

Remtech Engineer's News Flash

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Emergency Response & Site Remediation Specialists



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Remtech is committed to providing quality and cost-effective emergency response and site remediation contracting & engineering services. Remtech's goal is to minimize environmental damage and claims by applying innovative engineering technologies to preserve the world's resources for future generations. Remtech publishes this newsletter on a periodic basis to keep clients and friends informed. For current information on Remtech's turnkey site remediation products and services visit our website at www.remtech-eng.com.

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What's New?

New Equipment Additions

Remtech added two (2) 3,000 gallon XR-5 pillow tanks for emergency spill containment. Pillow tanks are pre-rolled with a geotechnical fabric to prevent punctures. These tanks can be deployed in rough terrain and difficult access areas in less than 20 minutes on most applications. Solvents, acids, and bases can be stored in these tanks for periods up to several months. Remtech currently maintains over 32,000 gallons of temporary storage capacity with its all-terrain vacuum tankers, and temporary storage tanks



3,000 gallon Pillow Tank Waste Storage

HC-2000 Developments

Gasoline Bio-Fence Cleanup - A gasoline tanker rolled over in a sandy drainage area in southern Georgia releasing over 2,300 gallons. The impacted area occurred on a tree farm. The aerial extent of contamination covered approximately one acre. Remtech installed three bio-fence reactors consisting of 30 injection points and an automated watering system for weekly HC-2000 applications. Following three months of treatment, groundwater concentrations for benzene, ethylbenzene, toluene, and total xylenes were reduced by 90, 98, 83, and 87% respectively. Gasoline recoverable organics were reduced up to 90% during the same period. Treatment will continue until state regulatory limits are met.



HC-2000 Bio-Fence System at Tree Farm

Recent Projects Completed

Power Plant Stormwater Treatment

5,000 gallons of solvent contaminated stormwater were treated below drinking water criteria with Remtech's Mobile Treatment System. The treatment train consists of an oil/water separator, twin air strippers, and twin activated carbon filters and is capable of treating over 30,000 gallons per day of wastewater. Treatment removal efficiencies exceeded 97% for cyclohexanone, ethylbenzene, MEK, and xylene.



Remtech Treatment System at Power Plant

Dye Removal from Stormwater Retention Basin

Remtech's Mobile Diatomaceous Earth (DE) and Activated Carbon Filtration (AC) System (36,000 gpd capacity) removed blue water soluble organic dye from 2,000 gallons of stormwater at a truck facility retention basin. Bench scale color removal tests indicated that diatomaceous earth and carbon filtration provided superior color removal than peroxide or bleach oxidization, acidification or filtration.



Remtech DE & AC Color Removal System

Feature Article

Roles & Responsibilities of Hazmat Contractors in Clearing Interstate/Highway Incidents (1)

INTRODUCTION

Traffic accidents and the time to clear them play a major role in traffic delays and congestion in metropolitan areas. The HAZMAT contractor needs to have a clear understanding of the responsibilities and roles to accelerate clearing of HAZMAT incidents from the interstate/highway system to protect the public health and safety of the motoring public and response community.

CONTRACTOR ROLES & RESPONSIBILITIES

Contractor Responsibilities

The contractor's primary responsibility is to remove and prevent additional hazardous material releases in a safe, rapid, and efficient manner. The appropriate resources are accident specific, but include experienced personnel, appropriate personal protective equipment, environmental surveillance instrumentation, and cleanup materials and equipment. Secondary responsibilities involve practicing good stewardship of DOT and responsible party assets that is measured by minimizing financial and environmental impacts.

Contractor Roles

The contractor's role is to quickly integrate into the incident command system, which includes communication systems, site safety practices, and organizational structure. The contractor confirms the hazard assessment and prepares a remediation work plan. The contractor should also document the root cause and prepare an incident response report to satisfy regulatory reporting requirements.

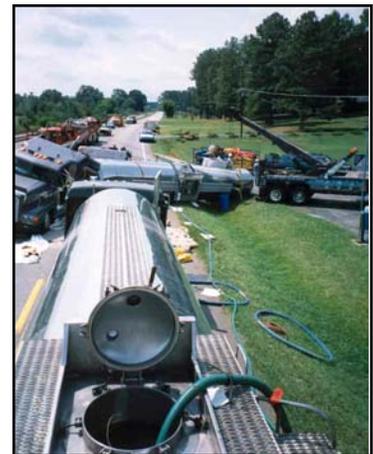
CONTRACTOR DELAY FACTORS

Typical Administrative Delays

Valuable time can be lost by delayed contractor notification and contract authorization from the responsible party. It is often difficult to contact an authorized responsible party representative to engage a contractor. Insurance companies



Who's In Charge?



Tanker Transload Prevents Rupture

(1) Presented at the Traffic Incident Management Enhancement Task Force (TIME) Meeting, Transportation Management Center, Atlanta, Georgia, June 19, 2003

and responsible parties frequently attempt to control responses since they are paying for the cleanup. Many companies attempt to shift the liability and cleanup costs to a third party who is responsible for the release. Liability subrogation should be handled after the incident and not delay a timely response.

Limited Pool of Experienced Personnel - Hazardous material incidents usually involve the simultaneous occurrence of two or more unlikely events. Turnover and rotation also minimizes the accumulation of an experienced personnel pool. Lessons learned are seldom shared in an interagency forum. Currently there are no accredited universities or colleges that offer degrees in hazardous materials science or engineering. Several professional organizations certify individuals and contractors who have acquired an appropriate educational background and have demonstrated practical experience with hazardous materials and hazardous waste management. The American Academy of Environmental Engineers offers a specialty certification in Hazardous Waste Management, the Academy of Certified Hazardous Materials Managers certifies Hazardous Material Managers, and Chemtrec provides a chemical industry peer reviewed process for selecting Chemnet contractors. Short courses include; Hazwopper and Incident Commander Training offered by various public institutions and private entities. The experience, integrity, and success record of a response contractor can be confirmed by performing background reference checks with past clients, checking environmental compliance records, OSHA safety records, and a contractor's fiscal viability. Ultimately, the experience and integrity of the contractor's manager will determine the success or failure of a timely and effective response effort.

Conflicting Agency Agendas/Objectives - With State and Federal budgets limited, there is often a need to involve the responsible party in assuming financial responsibility to mitigate an incident. Insurance companies frequently attempt to limit or avoid claims. Oftentimes, the responsible party does not have coverage that includes environmental cleanups. The owner of the transport may attempt to influence a response action by focusing on protecting his equipment while not considering overall public safety and environmental impacts.

Each responding agency has its own well-intended and singularly valid agenda. The Department of Transportation's objective includes opening the traffic corridor to restore safe traffic flows as soon as possible. The fire department focuses on setup of the Incident Command System, incident assessment, isolation, and containment. Environmental regulatory agencies target protection and cleanup of the environment. With the advent of terrorism, Homeland Security, State and Federal Bureaus of Investigation have also added organizational complexity to response management systems.

Other Factors - Type A personalities of response personnel and jurisdictional disputes over who's in charge can reduce the effectiveness of a response effort significantly.

Typical Operational Delays

The success of an emergency response depends on; an accurate site assessment; definition of what and how much was released, where the release occurred, delineation of pathways available to transport the release, and identification of the receptors that may be affected by the release. When a material is released from a container, it reacts with the environment and other chemicals and may have substantially different properties from the original material. How much is spilled is generally difficult to determine at the onset of an incident. Leaks can occur in the middle of a load, through the bottom of a container, or migrate through the ground or sewer. Thermal imaging and acoustical resonance techniques can be used to assist in determining if a container is empty or full. Mass balances can also be used to estimate the amount of material released.

The structural integrity of containers involved in a transportation accident is unknown. Care should be exercised to minimize stresses and minimize additional release potentials. Products should be transferred (pumped) wherever possible rather than lifting containers (especially tankers). The structural stability of highway structures (bridges), roadways, and the ground around an incident should also be investigated and integrated into a safe highway clearing plan.



Runoff from Tanker Fire Penetrates Soil

SUGGESTIONS TO ACCELERATE CONTRACTOR RESPONSE

Road Map to Success

- Establish Command & Authority
- Select Contractor Based on Experience, Available Resources & Response Time
- Rapid Authorization & Notification
- Integrated Communications & Operations
- Resolve Problem Safely, Quickly & Efficiently

Creating Unified Incident Command System - An experienced response contractor places stewardship of public health and safety first and protection of the environment second. A contractor's responsibility includes assisting authorities with developing a remediation plan to resolve the incident. Participative management is an effective way to gain cooperation of regulatory authorities on scene. A successful technique used by the authors is to involve the DOT, EPA, DNR, and Fire Department in a joint assessment, and evaluation and selection of the remedial alternative.

Early Notification & Authorization - Early notification and authorization of a contractor are frequently a problem when the responsible party (corporate safety personnel) or his insurance company cannot be contacted in a timely fashion. Authorities on scene should verify response times, availability, and that appropriate resources are available to respond to the incident. Chemtrec (800-424-9300) can assist with locating the responsible party, locating a qualified contractor, or providing technical assistance on material specific response procedures. To initiate the process all that is required is the name of the carrier and location of the incident. (Mr. Carl Reynolds, Chemtrec Managing Director, telecon June 13, 2003).

Another resource is the State emergency response agency, which may have a budget to authorize a contractor. The Federal EPA can authorize a contractor and recover damages and levy enforcement action against the responsible party. For example, Dr. Bert Langley (Georgia Emergency Response Unit Chief) and his staff can provide technical assistance over the phone (404-656-4863 or 800-241-413) or assist with initial site assessments (Telecon June 13, 2003). Many contractors know who their clients are and have alternative contacts to obtain authorization. Responsible parties are generally aware of reputable contractors, have a list of qualified contractors, and realize that availability of a contractor may dictate who responds.

Integrated Communications - Good communications with all parties from the onset of an incident provides a sound basis for a successful response. Communications should be maintained with responsible parties and authorities on scene so that they are kept informed of incident resolution progress. Radio phones can interface with some state regulators. Exchanging radios and use of cell phones can bridge communications with other response parties.

PROJECT PROFILES & LESSONS LEARNED

No response effort is flawless. There are always lessons that can be learned to improve future responses. Six (6) project profiles are presented herein to illustrate how some of the problems outlined above can be resolved and minimized in the future.

Gasoline Tanker Explosion

A gasoline tanker (carrying approximately 7,800 gallons of unleaded gasoline) traveling on a highway in central Georgia overturned, struck a power pole, and exploded near a water line. The driver was injured and a youth was thrown from the tractor cab and died at the scene. The fire burned for approximately two hours and could be seen for two miles. The local fire department controlled the spread of the fire with water and foam before it was extinguished by an airport crash truck.

Fuel remaining in the rear compartments was too hot to transfer (150°F) eleven hours after the fire was extinguished. The front compartment contained 2,500 gallons of fuel, which was cool enough to transfer. 2,300 pounds of ice were placed in the rear compartments that facilitated transfer of the remaining 1,000 gallons of fuel.



Gasoline Tanker Explosion

Lessons Learned Included:

- Earlier contractor notification to prepare plan for transfer and site remediation
- Reduce fuel core temperatures prior to pumping with Ice.
- Water and foam applied to fire increased the vertical penetration of fuel.
- Gasoline migrates rapidly through soils to groundwater.

Cyanide & Acid Tractor Trailer Incident

A tandem tractor-trailer carrying potassium cyanide and acids jackknifed and rolled over on an interstate. Concern was expressed for the formation of hydrogen cyanide if the acids came in contact with the cyanide. A HAZMAT team located one of the cyanide containers in the rear of the second trailer. Visibility difficulties were experienced with Level A PPE lenses fogging up. A second entry was made with the contractor in Level B PPE. The four (4) containers of potassium cyanide were extracted intact and not leaking.

Cargo from the rear trailer was off-loaded onto a second trailer with contractor and carrier personnel in less than 45 minutes. Several pallets of heavy freight were left on the trailer and righted with a tow truck. Air bags were requested by the DOT. The front trailer and tractor were lifted with air bags and righted with two wreckers 3.5 hours later. Cargo was off-loaded with a telescoping forklift.

Lessons Learned Included:

- Earlier contractor notification.
- The position of the two trailers obstructed access to determine if acids had leaked in the rear trailer.
- Human chain and an articulating forklift were effective transloading tools.
- Sliding the front trailer towards the center lane and off loading on the ground may have cleared the incident and/or opened additional lanes sooner than using air bags.
- Cyanide Package Recognition – First Responders had difficulty recognizing laboratory chemical packaging and labeling, due, in part, to obstructed vision created by face pieces fogging up in Level A PPE.

Acid Tanker Rollover

A tanker transporting 5,000 gallons of Waste Corrosive Liquids (hydrofluoric, phosphoric, and nitric acids) rolled-over on an interstate access ramp. The tanker struck large riprap next to a bridge abutment. Approximately 50 gallons of acid were observed on the interstate and the tanker was presumed full by first responders who attempted to locate a second tanker for transloading. Waste profile information was obtained indicating that the shipment was a dilute acid cleaning solution from a semi conductor manufacturing operation with trace level heavy metals.

A joint assessment was performed by the contractor, DOT, Fire Department, and GA DNR officials. It was determined that the tanker's contents had been released on impact. A stormwater drop inlet under the riprap conveyed spill residues into a National Park Service stream.



Tandem Tractor Trailer Flips over on Interstate



Face Pieces Fog Up In Level A PPE



Composite Acid Tanker Ruptures on Impact



Acid Transferred with Poly Diaphragm Pump

Acid gas measurements near the tanker reduced the hazard corridor to the DOT ROW allowing traffic lanes to be opened. An all-terrain vacuum tanker was used to pump 150 gallons of acid remaining in the tanker. A towing company righted the tanker and removed it from the scene. Regulatory authorities approved neutralization of acidic soils with soda ash. This approach was deemed safer than excavation and backfilling. Structural impacts to bridge footings were controlled and truck movement onto the highway was avoided. DOT plantings in the soil neutralization area under the bridge showed no impact several years after the incident.

Lessons Learned Included:

- Quicker contractor notification.
- Load Released on Impact – Approximately 5 hours elapsed prior to making this determination.
- Identify Stormwater Drainage Pathways – Earlier identification of this pathway would have facilitated recovery of additional spill residues.
- The acid spilled was dilute rather than concentrated. Obtaining waste profile information and acid gas measurements collapsed hazard corridors to the ROW.
- Neutralization of soils in place was permitted by regulatory authorities with no lane closure required.

Interstate Tanker Fire (diesel and gasoline)

A DOT HERO unit requested assistance of a cleanup contractor to respond to a gasoline tanker fire. The tanker had been allowed to burn to minimize environmental impacts. A small amount of diesel fuel remained in bottom of the tanker. These residues were pumped into a 250-gallon bladder and cooled by a water spray from the fire department. Liquid burn residues were pumped from the bladder into metal drums.

Burn residues and sharp debris were removed from the pavement with a power broom and placed in one-cubic yard supersacks. Stormwater runoff pathways from the bridge were inspected and no significant environmental impacts were found. The bridge concrete and steel support members were severely damaged by the fire, requiring emergency bridge repairs and the closing of three lanes for several weeks.

Lessons Learned Included:

- Let it Burn Minimized Environmental Impacts
- Dissipated residual fuel heat in pillow tank with water spray from the Fire Department
- Road Hazard Removal – small metallic debris removed with power broom & packaged in supersacks

JP-8 Tanker Rollover

A tanker carrying 8,000 gallons of JP-8 rolled over on an interstate, struck the guardrail, and slid down a sharp embankment shearing several trees. The insurance company for the tanker line retained a contractor to monitor the response activities of another contractor who showed up on the scene. The insurance company permitted the initial contractor to complete product transfer operations prior to turning the project over to their preferred contractor. 5,400 gallons of JP-8 were transferred into a second tanker, leaving an estimated spill volume of 2,700 gallons.



Tanker fire on Major Interstate Overpass



Tanker Carcass Removal Operations



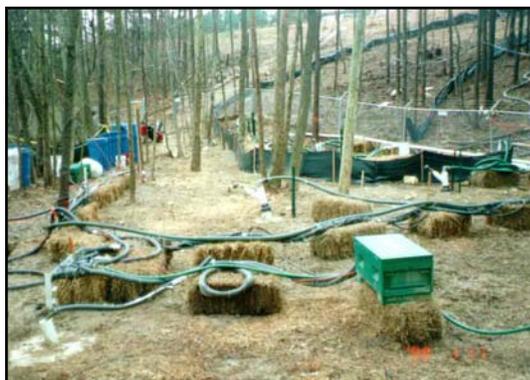
JP-8 Tanker Roll Over on Major Interstate

The spill area was located in the immediate drainage area of stream, which drained to a lake. The insurance company decided to treat the spill in place rather than excavate soils. Site excavation could potentially destabilize the interstate bank and streambed. In place treatment would also minimize interferences with interstate traffic flows.

A proprietary bioremediation enzyme accelerator (HC-2000) was used to treat the soils and groundwater in place. Total Petroleum Hydrocarbon concentrations were reduced by up to 98% and groundwater TPH concentrations were reduced by over 94%.

Lessons Learned Included:

- The insurance company selected the contractor.
- The response time for the product transfer contractor was delayed four (4) hours due to rush hour traffic.
- Insitu treatment was selected by the Insurance Company to prevent highway or stream destabilization.
- Remediation costs were reduced 50% using enzyme treatment over shoring, excavation, and backfilling.
- Traffic interruption was minimized during remediation with onsite treatment.



HC-2000 Bioremediation System in DOT ROW

Diesel Tanker Rollover

A tanker traveling on a highway carrying 7,600 gallons of low sulfur No. 2 diesel rolled over into a marsh area and released 2,200 gallons. The fire department applied Fuel Buster (F-500) and foam to the release that increased the volume of soil impacted. Fuel migrated over 10 feet into the groundwater and 60 feet away from the tanker.



Wetting Agents Drive Fuel Into Ground

A 60-foot long interceptor trench was installed to collect free product. Site excavation was selected to satisfy a private property owner. During excavation operations, 13,200 gallons were treated by a stormwater treatment system consisting of an oil/water separator, air stripper, and activated carbon filter prior to discharge to the sanitary sewer. Over 550 gallons of diesel fuel were recovered from treatment operations. Fifty-two (52) truckloads of soil were excavated and transported to a bioremediation treatment facility. Soils and stormwater were cleaned up to below regulatory limits. Clean soil was used to backfill the site.



Foam and F-500 Increased Cleanup Volume

Lessons Learned Included:

- Application of foam & wetting agent increased the impacted soil volume.
- Installing the main interceptor trench in the correct location on the day of the spill minimized the aerial extent of groundwater migration.
- Onsite treatment of stormwater and discharge to a sanitary sewer reduced site-dewatering costs.

CRITICAL RESPONSE ASSETS

Response assets which can optimize hazmat response efforts include; tanker transfer kits (offload without cutting holes in or lifting tankers), emergency response trailers with emergency lighting and personal protective gear, spark proof tools to cut transfer holes in tankers, speciality chemical transfer pumps and hoses, product containment systems (tankers, vac trucks, frac tanks, pillow tanks, overpaks, and supersacks), transloading equipment (telescoping fork lifts, hydraulic lift gate trucks,



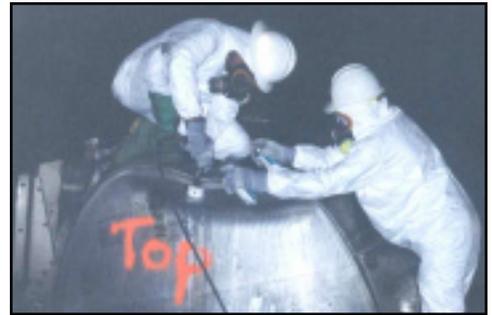
Tanker Offloaded with Transfer Kit

pallet jacks, and dollies), power brooms, spill containment booms and sorbent, chemical transfer-capping-leak repair kits, mobile treatment systems, treatment and neutralization chemicals, and environmental surveillance instrumentation.

CONCLUSION

The role of the response contractor is to provide a safe, rapid, and efficient response to assist in the clearing of highway accidents. Factors, which influence the successful completion of recovery operations, include the experience of the response contractor, availability, early notification, rapid authorization from the responsible party, and mobilization of appropriate personnel and equipment. Cooperation and integration of common objectives of responding parties can accelerate a successful response.

Operational decisions and available resources, which can influence the tactical success of clearing a highway incident, include: conducting an accurate initial assessment and implementing a work plan that is approved by the Incident Commander and regulatory authorities.



Spark Proof Cutting Tools for Transfer



Transfer-Capping-Leak Repair Kits



Remtech Fleet of Emergency Response Equipment



Telescoping Forklift Transload

About the Authors



Mark D. Ryckman is Principal Engineer and Founder of Remtech Engineers. He is a licensed engineer in ten (10) states and possesses specialty certifications as a Diplomat in Hazardous Waste Management and Water and Wastewater Treatment from the American Academy of Environmental Engineers. He possesses undergrad degrees in Mathematics, and Civil Engineering and a Masters in Environmental Systems Engineering from Clemson University. He has served as project principal on over 2,500 hazardous material incidents during the past 28 years. Remtech is a Chemnet Contractor for Chemtrec.

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