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President

*Remtech is committed to providing quality and cost-effective emergency response, environmental assessment and turnkey cleanup 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](http://www.remtech-eng.com).*

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## REMTECH IN THE NEWS

**A Son's Reflections on His Dad.** Dr. D. W. (Rick) Ryckman passed away on September 14, 2004 at 80 from complications of Non-Hodgkins Lymphoma. Dad was a great father, mentor, teacher and encourager. Dad believed that if you had faith, did your homework, and never gave up you could accomplish anything you put your mind to. He always brought out the best in people by bragging them up and encouraging them. This made you want to give it your best and not let him down even though at times his praise may have seemed exaggerated. He never allowed his accomplishments or size (that could be intimidating at times - his height of 6 feet 2-inches) to interfere with his mission in life of equipping young people with the educational and problem solving skills to be successful. He was extremely proud and a strong advocate of his children and students (over 200), and friends. When asked when are you going to retire he would respond ... "why I haven't started to work yet" ... since he enjoyed his profession so much.



Dr. D.W. "Rick" Ryckman

Dad's accomplishments were many - He earned his doctorate of science from the Massachusetts Institute of Technology and Masters from Michigan State University. Dr. Ryckman founded the Environmental Engineering Program at Washington University in St. Louis where he served as the A. P. Greensfelder Professor of Engineering. From 1963 to 1975 he founded and was a partner in RETA (Ryckman, Edgerly, Tomlinson & Associates) an environmental consulting engineering firm that won the Grand Conceptors Award from the Consulting Engineering Council of America for an equalization basin design for Uniroyl in Baton Rouge, LA. In 1975 he founded another environmental engineering firm REACT (Ryckman's Emergency Action & Consulting Team) where Stewart Ryckman currently serves as president. Recently, the environmental engineering department at Washington University established the *Rick and Betty Ryckman Lecture Series* which invites individuals to further promote environmental engineering science education. Dr. Ryckman was on the Board of Directors of the Salvation Army and a member of the First Congregational Church of Webster Groves, Missouri.

**Larry K. Seabolt, Jr. (Senior Remtech Engineer)** is serving as Chairman of the Traffic Incident Management Operations Committee for TIME (Traffic Incident Management Enhancement - Georgia Department of Transportation). The Operations Committee is developing written procedures for all Metro Atlanta agencies to use in response to major highway incidents (including hazmat incidents). Larry was on hand representing Remtech and TIME recently when Gov. Sonny Perdue signed Incident Management Day Proclamation.



Governor Sonny Perdue signs Incident Management Day Proclamation with TIME

## RECENT PROJECTS COMPLETED

**Crawfish Intermodal Container** - 45,000 pounds of frozen crawfish were lost when a refrigeration system malfunctioned between California and Georgia. Remtech mobilized a 135-ton crane to lift the container and trailer chassis to slide the freight out at a landfill. The container was decontaminated and returned to the seafood company.

## HC-2000 DEVELOPMENTS

**No Benzene Rebound Six Years After Treatment** - No rebound on groundwater benzene concentrations has been observed at a 0.6-acre petroleum contaminated wetland site cleaned up with Remtech's proprietary HC-2000 native bioremediation accelerator. Pre-cleanup groundwater concentrations were 125 ug/l and have remained consistently below 5 ug/l for 6-years. Pre-treatment soil BTEX concentrations exceeded 15,000 mg/kg and have also remained below 0.001 mg/kg for six years.

**New York Site Nears Completion** - A petroleum contaminated site under a building near the Canadian border has been treated with Remtech's mobile bioremediation trailer constructed for a major beverage distribution company. (See Story on page 4).

## COLOR REMOVAL BY FILTRATION & COAGULATION

**Dye Spill Cleanup** - Two-Hundred gallons of concentrated mulch dye were released into a stormwater drainage system impacting several million gallons of surface water. Remtech was engaged by the transportation company to remediate the problem. The impacted stream ran through an affluent area and passed through a reflective pool prior to discharging into a major river. Chemicals of Concern (COCs) in the dye included; color, ethylene glycol, surfactants, and iron oxide. Remtech constructed an instream activated carbon filtration dam at the leading edge of the spill to remove organics and color.

The first 1,000 feet of stormsewer and drainage ditch were purged with clean water and pumped into two (2) 21,000 frac tanks. 40,000 gallons of dye impacted stormwater were recovered within a 30 - hour period. Emergency treatability bench-scale tests were conducted and it was determined that 250 mg/l calcium chloride and 700 mg/l powdered activated carbon (PAC) removed the color and organics following a 10 - hour clarification period.

**Colloidal Kaolinite Removed From Stormwater** - Remtech Engineers was contracted to treat 64,000 gallons of stormwater containing kaolin dust that leached into an oil/water separator at a major rail yard in southeast Georgia causing a suspended solids effluent problem. Treatability investigations were conducted using filtration and colloidal suspension destabilization agents. Filtration media used included diatomaceous earth, Zeosand, and Fiber Clear. Calcium chloride, powdered activated carbon, and diatomaceous earth were used as colloidal destabilization and coagulation agents.



Crawfish Intermodal Container Unloading



Red Dye In Large Reflective Pool



Dye Pumped into Frac Tanks for Treatment & Disposal



PAC & Calcium Chloride Dye Treatment

Zeosand (particle removal in 1 to 10 micron range) and Fiber Clear (particle removal < 3 microns) provided the best laboratory bench-scale filtration results and chemical treatment with calcium chloride and diatomaceous earth provided the best clarification results. Filtration rates (16 to 33 gpm) were determined to be time limiting and a decision was made to proceed with bulk stormwater chemical clarification. Filtration was reserved for water near the solids blanket/water interface. Calcium chloride dosages that provided chemical clarification below NPDES limits ranged from 250 to 930 mg/l. A total of 72,835 gallons of stormwater were treated and discharged under an existing NPDES permit.

## FEATURE ARTICLE

### HC-2000 MULTI-MEDIA APPLICATIONS

#### HC-2000 Multi-Media Applications

HC-2000 is a bioremediation accelerator that degrades fuels, oils, lubricants, and chlorinated and non-chlorinated solvents. HC-2000 has a variety of applications including - removal of petroleum sheens from surface water, desorption of fuels from sediment, soils and vegetation, cleaning of pavement surfaces, insitu treatment of soils and groundwater, odor control, breakup of solids/sludges, and wastewater treatment.

Surface Water Applications - When oil or fuel spills are cleaned up to non-recoverable sheens, HC-2000 can be applied to lower surface tension and allow sheens to come in contact with particulate born bacteria for degradation. HC-2000 removes light sheens and odors almost immediately and also desorbs fuel from banks, leaves, limbs, and organic matter.

Sediment Applications - HC-2000 desorbs flammable/combustible fuels from sediment in sewers, retention basins, stream/river beds, and storage tanks. Flushing sewers with HC-2000 accelerates fuel removal and lowers vapor concentrations below flammable/ explosive limits and accelerates natural degradation of residual fuels.

Soil Applications - Fuel and solvent contamination can be treated by land farming, tilling, deep soil tilling, composting, and insitu injection techniques. HC-2000 may be injected passively or actively through biosparge/biovent delivery systems. A gasoline tanker rolled over in a one-acre swap in Southern Georgia releasing an estimated 2,000 gallons. Three biofence reactors consisting of 30 enzyme injection points and an automated watering system were installed at this one-acre site. This project was completed in sixteen (16) week treatment period. Average site soil Gasoline Recoverable Organic concentrations were reduced 98.7% and average groundwater benzene concentrations were reduced by over 84%.

Groundwater Applications - Contaminated groundwater can be treated via direct injection, (active and passive), biofences, reactor trenches, and groundwater sparge wells.



Kaolin in Oil/Water Separator  
Prior to Treatment



Remtech Mobile Filtration System  
Removes Kaolin Dust



Kaolin Removed by Chemical Addition



HC-2000 Treatment System in New York



HC-2000 BioFence System in Swamp



**New York Treatment System** - Soil and groundwater under an 8,000 square foot building and paved parking lot in upstate New York was contaminated with non-chlorinated solvents. Remtech manufactured a mobile bioremediation trailer is equipped with telemetry reporting and remote control. Remtech installed five air/enzyme injection wells and five vapor extraction wells. After 5.5 months of system operation, analyte removal efficiencies were as follows: benzene - 99.9%, ethylbenzene - 99.9%, naphthalene - 95%, toluene - 95%, 1,2,4 trimethylbenzene - 97%, 1,3,5-Trimethylbenzene 85%, and total xylenes - 98%.

Other HC-2000 Multi-media Applications include:

*Pavement & Surface Cleaning Applications* - cleans asphalt, concrete, and metal surfaces.

*Odor Control* - HC-2000 kills pathogenic bacteria, reduces the vapor pressure of volatile compounds, and activates bacterial odor degrading microorganisms.

*Solids & Sludge Breakup* - breaks up sludge in digesters, sludge pits and solids buildup in ASTs and USTs.

*Forrest Canopy & Vegetation* - elutriates fuels and solvents from leaves, foliage, sod, etc. to minimize interference with photosynthesis and minimizes loss of foliage.

*Railroad Ballast & Gravel* - insite treatment of ballast on main line and siding tracks.

*Tank Farms & Power Substations* - treatment of gravel and soils in place without digging up grounding grids.

*Wastewater Applications* - accelerates biological degradation in oil/water separators, truck washes, and conventional biological wastewater treatment systems.



Pond Prior to Treatment with HC-2000



HC-2000 Removes Sheens from Pond



Containment Area Prior to Cleaning



HC-2000 Removes Stains & Sheens

## About The Authors



Mark Ryckman

Mark D. Ryckman is President and Founder of Remtech Engineers. He is a licensed engineer in ten 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 earned undergraduate 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 environmental projects during the past 28 years.



Larry Seabolt

Larry K. Seabolt, Jr. is Senior Engineer with Remtech. He has over twelve (12) years experience as project manager on emergency response and site remediation projects. Mr. Seabolt is a Certified Hazardous Materials Manager, an instructor for OSHA Incident Commander training and OSHA Hazardous Materials Awareness through Specialist training, DOT Hazmat training,

EPA RCRA training, and a First Aid and CPR instructor. He has an engineering degree in Civil and Environmental Engineering from Southern Tech.



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