specific emergency develops [19.15.36.13.N(1) NMAC].

4.1 Implementation

The Contingency Plan will be implemented when an imminent or actual emergency situation develops that represents a potential impact to freshwater, public health, safety or the environment. Situations that could require implementation of this Plan include:

- fire/explosions
- release of contaminants or oilfield waste constituents
- release of H_2S gas

The following implementation, assessment, and notification procedures will be followed in the case of an emergency. Assessment and notification are discussed further in subsections 4.2 and 4.3.

TABLE A

Implementation, Assessment, and Notification Procedures for Releases

(Breaks, Leaks, Spills, Releases, Fires or Blowouts)

1. **NOTIFY THE ECs:** The employee who first becomes aware of the emergency will immediately notify the Primary EC, and the Alternate EC and On-site EC if necessary. Notification will be made in person, via telephone, or via radio. The responding EC will assume full authority over the situation.
2. **ASSESS SOURCE, AMOUNT, AND EXTENT OF RELEASE:** The EC will assess the source, amount, and extent of any spill or release, or released material resulting from a fire or explosion and determine possible hazards to fresh water, public health, safety or the environment.
3. **CONTROL MEASURES OR EVACUATION:** The EC's assessment of the emergency situation will be the basis for attempting to control the release or for implementing an evacuation, as well as for notifying the appropriate state and local authorities if their assistance is needed. **Table 5** provides Evacuation Procedures and a Site Evacuation Plan is provided as **Figure 3**. Also refer to control measures in Section 5.0.
4. **CONTAIN AND PREVENT SPREAD OF RELEASE:** If deemed safe by the EC, the appropriate CRI response equipment and personnel will be dispatched to the scene of the release. Personnel will initiate actions within their scope of training to contain the release and prevent the spread and/or windblown dispersion of the release. Depending on the type of release, appropriate equipment may include deployment of absorbents for spills, fire extinguishers, and/or earthmoving equipment.
5. **NOTIFICATION OF EMERGENCY AUTHORITIES:** If the EC's assessment indicates a need to notify appropriate state and local emergency authorities, notification will be initiated immediately. A list of state and local response agencies with phone numbers is provided as **Table 1**. OCD will be notified as necessary in accordance with **Table 4** (Release Notification and Corrective Action).
6. **DIVERT TRAFFIC AND RESTRICT PERSONS FROM AREA:** CRI personnel not actively involved in release control operations will be restricted from the area until the area is determined to be safe by the EC and, if appropriate, the on-scene senior emergency authority (i.e., fire, police, hazard or other official). Vehicular traffic will be diverted away from release response activities until the situation is abated.

4.1.1 Fires/Explosions

Potential scenarios for fires include ignition of mobile equipment while operating or during servicing, or the ignition of oil contaminated wastes. It is also possible that a hot or smoldering load of material may be transported to the facility. Personnel are trained in the prevention and control of fires or explosions.

4.1.2 Spills/Releases

The spill or release of a hazardous material at CRI is most likely to involve fuel or various vehicle maintenance materials (i.e., engine oil, hydraulic oil, antifreeze, etc.). Other materials most likely to present a concern as a result of normal operations include petroleum products and petroleum wastes brought into the facility. Spills involving these types of materials could occur during fueling, routine maintenance operations or during unloading or processing of waste. In addition, the possibility exists for a spill of hazardous material that may be inadvertently transported to the facility.

4.1.3 Hydrogen Sulfide (H_2S)

Hydrogen Sulfide (H_2S) is a colorless and flammable gas with a distinct odor. Being heavier than air, H_2S tends to accumulate at the bottom of poorly ventilated spaces. It is found in petroleum and natural gas and is sometimes present in ground water. The odor of hydrogen sulfide gas can be perceived at levels as low as 10 ppb (parts per billion). At levels of 50-100 ppm (parts per million), it may cause the human sense of smell to fail. Limited exposure to low concentrations of H_2S can result in eye irritation, sore throat, coughing, shortness of breath, and fluid in the lungs. These symptoms usually go away in a few weeks. Long-term, low-level exposure may result in fatigue, loss of appetite, headaches, irritability, poor memory, and dizziness. Exposure to high concentrations of H_2S can lead to eye damage, loss of sense of smell, pulmonary edema (swelling and/or fluid accumulation in the lungs), loss of breathing and death. General risks associated with H_2S contact are also described below. More detailed chemical hazard information for H_2S is provided in **Attachment B**.

H_2S EXPOSURE LEVEL[1]	HEALTH RISK
Low (0-10 ppm)	Eye, nose, and throat irritation; coughing, shortness of breath, fluid in the lungs
Moderate (10-50 ppm)	Headache, dizziness, nausea and vomiting, coughing and breathing difficulty, loss of sense of smell
High (50-200 ppm)[2]	Severe respiratory tract irritation, loss of sense of smell, eye damage, shock, convulsions, coma, pulmonary edema (swelling and/or fluid accumulation in the lungs), death

[1]*General data obtained from www.safetydirectory.com*
[2]*NIOSH Immedidate Danger to Life or Health (IDLH) is 100 ppm*

CRI monitors for H_2S on a weekly basis. Monitoring results are recorded on an inspection report form (**Attachment C**) and retained as part of the facility operating record. CRI personnel wear H_2S personnel monitors under circumstances in which H_2S may be present, including the unloading of materials that contain H_2S. The monitors issue a visual and audible signal at 10 ppm of H_2S in the ambient air that becomes more rapid at 20 ppm. In the event of an H_2S detection of 10 ppm or greater, the following procedures will be implemented:

TABLE B

Implementation, Assessment, and Notification Procedures for H_2S

1. **EVACUATE AREA AND NOTIFY THE ECs:** The employee who first becomes aware of the H_2S alarm will immediately evacuate the area and notify the Primary EC, and the Alternate EC and On-site EC if necessary. Notification will be made in person, via telephone, or via radio. The responding EC will assume full authority over the situation.
2. **REMAIN UPWIND OF RELEASE:** Persons evacuated from the release area should remain away and upwind from the area of the release until a determination of the amount has been made.
3. **ASSESS THE AMOUNT OF RELEASE:** The EC will assess the source, amount, and extent of the alarm. Monitoring equipment will be operated by trained personnel.
4. **MONITOR DOWNWIND IF H_2S = 10 PPM**: In the event a reading of 10 ppm is registered, the area will be evacuated and CRI personnel will monitor the H_2S levels along the downwind boundary of the facility.

5. **EVACUATE AND CLOSE THE FACILITY IF H_2S ≥20 PPM AT DOWNWIND BOUNDARY:** If levels reach 20 ppm at the downwind boundary, the facility will be evacuated and closed Evacuation procedures are covered in **Table 5** and a Site Evacuation Plan is provided as **Figure 3**.
6. **NOTIFICATION OF AUTHORITIES:** Notification will be provided to the New Mexico State Police, Lea County Sheriff, and OCD (**Table 1**). In addition, medical authorities will be contacted if needed. CRI will also notify Calaway Safety in Hobbs (**Table 1**) to provide personnel, equipment, and supplies to mitigate the source of an H_2S reading of 10 ppm or greater.
7. **RECORDKEEPING:** CRI will log and report to the OCD all incidences where a reading of 10 ppm H_2S or greater is registered at CRI's facility (also see Section 8.0).

4.2 Assessment

In the event of a spill, release, fire, or explosion the EC will immediately identify the character, source, amount and extent of released materials as feasible as well as assessing the potential impact to fresh water, public health, safety or the environment [19.15.36.13.N(10) NMAC]. During an emergency, the EC may amend this Plan as necessary to protect fresh water, public health, safety or the environment [19.15.36.13.N(14) NMAC]. The EC will also assess the circumstances of an emergency situation and determine the responses required to:

- provide notifications to appropriate agencies
- implement appropriate recordkeeping procedures

The assessment provides the EC with critical data needed to determine whether an evacuation is necessary, whether emergency authorities are needed, and whether CRI should attempt to control the release with on-site personnel and equipment. **Table 4** provides OCD descriptions of "major" and "minor" releases which are useful for assessment purposes. This section contains additional detailed information regarding the Site Evacuation Plan. Section 5.0 addresses control procedures.

4.2.1 Site Evacuation Plan

Based upon the type of waste materials received at CRI, the likelihood of a facility evacuation is unlikely [19.15.36.13.N(5) NMAC]. However, various circumstances could arise warranting a facility evacuation. In an emergency situation, the EC is the individual responsible for determining when evacuation of the facility is required.

Imminent or actual dangers that constitute a situation that could require evacuation include:

- A generalized fire or threat of fire that cannot be avoided.
- An explosion or the threat of explosion that cannot be averted.
- A major spill or leak that cannot be contained and constitutes a potential threat to human health or the environment.
- Detection of H_2S levels at 10 ppm or greater (evacuate the area and monitor downwind levels)
- Detection of H_2S levels at 20 ppm or greater (evacuate and close the facility)

When conditions warrant immediate evacuation (e.g., $H_2S \geq 20$ ppm), on-site persons (e.g., facility personnel, transporters, visitors, vendors, etc.) will be directed to proceed immediately to the Site Office, CRI's primary evacuation route. CRI Personnel will exercise good judgment and common sense in using the primary evacuation route to exit the facility, or selecting the most appropriate alternative evacuation route if necessary. **Table 5** provides detailed procedures for evacuating the facility. Assembly points, primary and alternative evacuation routes are provided on **Figure 3**. Driving directions to the nearest hospital are included as **Figure 4**.

4.3 Notification of Authorities

The following discussion presents a series of procedures for implementation and notification of appropriate authorities in the event that a specific emergency develops [19.15.36.13.N(1) NMAC]. Whenever there is an imminent or actual emergency, the EC will immediately notify on-site persons (facility personnel, visitors, vendors, transporters, etc.) of the emergency via on-site communication systems, as well as notify the appropriate state and local agencies as necessary [19.15.36.13.N(9) NMAC].

Table 1 provides a list of emergency response agencies and contacts that may need to be notified depending on the type and extent of an emergency situation. **Table 1** will be posted as appropriate and near on-site telephones for easy access by CRI personnel. Fire, police, and medical authorities should be contacted as necessary in an emergency situation (**Table 1**). The Store located at Halfway, NM (adjacent to CRI) should be notified if there is an immediate threat human health and the environment in the area,

such as fire, explosion, major H_2S release, etc.

In the case of an H_2S emergency where $H_2S \geq 20$ ppm, notification will be provided to the New Mexico State Police, Lea County Sheriff, and OCD (also included on **Table 1**):

- OCD
  Hobbs, NM (575) 393-6161
  Emergency Beeper (575) 370-7106
  Santa Fe, NM (505) 476-3440
- New Mexico State Police 911 or (505) 841-9271
- Lea County Sherriff's Dept. 911 or (575) 393-2515

CRI will also notify Calaway Safety in Hobbs (**Table 1**) to provide personnel, equipment, and supplies to mitigate the source of an H2S reading of H2S ≥10 ppm.

Table 4 provides specific information regarding notification of OCD in the case of a release, which by definition includes breaks, leaks, spills, releases, fires or blowouts (**Table 2**). In addition, **Table 4** also provides OCD definitions for "major" and "minor" releases.

Additional State, Federal, and other local (WIPP) emergency contact numbers are provided and should be used as deemed appropriate to the situation. If the EC determines that the incident could threaten fresh water, human health, public safety or the environment beyond the limits of the facility, the EC will notify the National Response Center and New Mexico Environment Department (NMED) spill emergencies at the following phone numbers (also included on **Table 1**):

- National Response Center - 24 Hr. Hotline: (800) 424-8802
- NMED Spill Emergencies - 24 Hr. Hotline: (505) 827-9329

The EC's notification to authorities must include all of the following information, as listed on the Emergency Response Record Keeping Form:

- name and telephone number of person reporting the incident
- name and address of facility
- time and type of incident (e.g., hazardous material release, fire)

- name and quantity of material(s) involved, to the extent known
- extent of injuries, if any
- possible hazards to human health or the environment

5.0 CONTROL PROCEDURES

This section provides information for the EC and CRI personnel regarding control procedures for different types of releases including fires, explosions, spills, and releases. The focus of the EC's initial efforts will be the protection of facility personnel and those using the facility. Control procedures should only be implemented by the EC and CRI personnel once an assessment of the situation and possible hazards to fresh water, public health, safety or the environment has been completed. Persons should not attempt to contain or control any fires, explosions, spills, leaks, breaks, or blowouts that are beyond the scope of their safety and training. Once the appropriate state and local agencies arrive on scene, these authorities will take control of the situation.

The following subsections provide the EC and CRI personnel with specific control procedures for emergency situations. Note that in the case of an H_2S emergency situation, the procedures outlined in **Table 5** should be followed.

5.1 Fire Control Guidelines

Fire response equipment available at CRI is identified on **Table 6**. Fire control efforts will not be initiated until any untrained personnel are at a safe distance. The following general guidelines for fire control will be followed in the event of a fire or explosion at CRI:

TABLE C

Fire/Explosion: Control Guidelines

1. **INITIATE FIRE CONTROL:** The EC and CRI personnel will initiate response actions within the scope of their training to control the spread of the fire.
2. **P.A.S.S. METHOD:** Fires will generally be controlled with ABC type fire extinguishers using the P.A.S.S. method (Pull pin, Aim nozzle, Squeeze trigger, Sweep from side to side to extinguish).
3. **SMOTHER METHOD:** Fires may also be smothered with cover materials (i.e., soil, caliche) when possible to extinguish.

4. **AVAILABLE WATER SOURCES:** Fires may be doused or hosed with available water hoses or buckets of water, etc.
5. **EVACUATE AND NOTIFY EMERGENCY AUTHORITIES:** If at any time the scope of the fire is beyond the capabilities of CRI personnel to contain and/or extinguish it, the EC will contact the local Fire Department or the WIPP Emergency Line (**Table 1**) for assistance. All personnel will be instructed to evacuate the area.
6. **MONITOR SITUATION:** The EC will monitor for leaks, pressure buildup, gas generation or rupture in valves, pipes or equipment as appropriate [19.15.36.13.N(11) NMAC].

After responding to the incident, the EC will meet with involved personnel to assess the cause of the fire and document the incident. The Incident Report Form (**Attachment D**) will reflect the details of any emergency and the resulting actions. The identified causative agent will be removed from the vicinity of the facility if the possibility of re-ignition exists. Appropriate actions (e.g., exclusion from the landfill or landfarm of the causative agent, more frequent equipment maintenance) to prevent recurrence of fire will be developed and implemented. Personnel involved with the handling, transport, and placement of materials at the facility will be informed of the resultant actions. Significant changes in operating protocol or procedures resulting from this meeting will be documented and added as an amendment to the Plan (see Section 10.0).

5.1.1 Hot Loads

"Hot" loads are those that show evidence of smoke, smoldering, smoky odor, cinders, etc. upon arrival at CRI. A waste inspection and screening program (see Section 3.1) has been implemented in order to identify problem loads. Immediately upon arrival and/or identification of a hot load, it will be directed to a designated area separate from the active areas of the surface waste management facilities and near one of the on-site access roads. The location of the hot load management area will be changed from time to time as CRI operations progress.

The material will be unloaded and inspected and any unusual characteristics will be observed and noted. The material will either be smothered with earth

or doused with water to extinguish any remaining fire. Prior to disposal at the disposal area, the material will be uncovered and inspected. If there are no health and safety threats, no evidence of smoke or fire, and the heat has diminished sufficiently; the load will be incorporated into the disposal area. If there are any concerns associated with the load or the cause of the fire, the load will be isolated and covered by soil or tarping for subsequent testing and evaluation.

5.2 Spills/Release Control Guidelines

A waste inspection and screening program (see Section 3.0) has been implemented in order to intercept potential hazardous wastes inadvertently delivered to CRI before they are unloaded at the facility. Emergency equipment for response to such releases includes but is not limited to the items provided in the Emergency Response Equipment List (**Table 6**). Containment/control and characterization of potential releases will wait until any untrained personnel are at a safe distance. At that point, the EC will then implement the following procedures for managing any existing or potential release [19.15.36.13.N(6) NMAC]:

TABLE D

Spill/Release: Control Guidelines

1. **INITIATE CONTROL:** The EC and CRI personnel will initiate response actions within the scope of their training to control the spill/release.
2. **REMOVAL OR SEGREGATION:** Determine if the material can be safely removed to a designated waste inspection/segregation area for further evaluation. If the materials cannot be safely relocated, contain them for investigation and sampling using the spill control list. If necessary, shut down operations until safe conditions are restored.
3. **CONTAIN RELEASE:** Attempt to contain the release to the smallest area possible. Examples of equipment available for spill containment are non-reactive sorbent materials, sand, shovels and heavy equipment.
4. **SAMPLING:** After isolating the contaminants and any contaminated media, inspect them to determine if sampling is appropriate. If appropriate, isolate contaminants in the waste inspection or segregation area, or in designated leak-proof containers, until characterization is complete.

5. **CLEANUP:** After the release has been contained and necessary samples have been obtained, cleanup will be initiated by removing the spilled materials, sorbent materials, soils used for containment, etc.
6. **EQUIPMENT MONITORING:** Pertinent equipment, including valves and pipes, will be monitored for leaks, pressure buildup, gas generation or rupture as appropriate [19.15.36.13.N(11) NMAC].
7. **VERIFICATION SAMPLING:** Dependent on the type of material spilled, the EC will assess requirements for cleanup verification including the collection of samples for appropriate analytical testing.
8. **DISPOSAL OR PROCESSING:** When visual and/or laboratory characterization is complete, determine appropriate processing or disposal procedures for that waste type. Send residuals for disposal to a facility that is approved for managing that type of waste.
9. **EVACUATE AND NOTIFY EMERGENCY AUTHORITIES:** If at any time the scope of the spill/release is beyond the capabilities of the on-site personnel to contain and/or extinguish it, the EC will contact the Fire Department or the WIPP Emergency Line (**Table 1**) for assistance. All personnel will be instructed to evacuate the area.

Immediately after an emergency situation, the EC will make arrangements for the storage, or disposal of any recovered wastes, water, or any contaminated materials resulting from the incident. An evaluation of the contamination will be carried out as soon as time permits to prevent any future accidents. The Incident Report Form (**Attachment D**) will reflect the details of any emergency and the resulting actions.

Although operating procedures, roadways, unloading areas, and general areas surrounding CRI will be maintained in an effort to minimize the release or spill of hazardous materials, provisions have been developed to improve procedures if an event warrants review and modification. After responding to the incident, the EC will meet with involved personnel to determine the cause of the spill. Appropriate actions to prevent its recurrence will be developed and implemented. Personnel involved with the handling and transport of hazardous materials will be informed of the procedures/protocol that are developed in response to knowledge gained from past response procedures. Significant changes in operating protocol or procedures resulting from this meeting will be documented and added as an amendment to this Plan. Plan amendments will be documented and disseminated as outlined in Section 10.0.

5.3 Clean, Replace, and Inspect Equipment

Following an emergency incident, all emergency response equipment used must be decontaminated/cleaned and made fit for re-use, or replaced as necessary, so that the equipment will be available when facility operations resume. An inspection of all equipment will take place before operations resume ensuring that each item is in proper working condition. This inspection will include a review of the facility infrastructure to ensure that no potential hazard has been created as a result of responding to the emergency. Prescribed procedures may include lock-out/tag-out on processing equipment until an inspection can be completed. Remedial activities, as a result of this inspection, may include recharging of fire extinguishers, replacement of personal protective gear, restocking of disposable items, etc. The EC will verify that response equipment has been properly decontaminated and returned to its original location and is fit for future use.

6.0 STORAGE AND TREATMENT OF RELEASED MATERIALS

Spilled or otherwise contaminated material approved for disposal will be disposed of in CRI's OCD landfill in accordance with standard operating practices. All other hazardous spilled materials will be containerized, stored and disposed of in accordance with applicable local, state and federal regulatory requirements. No oil field waste, which may be incompatible with the released material, will be treated, stored, or disposed of until cleanup procedures are complete [19.15.36.13.N(12), (13) NMAC].

7.0 EMERGENCY EQUIPMENT

The following sections describe emergency equipment at CRI that is available for responding to emergency situations. An Emergency Response Equipment List describing the equipment, quantity, location, and uses is provided as **Table 6**.

7.1 Internal Communications

Communications at CRI are accomplished via cellular telephones, land lines, and two-way radios. These systems provide facility personnel with immediate emergency

notification capabilities, and the opportunity to receive instructions in the event of an emergency incident. Any mechanical difficulties with the communications equipment will be promptly repaired. Internal communication devices are also included on **Table 6**.

7.2 External Communications

The telephones located at CRI have outside access in the event that notification of the local emergency response authorities is required (i.e., fire department, ambulance, etc.). In addition, key facility personnel including the ECs, facility General Manager, etc., carry cellular telephones for contacting outside agencies. The cellular telephones also provide a backup means for contacting emergency authorities in the event they cannot be reached by conventional telephone lines. External communication devices are also included on **Table 6**.

7.3 Fire Prevention

Portable ABC type fire extinguishers will be located in facility vehicles and mobile equipment, as well as within the site office, oil recycling plant, jet pit, maintenance shop and salt water disposal area. Fire extinguishers will be maintained in accordance with state and local fire codes and regulations and routinely serviced.

On-site earthmoving equipment is available to move and apply cover material for control of smoldering loads. As part of standard operating procedures, cover material will be stockpiled near the landfill (also known as area 51). In addition, the caliche stockpile located in the northeast corner of the facility will be available for use as cover material for fire or hot-load control purposes.

7.4 Personnel Protection, First Aid, and Safety Equipment

Personal protective equipment necessary for responding to a release of hazardous materials will be maintained in on-site buildings (Site Office, Maintenance Shop, and the Oil Recycling Plant) and/or issued to each employee (**Table 6**). These items include Tyvek suits, gloves, safety glasses, hearing protection, etc.

First aid and safety equipment will be maintained at various locations at CRI (**Table 6**). Safety equipment located at the facility includes industrial first aid kits, and an eye wash station. First aid kits will be placed in the facility office, maintenance shop and oil recycling plant. In addition, first aid kits will be maintained in all facility vehicles, including heavy equipment. Prominent signs will be placed identifying the location of health and safety equipment, and emergency response items (e.g., fire extinguishers).

7.5 Spill Response Equipment

Spill response equipment, including heavy equipment and shovels, is stored at various locations around the facility (**Table 6**).

8.0 RECORDKEEPING

The EC will be responsible for insuring that emergency response actions are fully documented. The Primary EC may complete the documentation requirements themselves or delegate to another EC. The CRI Incident Report Form (**Attachment D**) illustrates the information that will be recorded as a result of any emergency incident and related response action. This form will be signed by both the EC and the facility Plant Manager. Copies of the form filed for each incident will be retained as part of the Facility Operating Record.

In addition, in the case of an unauthorized release at CRI, the OCD will be notified pursuant to 19.15.29 NMAC. As defined by OCD in **Table 2**, a "release" is all "breaks, leaks, spills, releases, fires or blowouts involving oil, produced water, condensate, drilling fluids, completion fluids or other chemical or contaminant or mixture thereof, including oil field wastes and gases to the environment" (19.15.2.7.R(4) NMAC). A major release (19.15.29 NMAC; **Table 4**) includes an unauthorized release of a volume in excess of 25 barrels, or of any volume which results in a fire, will reach a water course, may with reasonable probability endanger public health or results in substantial damage to property or to the environment, cause detriment to water or exceed the standards in 19.15.30 NMAC. A major release requires both immediate verbal notification (within 24 hours) as well as timely written notification to OCD (within 15 days) using form C-141 relating to release

Notification and Corrective Action. A minor release (**Table 4**) is an unauthorized release of greater than 5 barrels but less than 25 barrels. A minor release requires timely written notice only. A copy of form C-141 is provided as **Attachment E**. Copies of the form filed for each incident will be retained as part of the Facility Operating Record.

9.0 COORDINATION AGREEMENTS

A copy of the Contingency Plan is made available to the organizations identified in **Table 1**. The Contingency Plan serves to familiarize each of the identified organizations with the operations of the facility and types of emergencies and responses that may be required. Each agency will be encouraged to visit the Facility for purposes of assessing site operations and providing input regarding emergency response procedures [19.15.36.13.N(2), (7) NMAC].

10.0 PLAN AMENDMENT

The EC will be responsible for assuring updates to or amendments of the Contingency Plan in the event of any of the following [19.15.36.13.N(8) NMAC]:

1. The Facility Permit is revised or modified.
2. The Plan fails in an emergency.
3. Modification to the Facility design, construction, operation, maintenance or other circumstances that changes the potential for fires, explosion, or releases of hazardous oil field waste constituents; or related changes in the appropriate emergency response.
4. The list of ECs changes.
5. The list of emergency equipment changes significantly.

The revised Contingency Plan will be distributed to OCD and made available to each of the organizations identified in **Table 1** with a cover letter highlighting any substantive changes. Any proposed changes will be in compliance with 19.15.36.13.N NMAC (Contingency Plan).

11.0 GAS SAFETY MANAGEMENT

As required by 19.15.36.13.O NMAC, each operator of a surface waste management facility that includes a landfill shall have a gas safety management plan that describes in detail procedures and methods that will be used to prevent landfill-generated gases from interfering or conflicting with the landfill's operation and protect fresh water, public health, safety and the environment. CRI requested that an Engineering Firm experienced in landfill gas management make a determination of the need for a Gas Safety Management Plan at CRI. A determination regarding this matter is provided in **Attachment F**.

FIGURES

SITE LOCATION

Based on Williams Sink, New Mexico (Provisional Edition 1985) and Laguna Gatuna, New Mexico (1984) Quadrangles, USGS 7.5' Series (1:24,000 Scale).

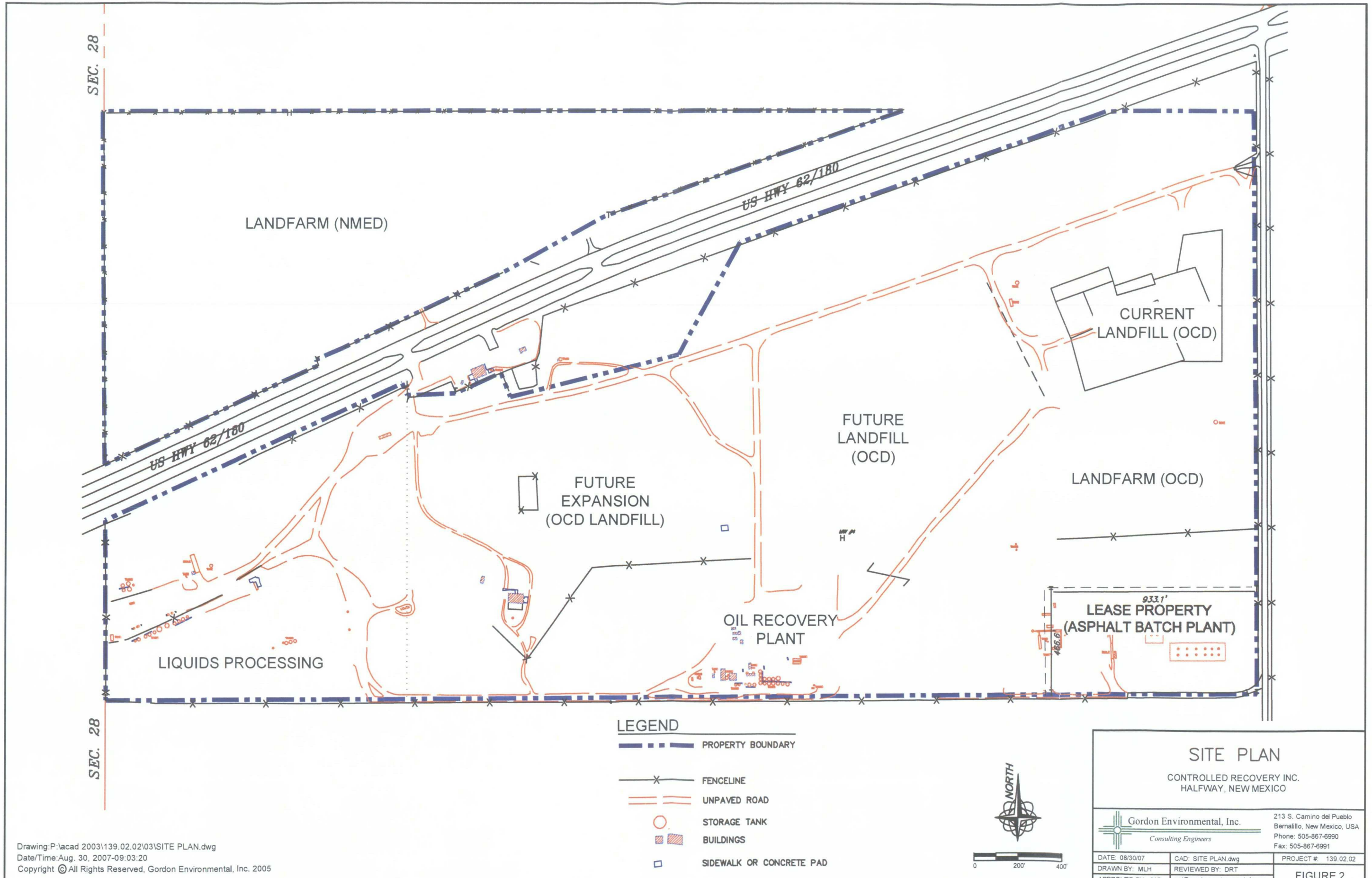
Drawing:P:\acad 2003\139.02.02\03\SITE LOC.dwg
Date/Time:May. 19, 2008-15:50:28

SITE LOCATION MAP

CONTROLLED RECOVERY INC.
HALFWAY, NEW MEXICO

Gordon Environmental, Inc.
Consulting Engineers
213 S. Camino del Pueblo
Bernalillo, New Mexico, USA
Phone: 505-867-6990
Fax: 505-867-6991

DATE: 08/27/07	CAD: SITE LOC.dwg	PROJECT #: 139.02.02
DRAWN BY: JFP	REVIEWED BY: DRT	FIGURE 1
APPROVED BY: IKG	gei@gordonenvironmental.com	



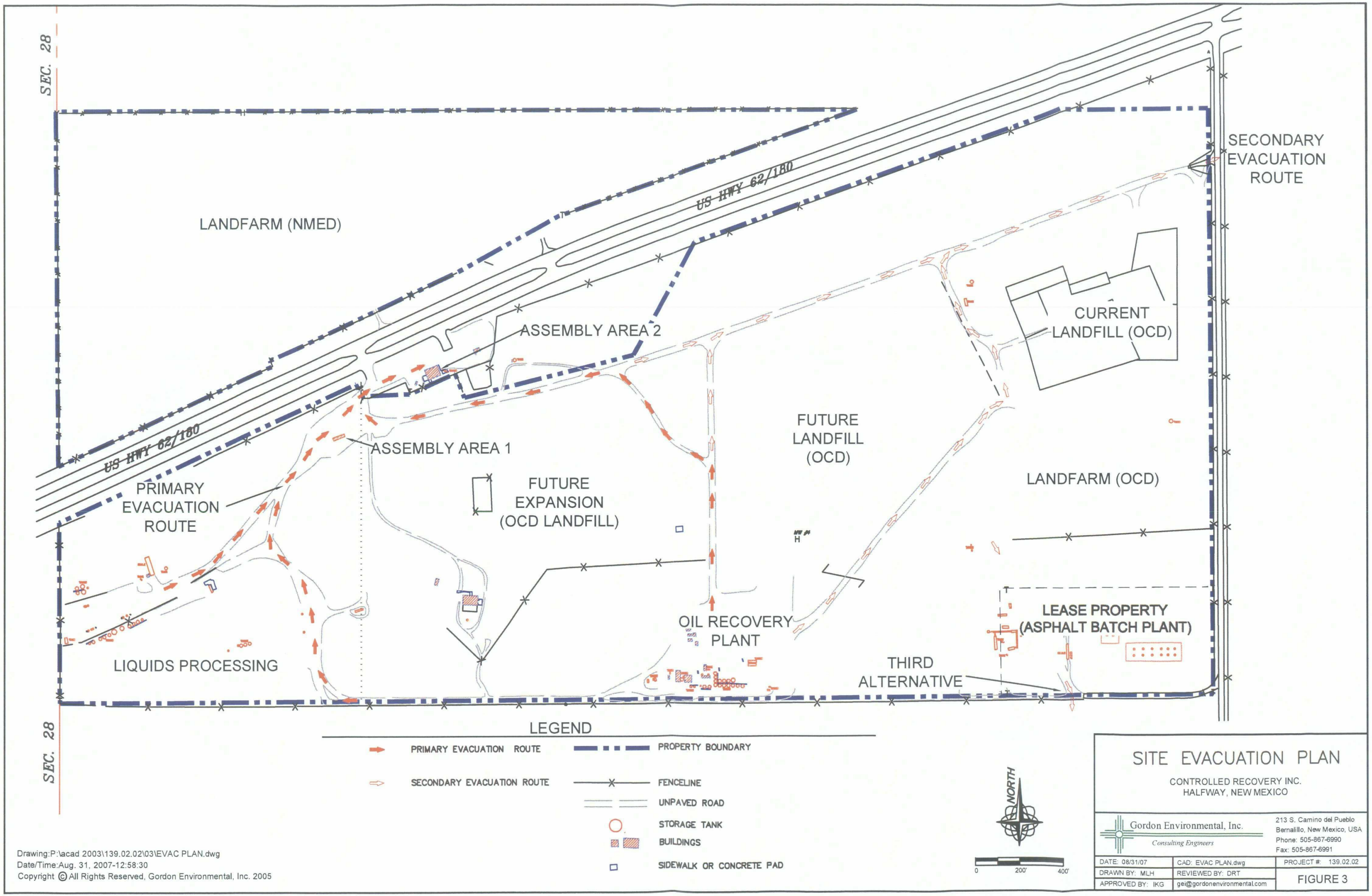
SITE PLAN

CONTROLLED RECOVERY INC.
HALFWAY, NEW MEXICO

Gordon Environmental, Inc.
Consulting Engineers
213 S. Camino del Pueblo
Bernalillo, New Mexico, USA
Phone: 505-867-6990
Fax: 505-867-6991

DATE: 08/30/07	CAD: SITE PLAN.dwg	PROJECT #: 139.02.02
DRAWN BY: MLH	REVIEWED BY: DRT	FIGURE 2
APPROVED BY: IKG	ge@gordonenvironmental.com	

Drawing:P:\acad 2003\139.02.02\03\SITE PLAN.dwg
Date/Time:Aug. 30, 2007-09:03:20



SITE EVACUATION PLAN

CONTROLLED RECOVERY INC.
HALFWAY, NEW MEXICO

Gordon Environmental, Inc.
Consulting Engineers
213 S. Camino del Pueblo
Bernalillo, New Mexico, USA
Phone: 505-867-6990
Fax: 505-867-6991

DATE: 08/31/07	CAD: EVAC PLAN.dwg	PROJECT #: 139.02.02
DRAWN BY: MLH	REVIEWED BY: DRT	FIGURE 3
APPROVED BY: IKG	gei@gordonenvironmental.com	

Drawing:P:\acad 2003\139.02.02\03\EVAC PLAN.dwg
Date/Time:Aug. 31, 2007-12:58:30

FIGURE 4
HOSPITAL LOCATION MAP

Sheet 1 of 2

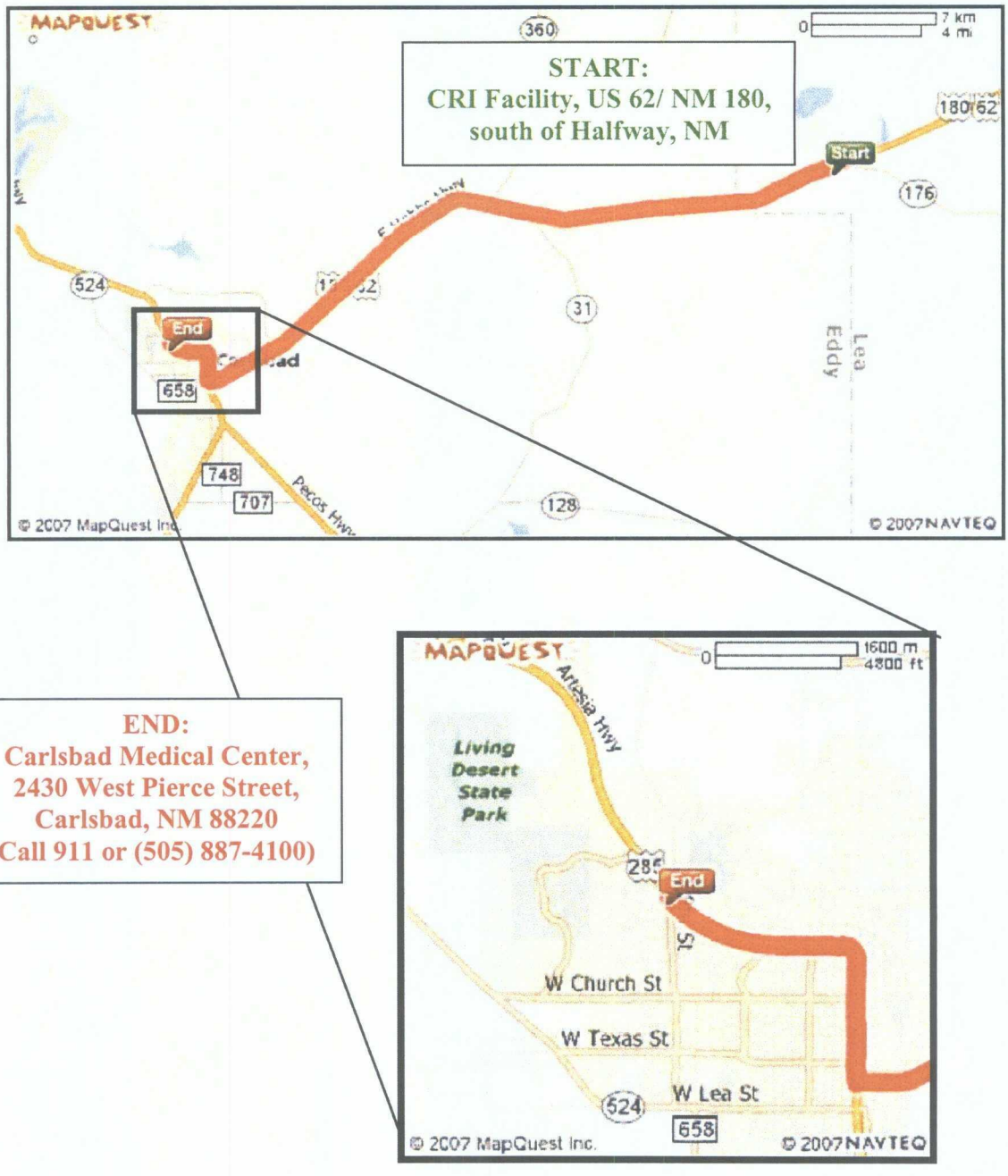


FIGURE 4
HOSPITAL LOCATION
DRIVING DIRECTIONS

Sheet 2 of 2

FROM: CRI, US 62/NM 180, south of Halfway, NM

TO: Carlsbad Medical Center, 2430 West Pierce Street, Carlsbad, NM 88220

STEP	DIRECTIONS	DISTANCE (miles)	TOTAL DISTANCE
1	Turn left (west) onto US 62/NM 180	31.9	31.9
2	Turn right (north) onto South Canal Street/US 285; Continue to follow US 285, it will turn into Pierce Street	3.0	34.9
3	End at Carlsbad Medical Center, 2430 West Pierce Street	.11	35.01
			Estimated Travel Time = 39 minutes

TABLES

TABLE 1

Emergency Response Agencies and Contacts

(Updated 04/2009)

Agency/Organization	Emergency Number
Fire	
Monument Volunteer Fire Dept.	911 or (575) 393-8690
Carlsbad Fire Department (31 miles)	911 or (575) 885-3125
Police	
Lea County Sheriff's Department (Hobbs Sub-Station)	911 or (575) 393-2515
New Mexico State Police	911 or (505) 841-9271
Medical/Ambulance	
Carlsbad Medical Center 2430 W. Pierce St. Carlsbad, NM 88220	911 or (575) 887-4100
Halfway NM	
Store, Customers and Employees	(575) 887-8112
Safety Supplies	
Calaway Safety 3229 Industrial Dr. Hobbs NM 88240	(575) 392-2973
OCD Emergency Response Contacts	
Oil Conservation Division 1625 North French Dr. Hobbs, NM 88240	(575) 393-6161
Emergency Beeper	(575) 370-7106
Oil Conservation Division 1220 South St. Francis Drive Santa Fe, NM 87505	(505) 476-3440
State Emergency Response Contacts	
New Mexico Environment Department Solid Waste Bureau, Santa Fe	(505) 827-0197
Hazardous and Radioactive Materials Bureau, Santa Fe	(505) 827-1557
Spill Emergencies 24 hr. Hotline (NMED)	(505) 827-9329
Other Local Emergency Response Contacts	
WIPP Emergency Line	(575) 234-8111
Federal Emergency Response Contacts	
National Emergency Response Center (U.S. Coast Guard)	(800) 424-8802
Region VI 24 hr. Emergency Response Hotline (USEPA)	(214) 665-2222

TABLE 2

Definitions

(Updated 04/2009)

Barrel *shall mean 42 United States gallons measured at 60 degrees fahrenheit and atmospheric pressure at the sea level.* [19.15.2.7.B(3) NMAC]

Division *shall mean the New Mexico energy, minerals and natural resources department, oil conservation division.* [19.15.2.7.D(4) NMAC]

Fresh water *(to be protected) includes the water in lakes and playas (regardless of quality, unless the water exceeds 10,000 mg/l TDS and it can be shown that degradation of the particular water body will not adversely affect hydrologically connected fresh ground water), the surface waters of streams regardless of the water quality within a given reach, and underground waters containing 10,000 mg/l or less of TDS except for which, after notice and hearing, it is found there is no present or reasonably foreseeable beneficial use that contamination of such waters would impair.* [19.15.2.7.F(3) NMAC]

Hazard to public health

exists when water that is used or is reasonably expected to be used in the future as a human drinking water supply exceeds at the time and place of the use, one or more of the numerical standards of Subsection A of 20.6.2.3103 NMAC, or the naturally occurring concentrations, whichever is higher, or if a toxic pollutant as defined at Subsection WW of 20.6.2.7 NMAC affecting human health is present in the water. In determining whether a release would cause a hazard to public health to exist, the director investigates and considers the purification and dilution reasonably expected to occur from the time and place of release to the time and place of withdrawal for use as human drinking water. [19.15.2.7.H(2) NMAC]

Oil field waste

shall mean waste generated in conjunction with the exploration for, drilling for, production of, refining of, processing of, gathering of or transportation of oil, gas or carbon dioxide;–waste generated from oil field service company operations; and waste generated from oil field remediation or abatement activity regardless of the date of release. Oil field waste does not include waste not generally associated with oil and gas industry operations such as tires, appliances or ordinary garbage or refuse unless generated at a division-regulated facility, and does not include sewage, regardless of the source. [19.15.2.7.O(3) NMAC]

Release *shall mean all breaks, leaks, spills, releases, fires or blowouts involving oil, produced water, condensate, drilling fluids, completion fluids or other chemical or contaminant or mixture thereof, including oil field wastes and gases to the environment.* [19.15.2.7.R(4) NMAC]

Waste (non-hazardous).

Non-hazardous waste shall mean non-exempt oil field waste that is not hazardous waste. [19.15.2.7.W(1) NMAC]

TABLE 3

List of Emergency Coordinators

(Updated 04/2009)

Primary Emergency Coordinator

Name:	Robert Whittemore	Home Phone: (575) 631-4640
Title:	Director of Sales	Mobile Phone: (575) 631-4640
Address:	2119 French Drive	Work Phone: (575) 393-1079
	Hobbs, NM 88240	

Alternate Emergency Coordinator*

Name:	W. David Poe	Home Phone: (575) 631-6989
Title:	Director of Safety	Mobile Phone: (575) 631-6989
Address:	2410 Idaho Street	Work Phone: (575) 393-1079
	Carlsbad, NM 88220	

Onsite Emergency Coordinator*

Name:	Javier Enriquez	Home Phone: (575) 492-1583
Title:	Plant Manager	Mobile Phone: (575) 602-1637
Address:	2516 Charlcia Blvd	Work Phone: (575) 887-6504
	Hobbs, NM 88240	(575) 393-1079

**Or as designated by CRI.*

TABLE 4

Part 29: Release Notification

(Page 1 of 2)

19.15.29.7 DEFINITIONS:

A. "Major release" means:

(1) an unauthorized release of a volume, excluding gases, in excess of 25 barrels;

(2) an unauthorized release of a volume that:

(a) results in a fire;

(b) will reach a watercourse;

(c) may with reasonable probability endanger public health; or

(d) results in substantial damage to property or the environment;

(3) an unauthorized release of gases in excess of 500 MCF; or

(4) a release of a volume that may with reasonable probability be detrimental to water or exceed the standards in Subsections A and B or C of 19.15.30.9 NMAC.

B. "Minor release" means an unauthorized release of a volume, greater than five barrels but not more than 25 barrels; or greater than 50 MCF but less than 500 MCF of gases.

[19.15.29.7 NMAC - Rp, 19.15.3.116 NMAC, 12/1/08]

19.15.29.8 RELEASE NOTIFICATION:

A. The person operating or controlling either the release or the location of the release shall notify the division of unauthorized release occurring during the drilling, producing, storing, disposing, injecting, transporting, servicing or processing of oil, gases, produced water, condensate or oil field waste including regulated NORM, or other oil field related chemicals, contaminants or mixture of the chemicals or contaminants, in accordance with the requirements of 19.15.29 NMAC.

B. The person operating or controlling either the release or the location of the release shall notify the division in accordance with 19.15.29 NMAC with respect to a release from a facility of oil or other water contaminant, in such quantity as may with reasonable probability be detrimental to water or exceed the standards in Subsections A and B or C of 19.15.30.9 NMAC.

[19.15.29.8 NMAC - Rp, 19.15.3.116 NMAC, 12/1/08]

19.15.29.9 REPORTING REQUIREMENTS: The person operating or controlling either the release or the location of the release shall provide notification of releases in 19.15.29.8 NMAC as follows.

A. The person shall report a major release by giving both immediate verbal notice and timely written notice pursuant to Subsections A and B of 19.15.29.10 NMAC.

B. The person shall report a minor release by giving timely written notice pursuant to Subsection B of 19.15.29.10 NMAC.

[19.15.29.9 NMAC - Rp, 19.15.3.116 NMAC, 12/1/08]

TABLE 4

Part 29: Release Notification

(Page 2 of 2)

19.15.29.10 CONTENTS OF NOTIFICATION:

A. The person operating or controlling either the release or the location of the release shall provide immediate verbal notification within 24 hours of discovery to the division district office for the area within which the release takes place. In addition, the person shall provide immediate verbal notification of a release of a volume that may with reasonable probability be detrimental to water or exceed the standards in Subsections A and B or C of 19.15.30.9 NMAC to the division's environmental bureau chief. The notification shall provide the information required on form C-141.

B. The person operating or controlling either the release or the location of the release shall provide timely written notification within 15 days to the division district office for the area within which the release occurs by completing and filing form C-141. In addition, the person shall provide timely written notification of a release of a volume that may with reasonable probability be detrimental to water or exceed the standards in Subsections A and B or C of 19.15.30.9 NMAC to the division's environmental bureau chief within 15 days after the release is discovered. The written notification shall verify the prior verbal notification and provide appropriate additions or corrections to the information contained in the prior verbal notification.

[19.15.29.10 NMAC - Rp, 19.15.3.116 NMAC, 12/1/08]

19.15.29.11 CORRECTIVE ACTION: The responsible person shall complete division-approved corrective action for releases that endanger public health or the environment. The responsible person shall address releases in accordance with a remediation plan submitted to and approved by the division or with an abatement plan submitted in accordance with 19.15.30 NMAC.

[19.15.29.11 NMAC - Rp, 19.15.3.116 NMAC, 12/1/08]

TABLE 5

Evacuation Procedures

When evacuation is required, the following procedures will be followed:

1. Facility personnel will be alerted directly or using the facility telephone, cellular telephones, or radios.
2. Vehicles delivering waste will be diverted away from the location of the emergency and routed towards the facility exit.
3. All facility operating equipment will be shut down.
4. Personnel will be directed to proceed to the Site Office, which will be the designated emergency response coordination location. The EC will identify missing persons at that time.
5. If the emergency involves the Site Office or its immediate environs, the Halfway store will be the secondary assembly point for facility personnel.
6. If the emergency precludes access to both, the Site Office and Halfway store, personnel will evaluate the site via an auxiliary access gate at the east end of the facility.
7. Once assembled, personnel will stand by to afford assistance, if and as needed, or evacuate through Site Office or Halfway store.

TABLE 6

Emergency Response Equipment List

Equipment Description	Quantity	Location	Use(s)
10 lb ABC rated fire extinguisher	3	Site Office	Firefighting
10 lb ABC rated fire extinguisher	14	Trucks	Firefighting
10 lb ABC rated fire extinguisher	1	Heavy Equipment	Firefighting
20 lb ABC rated fire extinguisher	12	Jet Pit Oil Recycling Plant Salt Water Disposal Maintenance Shop	Firefighting
Loader	1	Facility	Smothering Fires
Clean fill	NA	Landfill area	Smothering Fires
Caliche Stockpile	NA	North-East corner of facility	Smothering Fires
Tyvex protection suits	One per employee	Site Office Oil Recycling Plant Maintenance Shop	Protective gear for employees
Pair leather gloves	One per employee	Assigned to employee	Protective gear for employees
Pair safety glasses	One per employee	All employee workstations	Protective gear for employees
Round-point wood handle shovels	4	Site Office Jet Pit Oil Recycling Plant Maintenance Shop	Contain spillage, putting out fires
First Aid Kit	4	Site Office Jet Pit Oil Recycling Plant Maintenance Shop	First Aid
First Aid Kit	One per vehicle	Facility Vehicles	First Aid
Eye Wash Station	1	Oil Recycling Plant	First Aid
Portable 2-way radio	One per employee	Base unit at Site Office	Communications
Cell Phones	4	General Manager Plant Manager Plant Supervisor Office Supervisor	Communications
Office Phone	1	Site Office	Communications
Mobile pressure washer	1	Mobile	Decontamination equipment

ATTACHMENT A
WASTE INSPECTION FORM

CONTROLLED RECOVERY, INC.
WASTE INSPECTION FORM

DATE: _____ TIME: _____

VEHICLE INFORMATION

NAME OF HAULING COMPANY:			
NAME OF GENERATOR COMPANY:			
PHONE:		NAME OF DRIVER:	
VEHICLE MAKE	VEHICLE COLOR	ID#	LICENSE PLATE

GENERAL INFORMATION

LOAD ORIGIN (LEASE OR PHYSICAL LOCATION):			
LOAD DESCRIPTION:			
SAMPLED COLLECTED?	YES	NO	DESCRIPTION:
UNAUTHORIZED WASTE?	YES	NO	ACTION REQUIRED:

OBSERVATIONS/COMMENTS

ACTION TAKEN

SIGNATURES

CRI INSPECTOR	DRIVER
Printed Name: _____	Printed Name: _____
Signature: _____	Signature: _____

ATTACHMENT B

CHEMICAL HAZARD INFORMATION FOR H_2S

NIOSH Publication No. 2005-149: September 2005

NIOSH Pocket Guide to Chemical Hazards

Hydrogen sulfide

CAS 7783-06-4

H_2S

RTECS MX1225000

Synonyms & Trade Names
Hydrosulfuric acid, Sewer gas, Sulfuretted hydrogen

DOT ID & Guide
1053 117

Exposure Limits

NIOSH REL: C 10 ppm (15 mg/m^3) [10-minute]

OSHA PEL†: C 20 ppm 50 ppm [10-minute maximum peak]

IDLH 100 ppm See: 7783064

Conversion 1 ppm = 1.40 mg/m^3

Physical Description
Colorless gas with a strong odor of rotten eggs. [Note: Sense of smell becomes rapidly fatigued & can NOT be relied upon to warn of the continuous presence of H_2S. Shipped as a liquefied compressed gas.]

MW: 34.1	BP: -77°F	FRZ: -122°F	Sol: 0.4%
VP: 17.6 atm	IP: 10.46 eV	RGasD: 1.19	
Fl.P: NA (Gas)	UEL: 44.0%	LEL: 4.0%	

Flammable Gas

Incompatibilities & Reactivities
Strong oxidizers, strong nitric acid, metals

Measurement Methods
NIOSH 6013; OSHA ID141
See: NMAM or OSHA Methods

Personal Protection & Sanitation (See protection)
Skin: Frostbite
Eyes: Frostbite
Wash skin: No recommendation
Remove: When wet (flammable)
Change: No recommendation
Provide: Frostbite wash

First Aid (See procedures)
Eye: Frostbite
Skin: Frostbite
Breathing: Respiratory support

Respirator Recommendations NIOSH
Up to 100 ppm:
(APF = 25) Any powered, air-purifying respirator with cartridge(s) providing protection against the compound of concern
(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against the compound of concern
(APF = 10) Any supplied-air respirator*
(APF = 50) Any self-contained breathing apparatus with a full facepiece
Emergency or planned entry into unknown concentrations or IDLH conditions:
(APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode
(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus
Escape:
(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against the compound of concern/Any appropriate escape-type, self-contained breathing apparatus
Important additional information about respirator selection

Exposure Routes inhalation, skin and/or eye contact

Symptoms Irritation eyes, respiratory system; apnea, coma, convulsions; conjunctivitis, eye pain, lacrimation (discharge of tears), photophobia (abnormal visual intolerance to light), corneal vesiculation; dizziness, headache, lassitude (weakness, exhaustion), irritability, insomnia; gastrointestinal disturbance; liquid: frostbite

Target Organs Eyes, respiratory system, central nervous system

See also: INTRODUCTION See ICSC CARD: 0165 See MEDICAL TESTS: 0119

International Chemical Safety Cards

HYDROGEN SULFIDE

ICSC: 0165

Sulfur hydride
H_2S
Molecular mass: 34.1
(cylinder)

ICSC # 0165
CAS # 7783-06-4
RTECS # MX1225000
UN # 1053
EC # 016-001-00-4
October 04, 2002 Peer reviewed

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Extremely flammable.	NO open flames, NO sparks, and NO smoking.	Shut off supply; if not possible and no risk to surroundings, let the fire burn itself out; in other cases extinguish with water spray, powder, carbon dioxide.
EXPLOSION	Gas/air mixtures are explosive.	Closed system, ventilation, explosion-proof electrical equipment and lighting. Prevent build-up of electrostatic charges (e.g., by grounding) if in liquid state. Do NOT use compressed air for filling, discharging, or handling.	In case of fire: keep cylinder cool by spraying with water.
EXPOSURE		AVOID ALL CONTACT!	IN ALL CASES CONSULT A DOCTOR!
•INHALATION	Headache. Dizziness. Cough. Sore throat. Nausea. Laboured breathing. Unconsciousness. Symptoms may be delayed (see Notes).	Ventilation, local exhaust, or breathing protection.	Fresh air, rest. Half-upright position. Artificial respiration may be needed. No mouth-to-mouth artificial respiration. Refer for medical attention.
•SKIN	ON CONTACT WITH LIQUID: FROSTBITE.	Cold-insulating gloves.	ON FROSTBITE: rinse with plenty of water, do NOT remove clothes. Refer for medical attention.
•EYES	Redness. Pain. Severe deep burns.	Safety goggles, or eye protection in combination with breathing protection.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•INGESTION		Do not eat, drink, or smoke during work.	

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Evacuate danger area! Consult an expert! Remove all ignition sources. Ventilation. Remove gas with fine water spray. Personal protection: gas-tight chemical protection suit including self-contained breathing apparatus.	Fireproof. Separated from strong oxidants. Cool. Keep in a well-ventilated room. Install continous monitoring system with alarm.	F+ symbol T+ symbol N symbol R: 12-26-50 S: 1/2-9-16-36-38-45-61 UN Hazard Class: 2.3 UN Subsidiary Risks: 2.1

SEE IMPORTANT INFORMATION ON BACK

International Chemical Safety Cards

HYDROGEN SULFIDE

ICSC: 0165

IMPORTANT DATA	**PHYSICAL STATE; APPEARANCE:** COLOURLESS COMPRESSED LIQUEFIED GAS , WITH CHARACTERISTIC ODOUR OF ROTTEN EGGS. **PHYSICAL DANGERS:** The gas is heavier than air and may travel along the ground; distant ignition possible. As a result of flow, agitation, etc., electrostatic charges can be generated. **CHEMICAL DANGERS:** Heating may cause violent combustion or explosion. The substance decomposes on burning producing toxic gases (sulfur oxides). Reacts violently with strong oxidants, causing fire and explosion hazard. Attacks many metals and some plastics. **OCCUPATIONAL EXPOSURE LIMITS:** TLV: 10 ppm as TWA 15 ppm as STEL (ACGIH 2004). MAK: 10 ppm 14 mg/m³ Peak limitation category: II(2) Pregnancy risk group: IIc (DFG 2004). OSHA PEL†: C 20 ppm 50 ppm 10-minute maximum peak NIOSH REL: C 10 ppm (15 mg/m³) 10-minute NIOSH IDLH: 100 ppm See: 7783064
	ROUTES OF EXPOSURE: The substance can be absorbed into the body by inhalation. **INHALATION RISK:** A harmful concentration of this gas in the air will be reached very quickly on loss of containment. **EFFECTS OF SHORT-TERM EXPOSURE:** The substance is irritating to the eyes and the respiratory tract The substance may cause effects on the central nervous system Exposure may result in unconsciousness. Exposure may result in death. Inhalation of gas may cause lung oedema (see Notes). The effects may be delayed. Medical observation is indicated. Rapid evaporation of the liquid may cause frostbite. **EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:**
PHYSICAL PROPERTIES	Boiling point: -60°C Melting point: -85°C Solubility in water, g/100 ml at 20°C: 0.5 Relative vapour density (air = 1): 1.19 Flash point: Flammable Gas Auto-ignition temperature: 260°C Explosive limits, vol% in air: 4.3-46
ENVIRONMENTAL DATA	The substance is very toxic to aquatic organisms. 

NOTES

The symptoms of lung oedema often do not become manifest until a few hours have passed and they are aggravated by physical effort. Rest and medical observation are therefore essential. Specific treatment is necessary in case of poisoning with this substance; the appropriate means with instructions must be available. The odour warning when the exposure limit value is exceeded is insufficient.

Transport Emergency Card: TEC (R)-20G2TF or 20S1053
NFPA Code: H4; F4; R0;

ADDITIONAL INFORMATION

Specific Medical Tests or Examinations Published in the Literature for OSHA-Regulated Substances

Hydrogen sulfide

CAS No: 7783-06-4

NOTE:
(1) Efficacy of Medical Tests has not been evaluated.
(2) NIOSH references include diagnostic, screening, and other tests.
(3) OSHA mandated medical tests, if any, are provided in **BOLD** on a yellow background.
(4) This HTML page was created from DHHS (NIOSH) Publication No. 2005-110. December 2004.
(5) If a medical test/examination contains multiple references, each is listed separately.

Editor(s) / Author(s)	Specific Medical Test(s) or Examination(s)	Reference(s)
Baselt RC.	Whole Blood (chemical/metabolite)	*Biological Monitoring Methods for Industrial Chemicals.* 3rd Edition. Chemical Toxicology Institute,1997.
Linch AL.	Whole Blood (chemical/metabolite) • Carboxyhemoglobin	Biological Monitoring for Industrial Chemical Exposure Control. CRC Press. 1974.
Baselt RC.	Blood Plasma	*Biological Monitoring Methods for Industrial Chemicals.* 3rd Edition. Chemical Toxicology Institute,1997.
US DHHS PHS CDC NIOSH and US DOL OSHA.	Chest X-ray	NIOSH/OSHA Occupational Health Guidelines for Chemical Hazards DHHS (NIOSH) *Pub No. 81-123; 88-118; Suppls. I-IV. 1981-1995.*
Proctor NH, Hughes JP.	Chest X-ray	*Chemical Hazards of the Workplace.* JB Lippincott Company. 1978.
US DHHS PHS CDC NIOSH and US DOL OSHA.	Pulmonary Function Tests • Forced Vital Capacity • Forced Expiratory Volume (1 sec)	NIOSH/OSHA Occupational Health Guidelines for Chemical Hazards DHHS (NIOSH) *Pub No. 81-123; 88-118; Suppls. I-IV. 1981-1995.*
Proctor NH, Hughes JP.	Pulmonary Function Tests • Forced Vital Capacity • Forced Expiratory Volume (1 sec)	*Chemical Hazards of the Workplace.* JB Lippincott Company. 1978.

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Hydrogen sulfide

IDLH Documentation

CAS number: 7783064

NIOSH REL: 10 ppm (15 mg/m^3) 10minute CEILING

Current OSHA PEL: 20 ppm CEILING, 50 ppm 10minute MAXIMUM PEAK

1989 OSHA PEL: 10 ppm (14 mg/m^3) TWA, 15 ppm (21 mg/m^3) STEL

1993-1994 ACGIH TLV: 10 ppm (14 mg/m^3) TWA, 15 ppm (21 mg/m^3) STEL

Description of Substance: Colorless gas with a strong odor of rotten eggs.

LEL:. . 4.0% (10% LEL, 4,000 ppm)

Original (SCP) IDLH: 300 ppm

Basis for original (SCP) IDLH: The chosen IDLH is based on the statements by Patty [1963] that 170 to 300 ppm is the maximum concentration that can be endured for 1 hour without serious consequences; 400 to 700 ppm is dangerous after exposure of 0.5 to 1 hour [Henderson and Haggard 1943]. AIHA [1963] reported that 400 to 700 ppm caused loss of consciousness and possible death in 0.5 to 1 hour [MCA 1950].

Existing short-term exposure guidelines: 1991 American Industrial Hygiene Association (AIHA) Emergency Response Planning Guidelines (ERPGs):

ERPG1: 0.1 ppm (60minute)

ERPG2: 30 ppm (60minute)

ERPG3: 100 ppm (60minute)

National Research Council [NRC 1985] Emergency Exposure Guidance Levels (EEGLs):

10minute EEGL: 50 ppm

24hour EEGL: 10 ppm

ACUTE TOXICITY DATA:

Lethal concentration data:

Species	Reference	LC_{50} (ppm)	LC_{Lo} (ppm)	Time	Adjusted 0.5-hr LC (CF*)	Derived value
Rat	Back et al. 1972	713	-----	1 hr	977 ppm (1.37)	98 ppm
Mouse	Back et al. 1972	673	-----	1 hr	922 ppm (1.37)	92 ppm
Human	Lefaux 1968	-----	600	30 min	600 ppm (1.0)	60 ppm
Mouse	MacEwen and Vernot 1972	634	-----	1 hr	869 ppm (1.37)	87 ppm
Human	Tab Biol Per 1933	-----	800	5 min	354 ppm (0.44)	35 ppm
Rat	Tansey et al. 1981	444	-----	4 hr	1,141 ppm (2.57)	114 ppm

*Note: Conversion factor (CF) was determined with "n" = 2.2 [ten Berge et al. 1986].

Other human data: It has been reported that 170 to 300 ppm is the maximum concentration that can be endured for 1 hour without serious consequences [Henderson and Haggard 1943] and that olfactory fatigue occurs at 100 ppm [Poda 1966]. It has also been reported that 50 to 100 ppm causes mild conjunctivitis and respiratory irritation after 1 hour; 500 to 700 ppm may be dangerous in 0.5 to 1 hour; 700 to 1,000 ppm results in rapid unconsciousness, cessation of respiration, and death; and 1,000 to 2,000 ppm results in unconsciousness, cessation of respiration, and death in a few minutes [Yant 1930].

Revised IDLH: 100 ppm

Basis for revised IDLH: The revised IDLH for hydrogen sulfide is 100 ppm based on acute inhalation toxicity data in humans [Henderson and Haggard 1943; Poda 1966; Yant 1930] and animals [Back et al. 1972; MacEwen and Vernot 1972; Tansey et al. 1981].

REFERENCES:

1. AIHA [1963]. Hydrogen sulfide. In: Hygienic guide series. Am Ind Hyg Assoc J *24*:9294.

2. Back KC, Thomas AA, MacEwen JD [1972]. Reclassification of materials listed as transportation health hazards. WrightPatterson Air Force Base, OH: 6570th Aerospace Medical Research Laboratory, Report No. TSA20723, pp. A-220 to A221.

3. Henderson Y, Haggard HW [1943]. Noxious gases. 2nd ed. New York, NY: Reinhold Publishing Corporation, p. 245.

4. Lefaux R [1968]. Practical toxicology of plastics. Cleveland, OH: Chemical Rubber Co., p. 207.

5. MacEwen JD, Vernot EH [1972]. Toxic Hazards Research Unit annual report: 1972. WrightPatterson Air Force Base, OH: Air Force Systems Command, Aerospace Medical Division, Aerospace Medical Research Laboratory Report, AMRLTR7262.

6. MCA [1968]. Chemical safety data sheet SD36: properties and essential information for safe handling and use of hydrogen sulfide. Washington, DC: Manufacturing Chemists Association, pp. 113.

7. NRC [1985]. Emergency and continuous exposure guidance levels for selected airborne contaminants. Vol. 4. Washington, DC: National Academy Press, Committee on Toxicology, Board on Toxicology and Environmental Health Hazards, Commission on Life Sciences, National Research Council, pp. 5568.

8. Patty FA, ed. [1963]. Industrial hygiene and toxicology. 2nd rev. ed. Vol. II. Toxicology. New York, NY: Interscience Publishers, Inc., p. 899.

9. Poda GA [1966]. Hydrogen sulfide can be handled safety. Arch Environ Health *12*:795800.

10. Tab Biol Per [1933]; *3*:231 (in German).

11. Tansey MF, Kendall FM, Fantasia J, Landin WE, Oberly R [1981]. Acute and subchronic toxicity studies of rats exposed to vapors of methyl mercaptan and other reduced sulfur compounds. J Toxicol Environ Health *8*:7188.

12. ten Berge WF, Zwart A, Appelman LM [1986]. Concentration-time mortality response relationship of irritant and systematically acting vapours and gases. J Haz Mat *13*:301309.

13. Yant WP [1930]. Hydrogen sulfide in industry: occurrence, effects and treatment. Am J Public Health *20*:598608.

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This page was last updated : 8/16/96

Go back to the NIOSH home page or to the CDC home page.

Hydrogen Sulfide (H_2S)
CAS 7783-0604; UN 1053

Synonyms include dihydrogen sulfide, sulfur hydride, sulfurated hydrogen, hydrosulfuric acid, "sewer gas," "swamp gas," hepatic acid, sour gas, and "stink damp."

- **Persons exposed to hydrogen sulfide pose no serious risks of secondary contamination to personnel outside the Hot Zone. However, fatalities have occurred to rescuers entering the hot zone.**
- **Hydrogen sulfide is a colorless, highly flammable and explosive gas produced naturally by decaying organic matter and by certain industrial processes. Hydrogen sulfide has a characteristic rotten-egg odor; however, olfactory fatigue may occur and consequently it may not provide adequate warning of hazardous concentrations.**
- **Hydrogen sulfide is well absorbed through the lungs; cutaneous absorption is minimal. Exposure by any route can cause systemic effects.**

Description

Hydrogen sulfide is a colorless, flammable, highly toxic gas. It is shipped as a liquefied, compressed gas. It has a characteristic rotten-egg odor that is detectable at concentrations as low as 0.5 ppb.

Routes of Exposure

Inhalation

Inhalation is the major route of hydrogen sulfide exposure. The gas is rapidly absorbed by the lungs. The odor threshold (0.5 ppb) is much lower than the OSHA ceiling (20 ppm). However, although its strong odor is readily identified, olfactory fatigue occurs at high concentrations and at continuous low concentrations. For this reason, **odor is not a reliable indicator of hydrogen sulfide's presence and may not provide adequate warning of hazardous concentrations.** Hydrogen sulfide is slightly heavier than air and may accumulate in enclosed, poorly ventilated, and low-lying areas.

Children exposed to the same levels of hydrogen sulfide as adults may receive larger doses because they have greater lung surface area:body weight ratios and increased minute volumes:weight ratios. In addition, they may be exposed to higher levels than adults in the same location because of their short stature and the higher levels of hydrogen sulfide found nearer to the ground. Children may be more vulnerable to corrosive agents than adults because of the relatively smaller diameter of their airways.

Skin/Eye Contact

Prolonged exposure to hydrogen sulfide, even at relatively low levels, may result in painful dermatitis and burning eyes. Direct contact with the liquefied gas can cause frostbite. Absorption through intact skin is minimal.

Ingestion

Because hydrogen sulfide is a gas at room temperature, ingestion is unlikely to occur.

Sources/Uses

Hydrogen sulfide is produced naturally by decaying organic matter and is released from sewage sludge, liquid manure, sulfur hot springs, and natural gas. It is a by-product of many industrial processes including petroleum refining, tanning, mining, wood-pulp processing, rayon manufacturing, sugar-beet processing, and hot-asphalt paving. Hydrogen sulfide is used to produce elemental sulfur, sulfuric acid, and heavy water for nuclear reactors.

Standards and Guidelines

OSHA ceiling = 20 ppm

OSHA maximum peak = 50 ppm (10 minutes, once, no other exposure)

NIOSH IDLH (immediately dangerous to life or health) = 100 ppm

AIHA ERPC-2 (emergency response planning guideline) (maximum airborne concentration below which it is believed that nearly all individuals could be exposed for up to 1 hour without experiencing or developing irreversible or other serious health effects or symptoms which could impair an individual's ability to take protective action) = 30 ppm.

Physical Properties

Description: Colorless gas with odor of rotten eggs

Warning properties: Not dependable; characteristic rotten-egg odor detectable at about 0.5 ppb, but olfactory nerve fatigue occurs in 2 to 15 minutes at concentrations over 100 ppm

Molecular weight: 34.1 daltons

Boiling point (760 mm Hg): -77 °F (-60.3 °C)

Vapor pressure: >760 mm Hg at 68 °F (20 °C)

Gas density: 1.2 (air = 1)

Water solubility: Slightly water soluble (0.4% at 68 °F [20 °C])

Flammability: Highly flammable and explosive between 4% and 45% (concentration in air); may travel to a source of ignition and flash back. Burns to produce a toxic gas, sulfur dioxide.

Incompatibilities

Hydrogen sulfide reacts with strong oxidizers, strong nitric acid, and metals.

Health Effects

- **Hydrogen sulfide is a mucous membrane and respiratory tract irritant; pulmonary edema, which may be immediate or delayed, can occur after exposure to high concentrations.**
- **Symptoms of acute exposure include nausea, headaches, delirium, disturbed equilibrium, tremors, convulsions, and skin and eye irritation.**
- **Inhalation of high concentrations of hydrogen sulfide can produce extremely rapid unconsciousness and death. Exposure to the liquified gas can cause frostbite injury.**

Acute Exposure

Hydrogen sulfide's can cause inhibition of the cytochrome oxidase enzyme system resulting in lack of oxygen use in the cells. Anaerobic metabolism causes accumulation of lactic acid leading to an acid-base imbalance. The nervous system and cardiac tissues are particularly vulnerable to the disruption of oxidative metabolism and death is often the result of respiratory arrest. Hydrogen sulfide also irritates skin, eyes, mucous membranes, and the respiratory tract. Pulmonary effects may not be apparent for up to 72 hours after exposure.

Children do not always respond to chemicals in the same way that adults do. Different protocols for managing their care may be needed.

CNS

CNS injury is immediate and significant after exposure to hydrogen sulfide. At high concentrations, only a few breaths can lead to immediate loss of consciousness, coma, respiratory paralysis, seizures, and death. CNS stimulation may precede CNS depression. Stimulation manifests as excitation, rapid breathing, and headache; depression manifests as impaired gait, dizziness, and coma, possibly progressing to respiratory paralysis and death. In addition, decreased ability to smell hydrogen sulfide occurs at concentrations greater than 100 ppm.

Respiratory

Inhaled hydrogen sulfide initially affects the nose and throat. Low concentrations (50 ppm) can rapidly produce irritation of the nose, throat, and lower respiratory tract. Pulmonary manifestations include cough, shortness of breath, and bronchial or lung hemorrhage. Higher concentrations can provoke bronchitis and cause accumulation of fluid in the lungs, which may be immediate or delayed for up to 72 hours. Lack of oxygen may result in blue skin color.

Children may be more vulnerable to corrosive agents than adults because of the relatively smaller diameter of their airways. Children may also be more vulnerable to gas exposure because of increased minute ventilation per kg and failure to evacuate an area promptly when exposed.

Cardiovascular — High-dose exposures may cause insufficient cardiac output, irregular heartbeat, and conduction abnormalities.

Renal — Transient renal effects include blood, casts, and protein in the urine. Renal failure as a direct result of hydrogen sulfide toxicity has not been described, although it may occur secondary to cardiovascular compromise.

Gastrointestinal — Symptoms may include nausea and vomiting.

Dermal — Prolonged or massive exposure may cause burning, itching, redness, and painful inflammation of the skin. Exposure to the liquified gas can cause frostbite injury.

Ocular — Eye irritation may result in inflammation (i.e., keratoconjunctivitis) and clouding of the eye surface. Symptoms include blurred vision, sensitivity to light, and spasmodic blinking or involuntary closing of the eyelid.

Potential Sequelae — Inflammation of the bronchi can be a late development. Survivors of severe exposure may develop psychological disturbances and permanent damage to the brain and heart. The cornea may be permanently scarred.

Chronic Exposure

Hydrogen sulfide does not accumulate in the body. Nevertheless, repeated or prolonged exposure has been reported to cause low blood pressure, headache, nausea, loss of appetite, weight loss, ataxia, eye-membrane inflammation, and chronic cough. Neurologic symptoms, including psychological disorders, have been associated with chronic exposure. Chronic exposure may be more serious for children because of their potential longer latency period.

Carcinogenicity — Hydrogen sulfide has not been classified for carcinogenic effects.

Reproductive and Developmental Effects

There is some evidence to suggest that exposure to hydrogen sulfide may be associated with an increased risk of spontaneous abortion. No information was located pertaining to placental transfer of hydrogen sulfide or to excretion of hydrogen sulfide in breast milk. There are no studies of developmental effects in humans exposed to hydrogen sulfide. However, results from animal studies suggest that hydrogen sulfide may be a developmental neurotoxicant. Hydrogen sulfide is not listed in TERIS or in *Shepard's Catalog of Teratogenic Agents.* It is also not included in *Reproductive and Developmental Toxicants,* a 1991 report published by the U.S. General Accounting Office (GAO) that lists 30 chemicals of concern because of widely acknowledged reproductive and developmental consequences.

Prehospital Management

- **Victims exposed only to hydrogen sulfide gas do not pose substantial risks of secondary contamination to personnel outside the Hot Zone. However, personnel could be secondarily contaminated by contacting or breathing vapors from clothing heavily soaked with hydrogen sulfide-containing solution.**
- **Hydrogen sulfide is a highly toxic gas that can produce extremely rapid CNS and respiratory depression. It is also an irritant affecting skin and mucous membranes.**
- **There is no proven antidote for hydrogen sulfide poisoning. Treatment generally consists of support of respiratory and cardiovascular functions.**

Hot Zone

Rescuers should be trained and appropriately attired before entering the Hot Zone. If the proper equipment is not available, or if prehospital staff have not been trained in its use, assistance should be obtained from a local or regional HAZMAT team or other properly equipped response organization.

Rescuer Protection

Hydrogen sulfide is an extremely rapidly acting, highly toxic gas. Fatalities have occurred to rescuers entering the hot zone.

Respiratory Protection: Positive-pressure, self-contained breathing apparatus (SCBA) is recommended in response situations that involve exposure to potentially unsafe levels of hydrogen sulfide.

Skin Protection: Chemical-protective clothing is not generally required because hydrogen sulfide gas is not absorbed through the skin, and skin irritation is rare. Direct contact with the liquefied gas can cause frostbite.

Rescuers should have a safety line during rescue operations because of the extremely rapid toxic action of hydrogen sulfide.

ABC Reminders

Quickly access for a patent airway, ensure adequate respiration and pulse. If trauma is suspected, maintain cervical immobilization manually and apply a cervical collar and a backboard when feasible.

Victim Removal

If victims can walk, lead them out of the Hot Zone to the Decontamination Zone. Victims who are unable to walk may be removed on backboards or gurneys; if these are not available, carefully carry or drag victims to safety.

Consider appropriate management of chemically contaminated children, such as measures to reduce separation anxiety if a child is separated from a parent or other adult.

Decontamination Zone

Patients exposed only to hydrogen sulfide gas who have no skin or eye irritation do not need decontamination. They may be transferred immediately to the Support Zone. Other patients will require decontamination as described below.

Rescuer Protection

If exposure levels are determined to be safe, decontamination may be conducted by personnel wearing a lower level of protection than that worn in the Hot Zone (described above).

ABC Reminders

Quickly access for a patent airway, ensure adequate respiration and pulse. Stabilize the cervical spine with a collar and a backboard if trauma is suspected. Administer supplemental oxygen as required. Assist ventilation with a bag-valve-mask device if necessary.

Basic Decontamination

Victims who are able may assist with their own decontamination. Remove and double-bag contaminated clothing.

Handle frostbitten skin and eyes with caution. Wrap the affected part gently in blankets. Let the circulation reestablish itself naturally. Encourage the victim to exercise the affected part while it is being warmed.

Flush exposed skin and hair with water for 3 to 5 minutes. Use caution to avoid hypothermia when decontaminating children or the elderly. Use blankets or warmers when appropriate.

Do not irrigate frostbitten eyes. Otherwise, irrigate exposed or irritated eyes with plain water or saline for at least 5 minutes. Eye irrigation may be carried out simultaneously with other basic care and transport. Remove contact lenses if easily removable without additional trauma to the eye. If a corrosive material is suspected or if pain or injury is evident, continue irrigation while transferring the victim to the support zone.

Consider appropriate management of chemically contaminated children, such as measures to reduce separation anxiety if a child is separated from a parent or other adult. If possible, seek assistance from a child separation expert.

Transfer to Support Zone

As soon as basic decontamination is complete, move the victim to the Support Zone.

Support Zone

Be certain that victims have been properly decontaminated (see *Decontamination Zone* above). Victims who have undergone decontamination or who have been exposed only to hydrogen sulfide gas pose no serious risks of secondary contamination. In such cases, Support Zone personnel require no specialized protective gear.

ABC Reminders

Quickly access for a patent airway. If trauma is suspected, maintain cervical immobilization manually and apply a cervical collar and a backboard when feasible. Ensure adequate respiration and pulse. Administer supplemental oxygen as required and establish intravenous access if necessary. Place on a cardiac monitor.

Additional Decontamination

Continue irrigating exposed skin and eyes, as appropriate.

Advanced Treatment

In cases of respiratory compromise secure airway and respiration via endotracheal intubation. If not possible, perform cricothyroidotomy if equipped and trained to do so.

Treat patients who have bronchospasm with aerosolized bronchodilators. The use of bronchial sensitizing agents in situations of multiple chemical exposures may pose additional risks. Consider the health of the myocardium before choosing which type of bronchodilator should be administered. Cardiac sensitizing agents may be appropriate; however, the use of cardiac sensitizing agents after exposure to certain chemicals may pose enhanced risk of cardiac arrhythmias (especially in the elderly). Hydrogen sulfide poisoning is not known to pose additional risk during the use of bronchial or cardiac sensitizing agents.

Consider racemic epinephrine aerosol for children who develop stridor. Dose 0.25–0.75 mL of 2.25% racemic epinephrine solution in 2.5 cc water, repeat every 20 minutes as needed, cautioning for myocardial variability.

Patients who are comatose, hypotensive, or are having seizures or cardiac arrhythmias should be treated according to advanced life support (ALS) protocols.

If frostbite is present, treat by rewarming in a water bath at a temperature of 102 to 108 °F (40 to 42 °C) for 20 to 30 minutes and continue until a flush has returned to the affected area.

Nitrite therapy (found in the cyanide antidote kit) has been suggested as a therapy for hydrogen sulfide exposure. Amyl nitrite is given by inhalation (for 30 seconds every minute until an intravenous line is established) followed by intravenous sodium nitrite (**300 mg over absolutely no less than 5 minutes**). This may aid recovery by forming sulfmethemoglobin, thus removing sulfide from combination in tissue. It is not necessary to use the sodium thiosulfate component of the cyanide antidote kit. The antidotal efficacy of nitrite therapy is controversial, but is currently recommended if it can be started shortly after exposure. However, there is only anecdotal evidence that nitrite therapy is effective, and victims of hydrogen sulfide poisoning have survived without sequelae after supportive care alone. The usefulness of nitrite therapy given beyond the first few minutes after exposure is questionable. Nitrite therapy should not be allowed to interfere with the establishment of adequate ventilation and oxygenation.

Transport to Medical Facility

Only decontaminated patients or patients not requiring decontamination should be transported to a medical facility. "Body bags" are not recommended.

Report to the base station and the receiving medical facility the condition of the patient, treatment given, and estimated time of arrival at the medical facility.

Multi-Casualty Triage

Consult with the base station physician or regional poison control center for further advice regarding triage of multiple victims.

Patients with evidence of significant exposure (e.g., breathing difficulties, unconsciousness, seizures, or collapse) should be transported to a medical facility for evaluation. Patients who have minor or transient irritation of the eyes or throat may be discharged from the scene after their names, addresses, and telephone numbers are recorded. They should be advised to seek medical care promptly if symptoms develop or recur (see *Patient Information Sheet* below).

Emergency Department Management

- **Hospital personnel away from the scene are not at risk of secondary contamination from patients exposed only to hydrogen sulfide gas; however, personnel can be secondarily contaminated by contacting or breathing vapors from clothing heavily soaked with hydrogen sulfide-containing solution.**
- **Hydrogen sulfide is a very rapidly acting, highly toxic gas that can produce rapid CNS and respiratory depression. It is also an irritant affecting skin and mucous membranes.**
- **There is no proven antidote for hydrogen sulfide poisoning. Treatment generally consists of support of respiratory and cardiovascular functions.**

Decontamination Area

Patients who have been decontaminated previously and patients exposed only to hydrogen sulfide gas who have no skin or eye irritation may be transferred immediately to the Critical Care Area. Other patients require decontamination as described below.

Be aware that use of protective equipment by the provider may cause fear in children, resulting in decreased compliance with further management efforts.

ABC Reminders

Evaluate and support airway, breathing, and circulation. Children may be more vulnerable to corrosive agents than adults because of the smaller diameter of their airways. In cases of respiratory compromise secure airway and respiration via endotracheal intubation. If not possible, surgically create an airway.

Treat patients who have bronchospasm with aerosolized bronchodilators. The use of bronchial sensitizing agents in situations of multiple chemical exposures may pose additional risks. Consider the health of the myocardium before choosing which type of bronchodilator should be administered. Cardiac sensitizing agents may be appropriate; however, the use of cardiac sensitizing agents after exposure to certain chemicals may pose enhanced risk of cardiac arrhythmias (especially in the elderly). Hydrogen sulfide poisoning is not known to pose additional risk during the use of bronchial or cardiac sensitizing agents.

Consider racemic epinephrine aerosol for children who develop stridor. Dose 0.25–0.75 mL of 2.25% racemic epinephrine

solution in 2.5 cc water, repeat every 20 minutes as needed, cautioning for myocardial variability.

Patients who are comatose, hypotensive, or have seizures or ventricular arrhythmias should be treated in the conventional manner.

Nitrite therapy (found in the cyanide antidote kit) has been suggested as a therapy for hydrogen sulfide exposure. Amyl nitrite is given by inhalation (for 30 seconds every minute until an intravenous line is established) followed by intravenous sodium nitrite (**300 mg over absolutely no less than 5 minutes**). This may aid recovery by forming sulfmethemoglobin, thus removing sulfide from combination in tissue. It is not necessary to use the sodium thiosulfate component of the cyanide antidote kit. The antidotal efficacy of nitrite therapy is controversial, but is currently recommended if it can be started shortly after exposure. The usefulness of nitrite therapy given beyond the first few minutes after exposure is questionable. There is only anecdotal evidence that nitrite therapy is effective, and victims of hydrogen sulfide poisoning have survived without sequelae after supportive care alone. Nitrite therapy should not be allowed to interfere with the establishment of adequate ventilation and oxygenation.

Basic Decontamination

Patients who are able may assist with their own decontamination. Remove and double-bag contaminated clothing and personal belongings,

Handle frostbitten skin and eyes with caution. Place frostbitten skin in warm water, about 108 °F (42 °C). Let the circulation reestablish itself naturally. Encourage the victim to exercise the affected part while it is being warmed.

Flush exposed skin and hair with plain water for 5 minutes, preferably under a shower. Use caution to avoid hypothermia when decontaminating children or the elderly. Use blankets or warmers when appropriate.

Do not irrigate frostbitten eyes. Otherwise, irrigate exposed eyes for at least 5 minutes. Remove contact lenses if easily removable without additional trauma to the eye. An ophthalmic anesthetic may be necessary to alleviate blepharospasm, and lid retractors may be required to allow adequate irrigation under the eyelids. Continue irrigation while transporting the patient to the Critical Care Area.

Critical Care Area

Be certain that appropriate decontamination has been carried out (see *Decontamination Area* above).

ABC Reminders

Evaluate and support airway, breathing, and circulation as in *ABC Reminders* above. Children may be more vulnerable to corrosive agents than adults because of the smaller diameter of their airways. Establish intravenous access in seriously symptomatic patients. Continuously monitor cardiac rhythm.

Patients who are comatose, hypotensive, or have seizures or cardiac arrhythmias should be treated in the conventional manner.

Inhalation Exposure

Administer supplemental oxygen by mask to patients who have respiratory symptoms. Treat patients who have bronchospasm with aerosolized bronchodilators. The use of bronchial sensitizing agents in situations of multiple chemical exposures may pose additional risks. Consider the health of the myocardium before choosing which type of bronchodilator should be administered. Cardiac sensitizing agents may be appropriate; however, the use of cardiac sensitizing agents after exposure to certain chemicals may pose enhanced risk of cardiac arrhythmias (especially in the elderly). Hydrogen sulfide poisoning is not known to pose additional risk during the use of bronchial or cardiac sensitizing agents.

Consider racemic epinephrine aerosol for children who develop stridor. Dose 0.25–0.75 mL of 2.25% racemic epinephrine solution in 2.5 cc water, repeat every 20 minutes as needed, cautioning for myocardial variability.

Observe patients for 24 hours, repeating appropriate tests and chest examinations as needed. Follow-up as clinically indicated.

Skin Exposure

If concentrated hydrogen sulfide was in contact with the skin, chemical burns may result; treat as thermal burns. If the liquefied compressed gas is released and contacts the skin, frostbite may result. If a victim has frostbite, treat by rewarming affected areas in a water bath at a temperature of 102 to 108 °F (40 to 42 °C) for 20 to 30 minutes and continue until a flush has returned to the affected area.

Eye Exposure

Continue irrigation for at least 5 minutes. Test visual acuity. Examine the eyes for corneal damage and treat appropriately. Immediately consult an ophthalmologist for patients who have severe corneal injuries.

Antidotes and Other Treatments

Nitrite therapy (found in the cyanide antidote kit) has been suggested as a therapy for hydrogen sulfide exposure. Amyl nitrite is given by inhalation (for 30 seconds every minute until an intravenous line is established) followed by intravenous sodium nitrite (**300 mg over absolutely no less than 5 minutes**). This may aid recovery by forming sulfmethemoglobin, thus removing sulfide from combination in tissue. It is not necessary to use the sodium thiosulfate component of the cyanide antidote kit. The antidotal efficacy of nitrite therapy is controversial, but is currently recommended if it can be started shortly after exposure. The usefulness of nitrite therapy given beyond the first few minutes after exposure is questionable. There is only anecdotal evidence that nitrite therapy is effective, and victims of hydrogen sulfide poisoning have survived without sequelae after supportive care alone. Nitrite therapy should not be allowed to interfere with the establishment of adequate ventilation and oxygenation.

Hyperbaric oxygen therapy is controversial and based on anecdotal evidence. It may be effective for patients with persistent coma in whom other treatments are unsuccessful.

Laboratory Tests

Routine laboratory studies for all symptomatic exposed patients include CBC, blood glucose, and electrolyte determinations. Additional studies for patients exposed to hydrogen sulfide include ECG monitoring and renal-function tests. Chest radiography and pulse oximetry (or ABG measurements) may be helpful in cases of inhalation exposure. If nitrites are used, check methemoglobin levels.

Disposition and Follow-up

Delayed Effects

Patients who are unconscious or hypotensive should be observed closely for complications including post-hypoxic encephalopathy. Because pulmonary edema may be delayed in onset, patients seriously exposed by inhalation should be monitored for 24 hours. If pulmonary edema is suspected, admit patients to an intensive care unit.

Patient Release

Asymptomatic patients who have no evidence of pulmonary edema or CNS or respiratory compromise and no signs of eye irritation may be discharged after 4 to 6 hours of observation with instructions to seek medical care promptly if symptoms develop (see the *Hydrogen Sulfide—Patient Information Sheet* below).

Follow-up

Obtain the name of the patient's primary care physician so that the hospital can send a copy of the ED visit to the patient's doctor.

Patients exposed to hydrogen sulfide should be monitored for heart and brain injuries, including evaluation for neurologic deficits.

Patients who have skin or corneal injury should be re-examined within 24 hours.

Reporting

If a work-related incident has occurred, you may be legally required to file a report; contact your state or local health department.

Other persons may still be at risk in the setting where this incident occurred. If the incident occurred in the workplace, discussing it with company personnel may prevent future incidents. If a public health risk exists, notify your state or local health department or other responsible public agency. When appropriate, inform patients that they may request an evaluation of their workplace from OSHA or NIOSH. See Appendices III and IV for a list of agencies that may be of assistance.

Hydrogen Sulfide
Patient Information Sheet

This handout provides information and follow-up instructions for persons who have been exposed to hydrogen sulfide.

What is hydrogen sulfide?
Hydrogen sulfide is an extremely rapidly acting, highly toxic, colorless gas with a rotten-egg odor. It is produced naturally by decaying organic matter and is released from sewage sludge, liquid manure, sulfur hot springs, and natural gas. It is used in several industries and is a by-product of many industrial processes such as oil refining, mining, and rayon manufacturing.

What immediate health effects can result from hydrogen sulfide exposure?
Even in small amounts, hydrogen sulfide has a strong rotten-egg odor. However, with continued exposure and at high levels, the poison may deaden a person's sense of smell. If the rotten egg odor is no longer noticeable, it may not necessarily mean that exposure has stopped.

After a serious exposure, symptoms usually begin immediately. At low levels, hydrogen sulfide causes irritation of the eyes, nose, and throat. Moderate levels can cause headache, dizziness, nausea, and vomiting, as well as coughing and difficulty in breathing. Higher levels can cause shock, convulsions, coma, and death. Generally, the more serious the exposure, the more severe the symptoms.

Can hydrogen sulfide poisoning be treated?
There is no proven antidote for hydrogen sulfide poisoning, but the effects of hydrogen sulfide can be treated and some exposed persons get well. Persons who have had serious exposures may need to be hospitalized.

Are any future health effects likely to occur?
A single small exposure from which a person recovers quickly is not likely to cause delayed or long-term effects. Moderate exposure can cause residual damage and a serious exposure that causes coma or convulsions may damage the brain and heart.

What tests can be done if a person has been exposed to hydrogen sulfide?
Specific tests for the presence of hydrogen sulfide in blood and urine generally are not useful to the doctor. If a severe exposure has occurred, blood and urine analyses and other tests may show whether the brain, nerves, heart, or kidneys have been injured. If hydrogen sulfide was inhaled, blood tests and a chest x-ray may be necessary to determine if the lungs have been injured. Testing is not needed in every case.

Where can more information about hydrogen sulfide be found?
More information about hydrogen sulfide can be obtained from your regional poison control center; your state, county, or local health department; the Agency for Toxic Substances and Disease Registry (ATSDR); your doctor; or a clinic in your area that specializes in occupational and environmental health. If the exposure happened at work, you may wish to discuss it with your employer, the Occupational Safety and Health Administration (OSHA), or the National Institute for Occupational Safety and Health (NIOSH). Ask the person who gave you this form for help in locating these telephone numbers.

Follow-up Instructions

Keep this page and take it with you to your next appointment. Follow *only* the instructions checked below.

[ ] Call your doctor or the Emergency Department if you develop any unusual signs or symptoms within the next 24 hours, especially:
- coughing, wheezing, difficulty breathing, or shortness of breath
- chest pain or tightness
- stomach pain, or vomiting
- headache
- increased redness or pain or a pus-like discharge in the area of a skin burn

[ ] No follow-up appointment is necessary unless you develop any of the symptoms listed above.
[ ] Call for an appointment with Dr. _____ in the practice of _____. When you call for your appointment, please say that you were treated in the Emergency Department at _ _____ Hospital by _____ and were advised to be seen again in _____ days.
[ ] Return to the Emergency Department/ _____ Clinic on (date) _____at ___ _____ AM/PM for a follow-up examination.
[ ] Do not perform vigorous physical activities for 1 to 2 days.
[ ] You may resume everyday activities including driving and operating machinery.
[ ] Do not return to work for _____ days.
[ ] You may return to work on a limited basis. See instructions below.
[ ] Avoid exposure to cigarette smoke for 72 hours; smoke may worsen the condition of your lungs.
[ ] Avoid drinking alcoholic beverages for at least 24 hours; alcohol may worsen injury to your stomach or have other effects.
[ ] Avoid taking the following medications: _____
[ ] You may continue taking the following medication(s) that your doctor(s) prescribed for you: __
_____
_____
[ ] Other instructions: _____
_____
_____

- Provide the Emergency Department with the name and the number of your primary care physician so that the ED can send him or her a record of your emergency department visit.

- You or your physician can get more information on the chemical by contacting: _____ _____ or _____, or by checking out the following Internet Web sites: _____; _____.

Signature of patient _____ Date _____

Signature of physician _____ Date _____

ATTACHMENT C
CRI INSPECTION REPORT FORM

Controlled Recovery, Inc. (CRI)
WEEKLY INSPECTION REPORT

Date: _____ **Print Name:** _____

Signature: _____

Inspection will be in accordance with NMOCD operational conditions.

Item	Satisfactory	Action Required
Signs at each entrance		
Berms and outside pond levees		
Tank Labels		
Sumps		
Pit & Pond levels one-foot free board		
Free oil on Pits-Ponds		
Pit and Pond condition		
Pit and Pond marker numbers		
Treating Plan inspection		
Solid waste area inspection		
Blowing trash		
Fences and Gates		
Leak detection sumps - Truck wash - Liquid present?		(Monthly analysis required if yes)
Leak detection sumps - SWD - Liquid present?		(Monthly analysis required if yes)

***Comments & Repairs:** _____

_____

_____

H2S

READINGS ARE TO BE TAKEN 4' DOWNWIND FROM PIT

Pit (readings in ppm):

(AA) **(A)** **(B)** **(C)** **(D)**

*In the event that a reading of 10 ppm is registered at CRI's facility, CRI personnel will evacuate the area and CRI will monitor H2S levels at the downwind boundary of the facility. If H2S levels reach 20 ppm, the facility will be closed and notification will be given to the following:

CRI Office	393-1079
New Mexico State Police	392-5588
Lea County Sheriff	397-7546
NMOCD Hobbs	393-6161
NMOCD Santa Fe	476-3440

Receipt & Approval

Name: _____

Date: _____

Updated August 29, 2007

ATTACHMENT D
CRI INCIDENT REPORT FORM

CRI INCIDENT REPORT FORM

Type of Incident and General Information

- ❑ Work related Injury / Illness
- ❑ Property Damage
- ❑ Vehicular Accident
- ❑ Break/Leak/Spill/Release*
- ❑ Fire/Blowout*
- ❑ Unsafe Act / Near Miss
- ❑ Vandalism / Criminal Activity
- ❑ Other _____

Employee Name: _____ Job Title: _____

Date of Incident: _____ Time of Incident: _____ AM/PM

Location of Incident: _____

Unit# _____ Start of Shift:_____Weather:_____

Date and Time Reported to Management : Date:_____ Time:_____ AM/PM

Reported to: _____ Title:_____ Reported by:_____

Reported to OCD: _____ Title:_____ Reported by:_____

**For an unauthorized release >5 barrels but <25 barrels, must provide timely written notification (Form C-141) to OCD (15 days). If > 25 barrels, must provide both immediate verbal (24 hrs.) and timely written notification (Form C-141) to OCD (15 days).*

Reported to NMED: _____ Title:_____ Reported by:_____

What was the injury category of incident at the time it was first reported to management ?

- [ ] N/A. Employee does not claim an injury associated with this incident
- [ ] Notice Only of Injury, Declined Medical Treatment at this time
- [ ] First Aid done on site, Declined Medical Treatment at this time
- [ ] Medical Treatment. Transported by _____ to _____
- [ ] Fatality, Employee

Employee's Description of Incident / Declaración del empleado de los hechos

THIS SECTION FILLED OUT BY EMPLOYEE (as applicable)

Were you injured? *(Ud. se lastimó ?)* **Yes [ ] No [ ]**

Type of Injury: *(Tipo de lesión)* _____

Part of Body:_____ Left_____ Right_____
(Parte del cuerpo) *(Izq)* *(Der)*

Explain in your own words what happened. *(Explique en sus propias palabras lo que sucedió)*

_____

_____

_____

_____

_____

Employee Signature: (*Firma del empleado*) :_____

Date: (*Fecha*) _____

Revision 09/04/07

TO BE FILLED OUT BY CRI ACCIDENT INVESTIGATOR

Describe in order of occurrence the events leading to the accident and/or injury. Reconstruct the sequence of events that led to the accident.

_____
_____
_____
_____
_____
_____
_____
_____

Witnesses / Bystanders / Co-workers **Yes [ ]** **N/A (No Witnesses) [ ]**

Name: _____ Address: _____
Phone: _____ Workplace: _____
Was a Written Statement Obtained ? Yes [ ] No [ ]

Name: _____ Address: _____
Phone: _____ Workplace: _____
Was a Written Statement Obtained ? Yes [ ] No [ ]

Investigated by: _____ (CRI Employee)

Title: _____ Date: _____ Department: _____

CORRECTIVE ACTIONS. (Equipment, Practices, Environment, Retraining) Steps that have been, or will be taken to prevent recurrence:

_____
_____
_____
_____
_____

Corrective Action Completed ? □ YES Date Completed:_____

- I have been briefed on the corrective actions outlined above
- *Estoy consciente de las acciones correctivas mencionadas anteriormente en esta hoja*

_____
Employee's Signature / Date

REPORT REVIEWED AND CONCLUDED BY:

_____
Immediate Supervisor's Signature / Date

_____
Employee's Manager's Signature / Date

ATTACHMENT E

OCD - RELEASE NOTIFICATION AND CORRECTIVE ACTION

FORM C-141

District I
1625 N. French Dr., Hobbs, NM 88240
District II
1301 W. Grand Avenue, Artesia, NM 88210
District III
1000 Rio Brazos Road, Aztec, NM 87410
District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505

State of New Mexico
Energy Minerals and Natural Resources

Oil Conservation Division
1220 South St. Francis Dr.
Santa Fe, NM 87505

Form C-141
Revised October 10, 2003

Submit 2 Copies to appropriate District Office in accordance with Rule 116 on back side of form

Release Notification and Corrective Action

OPERATOR

☐ Initial Report ☐ Final Report

Name of Company	Contact
Address	Telephone No.
Facility Name	Facility Type

Surface Owner	Mineral Owner	Lease No.

LOCATION OF RELEASE

Unit Letter	Section	Township	Range	Feet from the	North/South Line	Feet from the	East/West Line	County

Latitude_____ **Longitude**_____

NATURE OF RELEASE

Type of Release	Volume of Release	Volume Recovered
Source of Release	Date and Hour of Occurrence	Date and Hour of Discovery
Was Immediate Notice Given? ☐ Yes ☐ No ☐ Not Required	If YES, To Whom?	
By Whom?	Date and Hour	
Was a Watercourse Reached? ☐ Yes ☐ No	If YES, Volume Impacting the Watercourse.	

If a Watercourse was Impacted, Describe Fully.*

Describe Cause of Problem and Remedial Action Taken.*

Describe Area Affected and Cleanup Action Taken.*

I hereby certify that the information given above is true and complete to the best of my knowledge and understand that pursuant to NMOCD rules and regulations all operators are required to report and/or file certain release notifications and perform corrective actions for releases which may endanger public health or the environment. The acceptance of a C-141 report by the NMOCD marked as "Final Report" does not relieve the operator of liability should their operations have failed to adequately investigate and remediate contamination that pose a threat to ground water, surface water, human health or the environment. In addition, NMOCD acceptance of a C-141 report does not relieve the operator of responsibility for compliance with any other federal, state, or local laws and/or regulations.

Signature:	OIL CONSERVATION DIVISION	
Printed Name:	Approved by District Supervisor:	
Title:	Approval Date:	Expiration Date:
E-mail Address:	Conditions of Approval:	Attached ☐
Date: Phone:		

* Attach Additional Sheets If Necessary

19.15.3.116 RELEASE NOTIFICATION AND CORRECTIVE ACTION

A. Notification

(1) The division shall be notified of any unauthorized release occurring during the drilling, producing, storing, disposing, injecting, transporting, servicing or processing of crude oil, natural gases, produced water, condensate or oil field waste including Regulated NORM, or other oil field related chemicals, contaminants or mixture thereof, in the State of New Mexico in accordance with the requirements of Section 116 of 19.15.3 NMAC.

(2) The division shall be notified in accordance with Section 116 of 19.15.3 NMAC with respect to any release from any facility of oil or other water contaminant, in such quantity as may with reasonable probability be detrimental to water or cause an exceedance of the standards in Section 19, Subsection B, Paragraphs (1) and (2) or (3) of 19.15.1 NMAC.

B. Reporting Requirements. Notification of the above releases shall be made by the person operating or controlling either the release or the location of the release in accordance with the following requirements: **(1)** A Major Release shall be reported by giving both immediate verbal notice and timely written notice pursuant to Subsection C, Paragraphs (1) and (2) of 19.15.3.116 NMAC. A Major Release is:

(a) an unauthorized release of a volume, excluding natural gases, in excess of 25 barrels;

(b) an unauthorized release of any volume which:

(i) results in a fire;

(ii) will reach a water course;

(iii) may with reasonable probability endanger public health; or

(iv) results in substantial damage to property or the environment;

(c) an unauthorized release of natural gases in excess of 500 mcf; or

(d) a release of any volume which may with reasonable probability be detrimental to water or cause an exceedance of the standards in Section 19, Subsection B, Paragraphs (1) and (2) or (3) of 19.15.1 NMAC.

(2) A Minor Release shall be reported by giving timely written notice pursuant to Subsection C, Paragraph (2) of 19.15.3.116 NMAC. A Minor Release is an unauthorized release of a volume, greater than 5 barrels but not more than 25 barrels; or greater than 50 mcf but less than 500 mcf of natural gases.

C. Contents Of Notification

(1) Immediate verbal notification required pursuant to Subsection B of 19.15.3.116 NMAC shall be reported within twenty-four (24) hours of discovery to the division district office for the area within which the release takes place. In addition, immediate verbal notification pursuant to Subsection B, Paragraph (1), Subparagraph (d) of 19.15.3.116 NMAC shall be reported to the division's Environmental Bureau Chief. This notification shall provide the information required on division Form C-141.

(2) Timely written notification is required to be reported pursuant to Subsection B of 19.15.3.116 NMAC within fifteen (15) days to the division district office for the area within which the release takes place by completing and filing division Form C-141. In addition, timely written notification required pursuant to Subsection B, Paragraph (1), Subparagraph (d) of 19.15.3.116 NMAC shall also be reported to the division's Environmental Bureau Chief within fifteen (15) days after the release is discovered. The written notification shall verify the prior verbal notification and provide any appropriate additions or corrections to the information contained in the prior verbal notification.

D. Corrective Action. The responsible person must complete division approved corrective action for releases which endanger public health or the environment. Releases will be addressed in accordance with a remediation plan submitted to and approved by the division or with an abatement plan submitted in accordance with Section 19 of 19.15.1 NMAC.

[1-1-50...5-22-73...2-1-96; A, 3-15-97; 19.15.3.116 NMAC - Rn, 19 NMAC 15.C.116, 11-15-01]

ATTACHMENT F

GAS SAFETY MANAGEMENT DETERMINATION

(505) 867-6990 **GORDON ENVIRONMENTAL, INC.** 213 S. Camino del Pueblo
(505) 867-6991 Fax *Consulting Engineers* Bernalillo, New Mexico 87004

September 14, 2007
(Updated April 20, 2009

Mr. Shawn Patterson
Controlled Recovery, Inc.
P. O. Box 388
Hobbs, NM 88241

Re: Controlled Recovery, Inc. [139.02.02]
Gas Safety Management Plan [§19.15.36.13.0]

Dear Mr. Patterson;
Gordon Environmental, Inc. (GEI) is an engineering firm that specializes in the design, permitting, and compliance of landfills in New Mexico. GEI has been instrumental in the updates to New Mexico's regulations under the Oil Conservation Division (OCD), Solid Waste Bureau, and Air Quality Bureau for land disposal facilities. We specifically provided technical comments and testimony regarding the management of "landfill gas" at hearings on the proposed regulations on the above-referenced subsection.

As requested by CRI, we have reviewed the waste streams accepted for processing and disposal at its approved facility as they pertain to the potential for the generation of landfill gases. Our review included an on-site inspection by GEI personnel on July 2 and 3, 2007; and a two-week inventory conducted during July, 2007. Based on our review, the waste types are not putrescible, being comprised primarily of soils and inert materials, and are not subject to significant aerobic or anaerobic decomposition.

Under the "Title V" Air Quality regulations, non-putrescible materials are subtracted from the waste mass for gas generation potential. Inert wastes are also excluded from the gas management requirements of NMED's Solid Waste Regulations. In summary, GEI's conclusions are that the waste types accepted at CRI do not represent a potential source of landfill gas during the operational or post-closure care period for the land disposal units. CRI will comply with the requirements of §19.15.36.8.C.(8) and §19.15.11 (Section 4.1.3, Contingency Plan, Recodification: April 20, 2009) pertaining to hydrogen sulfide prevention and contingency planning.

Very truly yours,
Gordon Environmental, Inc.

I. Keith Gordon, P.E.
Principal

Dacia Tucholke
Project Scientist