

Sage Natural Resources - Crown-Riley Hydrocarbon Release Final Remediation Report



June 11, 2019

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June 12, 2019



Catawater HHO, LLC

Sage Natural Resources - Crown-Riley Hydrocarbon Release

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EXECUTIVE SUMMARY

Spur Environmental Services (SPUR) thanks Sage Natural Resources (SAGE) for the opportunity to perform the Environmentally Non-Disruptive Hydrocarbon Remediation at the Crown-Riley Project (“Project”) location. These specialty projects fall under the auspice of our “Green Earth Projects” which uses SPUR’s cutting-edge proprietary treatment application and a biocatalyst that accelerates reaction rates of naturally occurring processes, thus allowing for an organic and harmonized environmental restoration of a once compromised location.

SPUR is partnered with and is the exclusive provider of the Catawater HHO, LLC (“CATAWATER”) proprietary catalyst which allows your site to remain in-tact while providing restorative services to remediate contaminated soils without the destructive impact of a typical mechanical dig and haul operation. This cutting edge approach enables the accelerated destruction of Oils and NaCl, based entirely on natural extracts that function in synergistic association with microorganisms, natural elements and natural processes in the environment to accelerate the contaminate elimination in such functions as in situ bio-remediation, which not only repairs, but regenerates your site.

Our certified and trained chemical engineers assess the unique environmental composition of the site, while evaluating the compromising breach, as well as the most efficient application of the patented product to restore the site to the optimal natural state. The team that works on these projects has direct experience in managing and performing Environmental work for large E&P Companies across multiple locations such as in the Barnett Shale, Permian Basin, and Bakken Shale Play in the recent past. This team is inclusive of Environmental Chemists, Scientists, Engineers, and Technicians who work toward one goal – Renewing the Earth through the Synergy of Nature and Technology.

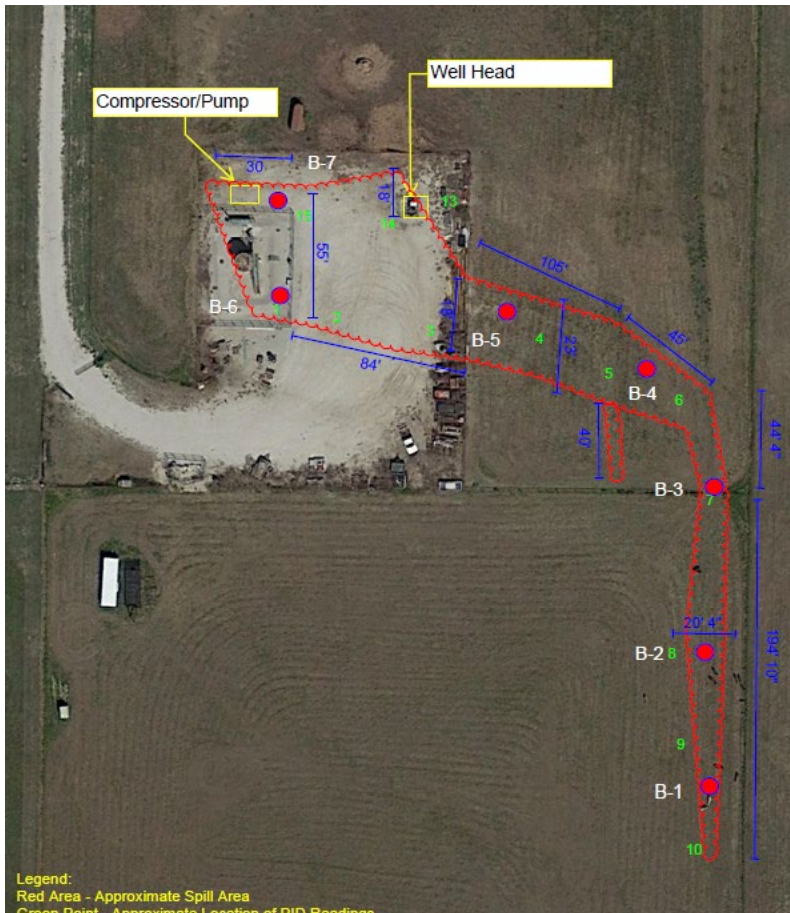
This report is a concise accounting of the work performed and the successful outcomes. SPUR has worked within an execution plan depicting our structure for the full remediation and project acceptance of the Sage Natural Resources - Crown-Riley Hydrocarbon Release Project. This comprehensive execution plan identifies the sequential steps of the process from pre-analysis, catalyst dilution rates, application, post analysis and Project closure. The holistic and tailored approach we of combining proprietary cutting-edge technology with highly skilled and trained application and analytical professionals yield a result that is truly amazing. We look forward to our continued successful partnership.

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EXECUTION PLAN

Project Start Date: 04/26/2019
Project Completion Date: 06/10/2019
E&P Contact:
 Name: Ryan Burson
Site Name: Crown-Riley
Release Type: Hydrocarbon
Contaminate: BTEX - Benzene

Site Map and Sample Locations:



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Communication

One of the keys to success in any project is communication as well as organized and effective completion. Therefore, SPUR remains easily accessible via phone and email, but we also provide daily and bi-weekly schedule updates to ensure operational transparency and to fully manage and complete the project in a timely and accurate fashion. Additionally, SPUR’s Project Manager will hold daily, on-site Schedule discussions with the various management teams to best schedule work, which allows for optimal, timely and efficient coordination between various groups on site.

Site Arrival and Incident Scene Protocol

Upon notification from SAGE of the Hydrocarbon Release, SPUR deployed a team of personnel who implemented our Hazmat Incident Scene Layout Protocol which includes facility layout, the identification of contaminants using on-board testing equipment, subcontractors and/or specialty skillsets required, and the initial plan for the most effective means to efficiently contain/manage the release with the least impact to the environment and customer. On this location, the customer clearly defined the Release and the contaminates (oils). SPUR utilized our testing equipment to ensure there were no other contaminates or other safety concerns prior to starting the Project.

Subcontract Management

Each event may require uniquely skilled labor to ensure efficiency and success on a project and at times, SPUR will require subcontractor assistance. The subcontractor chart below depicts all subcontractors utilized on the project. SPUR will have a minimum of one on-site event Manager from the beginning of the Project until completion who will be responsible for managing the overall coordination of all work, subcontractors, materials management, and schedule. SPUR understands that there are many complexities to managing subcontractors and the integration of uniquely skilled personnel into one cohesive team; therefore, based on our previous experience managing Environmental projects we are confident that our subcontractor management approach will produce effective results.

Contractor / Subcontractor	Scope of Work
TTI Environmental Labs	Sample Analytical
3 Star Water Logistics	Fresh Water Hauling

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Commencement of Activities on-site

SPUR began this project by mapping the three (3) samples, taken by SAGE Personnel on the site map. The samples were sent to a 3rd party laboratory for a pre-remediation evaluation by SAGE personnel. Based upon customer provided information and results of our testing equipment, SPUR determined that the most effective method to remediate the Release was using our CATAWATER product.

After customer approval, SPUR utilized the proprietary mixing guidelines to prepare the CATAWATER catalyst application. SPUR utilized two different techniques to apply the product, hand spraying the release where accessible and then by injecting the catalyst application into the moving flow of the release, allowing the catalyst to naturally infuse the release itself.

SPUR only focused on the B-2 area of contamination and all pre/post results are for the 20x20 B2 Area depicted in the Site Map/Sample Locations.

Project Pictures



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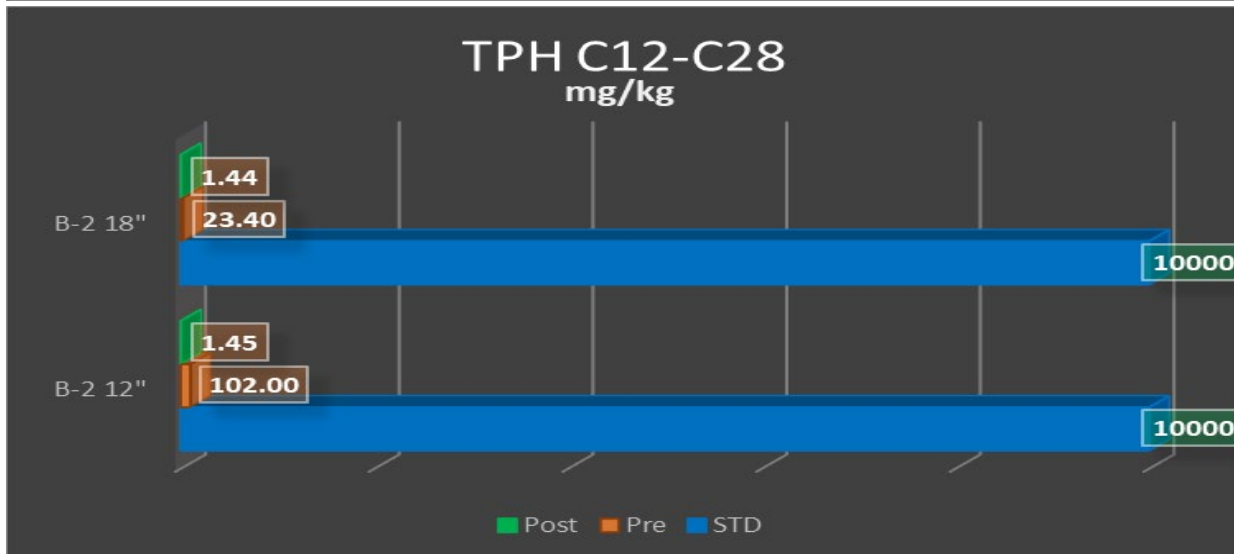
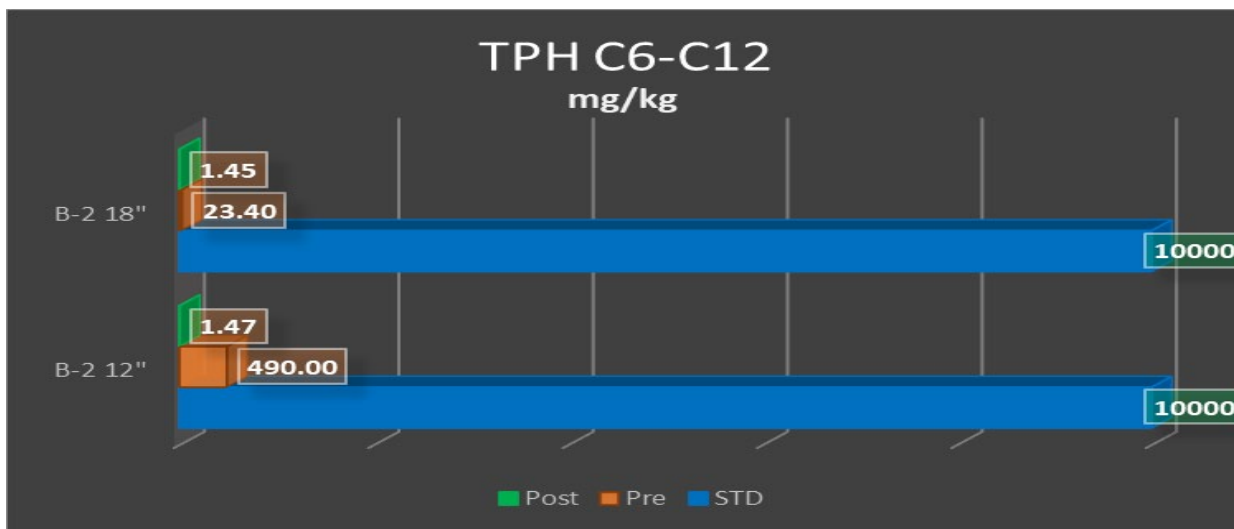


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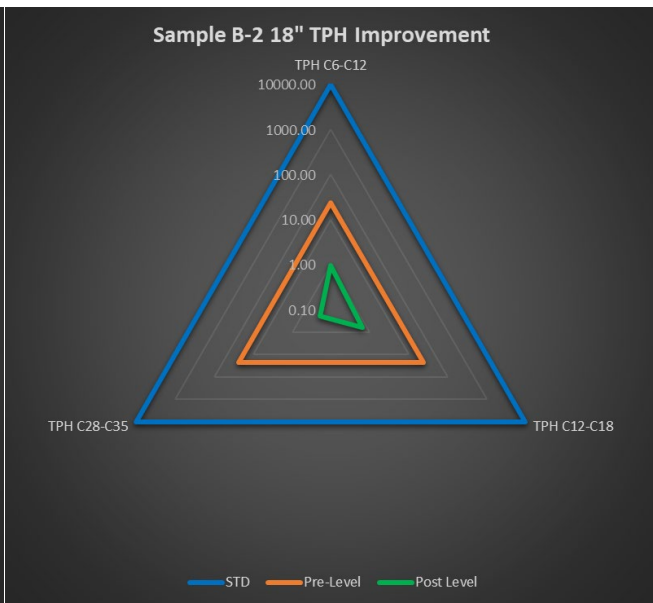
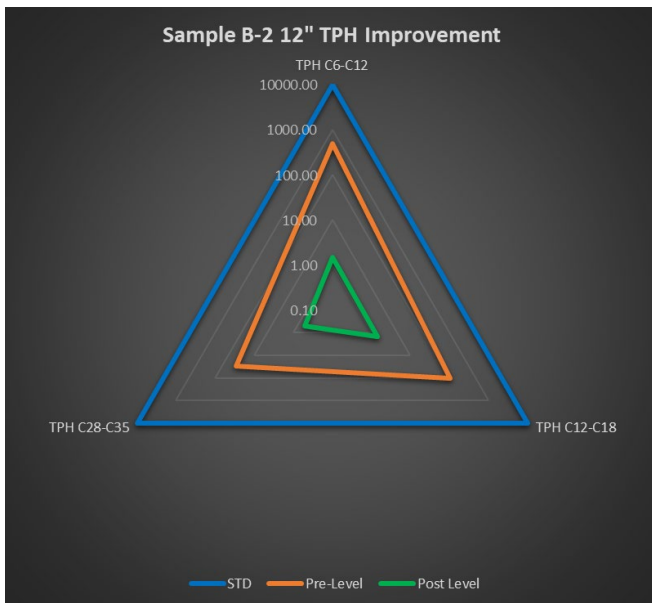
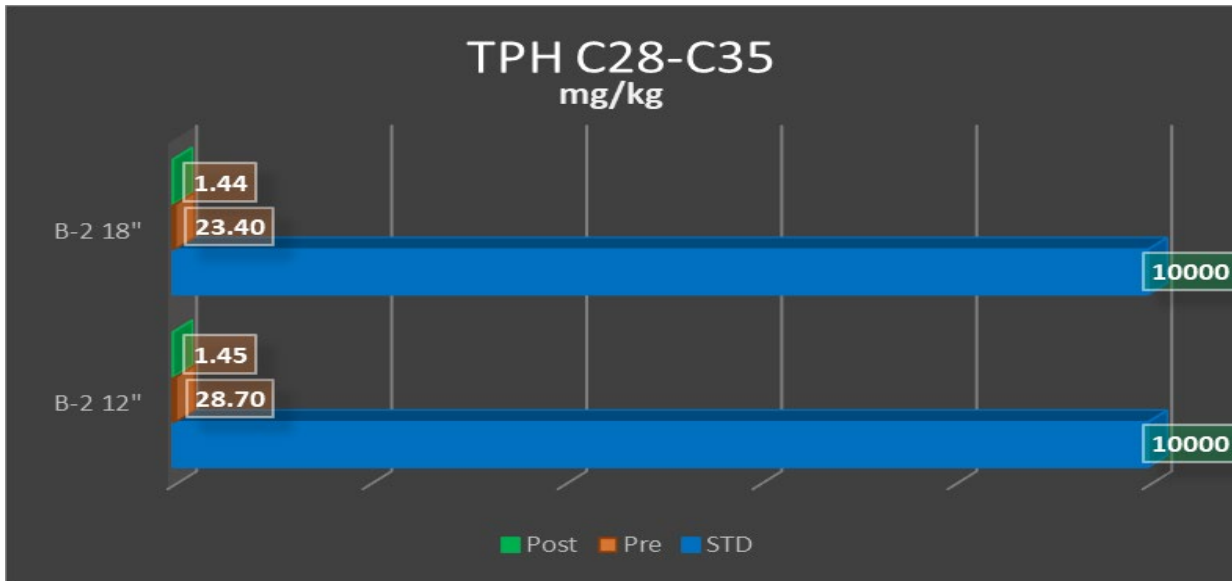
PROJECT RESULTS:

DATA AND CHARTS – POST APPLICATION - TPH RESULTS

Site - Sage Crown-Riley	TPH C6-C12 (mg/kg)				TPH C12-C28 (mg/kg)				TPH C28-35 (mg/kg)			
	STD	Pre	Post	% Imp	STD	Pre	Post	% Imp	STD	Pre	Post	% Imp
B-2 12"	10000	490.00	1.47	100%	10000	102.00	1.45	99%	10000	28.70	0.50	98%
B-2 18"	10000	23.40	1.45	94%	10000	23.40	1.44	94%	10000	23.40	0.50	98%



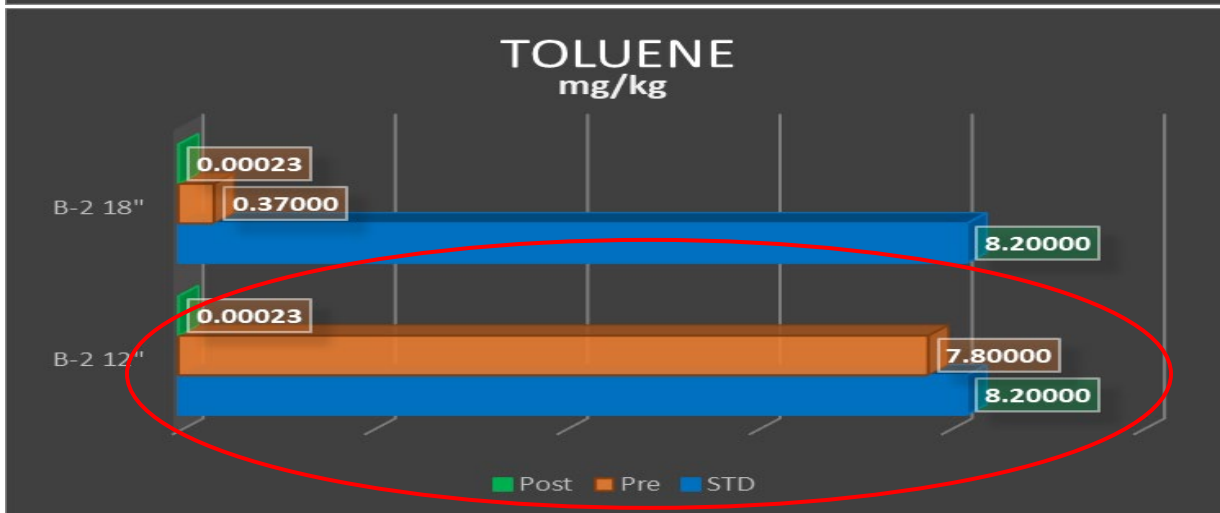
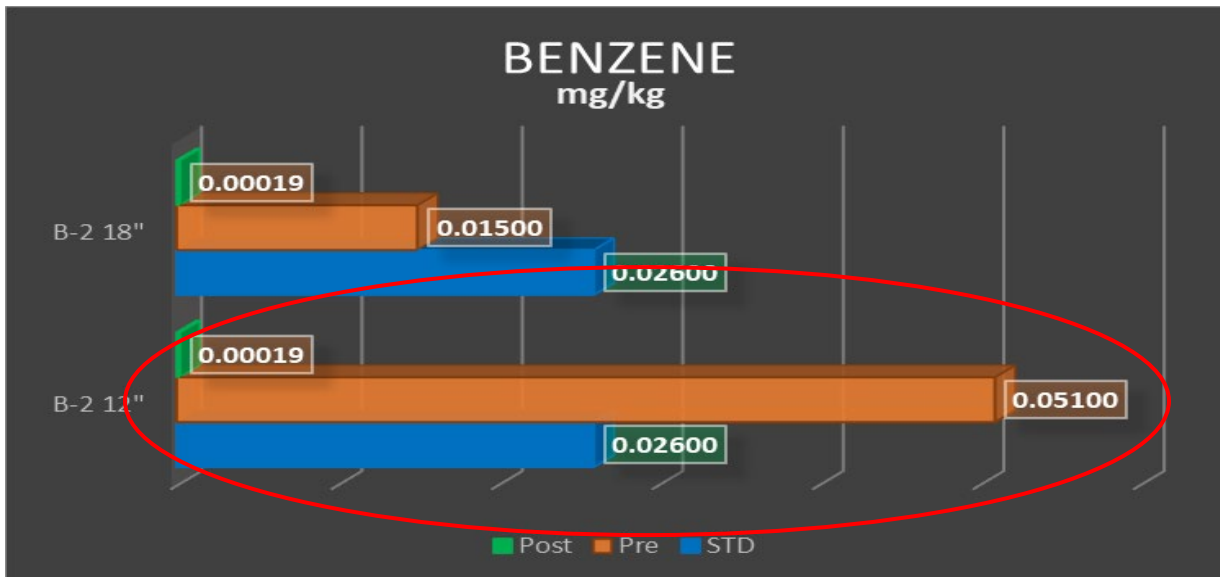
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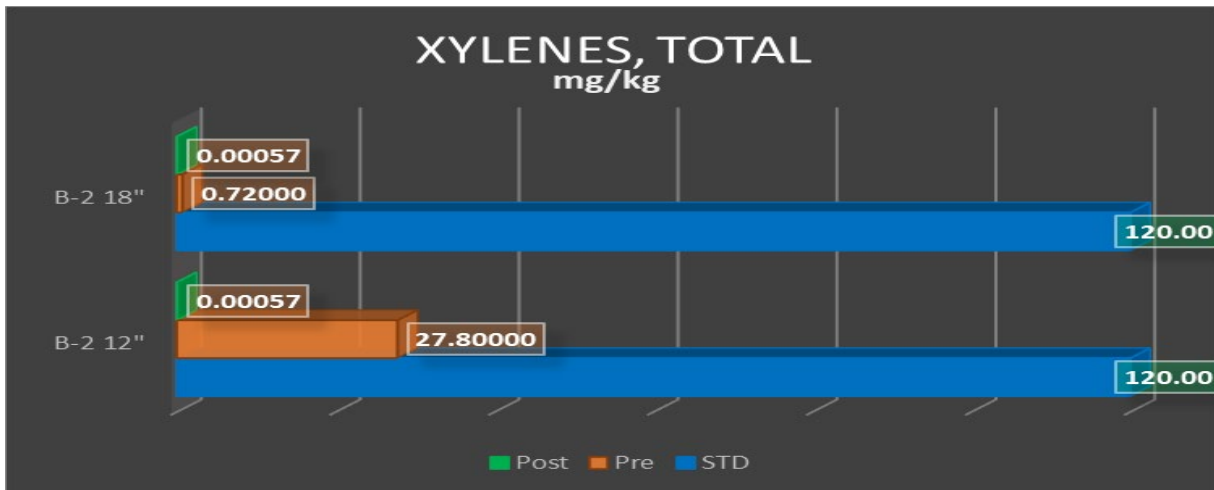
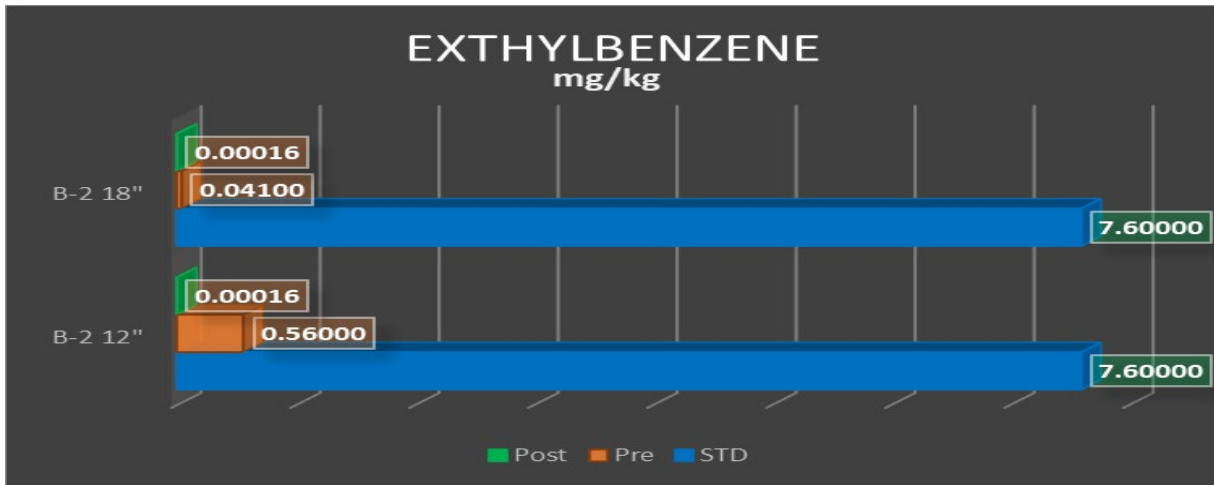
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DATA AND CHARTS – POST APPLICATION - BTEX RESULTS

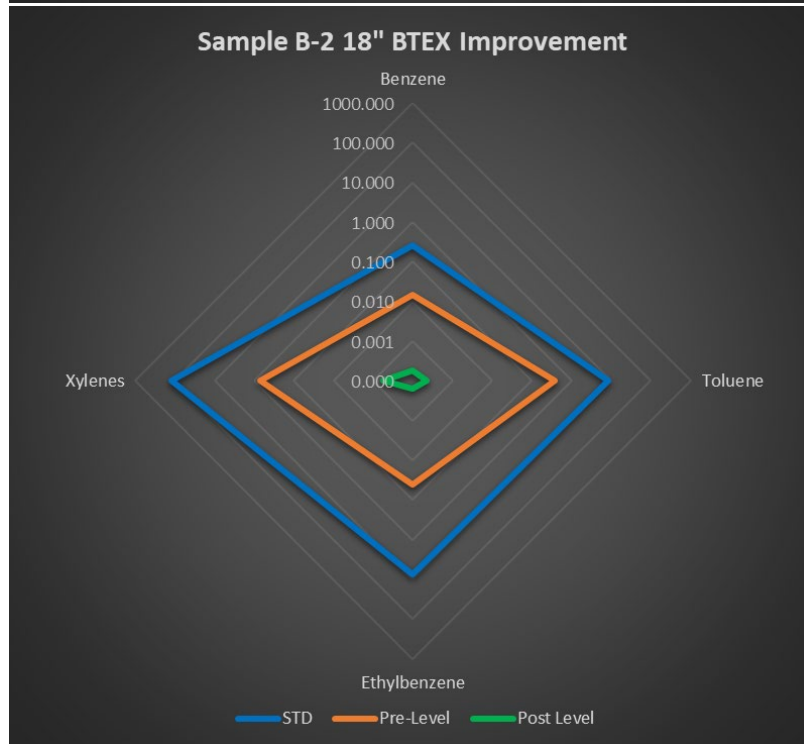
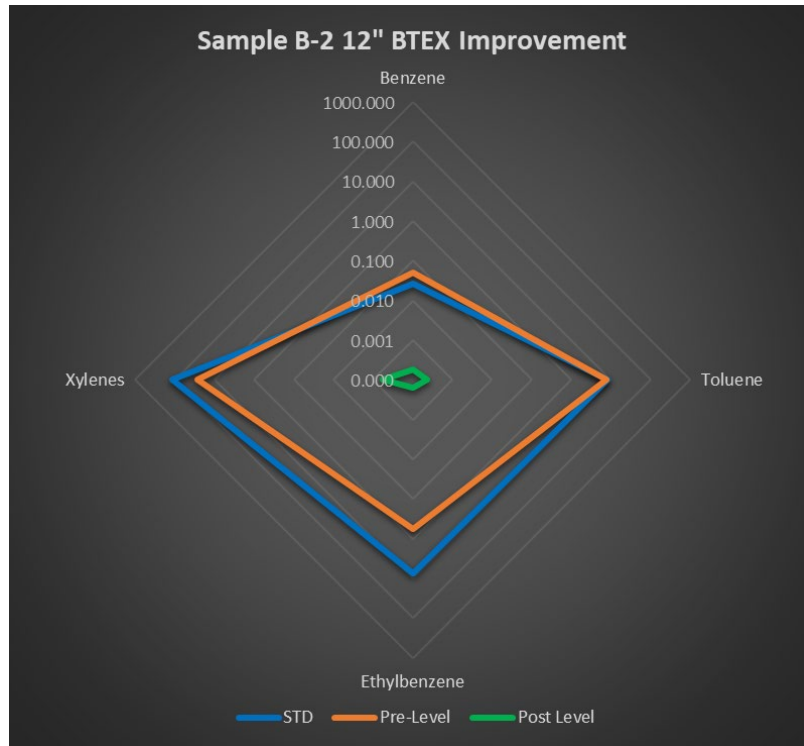
Site - Sage Crown-Riley	Benzene (mg/kg)				Toluene (mg/kg)				Ethyl Benzene (mg/kg)				Xylenes (mg/kg)			
	STD	Pre	Post	% Imp	STD	Pre	Post	% Imp	STD	Pre	Post	% Imp	STD	Pre	Post	% Imp
B-2 12"	0.02600	0.05100	0.00019	100%	8.20000	7.80000	0.00023	100%	7.60000	0.56000	0.00016	100%	120.00	27.80000	0.00057	100%
B-2 18"	0.02600	0.01500	0.00019	99%	8.20000	0.37000	0.00023	100%	7.60000	0.04100	0.00016	100%	120.00	0.72000	0.00057	100%



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FINAL ANALYSIS RESULTS

Below is a Project summary of the effects of using this unique patented and exclusive system on your Project: After one treatment, the laboratory and field sampling results validated the success of the CATAWATER Catalyst application in remediating the Hydrocarbon Release. All the data from testing equipment on-site and from 3rd party labs indicate up to 100% reduction in Hydrocarbons from the Release. All readings were below the Standard ppm expectation within 28 days.

There are both extensive tangible and intangible gains for the environment, customer, landowner, and community. Not only are we protecting the environment, we are being good stewards of the Earth.

CUSTOMER IMPACT BENEFIT:

The application of the CATAWATER catalyst product has proven to have a large and ongoing customer impact in regard to cost savings, landowner interruption, waste stream minimization, paperwork & administrative reductions, and overall Corporate Social Responsibility (CSR).

Cost Savings

- Lower cost than traditional mechanical dig and haul. The catalyst application tends to be 25% lower in completed project pricing over a large application area

Landowner Interruption minimization and soil improvement

- No impact to landowner. Minimal amount of heavy haul traffic, no disturbed soil, minimizes concern over unabated areas as the catalyst will spread with future rains beyond application area, improves soil content by breaking down current barriers to water absorption

Waste Stream Minimization

- No contaminated soil to document, minimizes waste stream paperwork and audit requirements, minimizes landfill impact risk

Paperwork and Administrative Cost Reductions

- No increase in paperwork administration or costs due to Governmental audits

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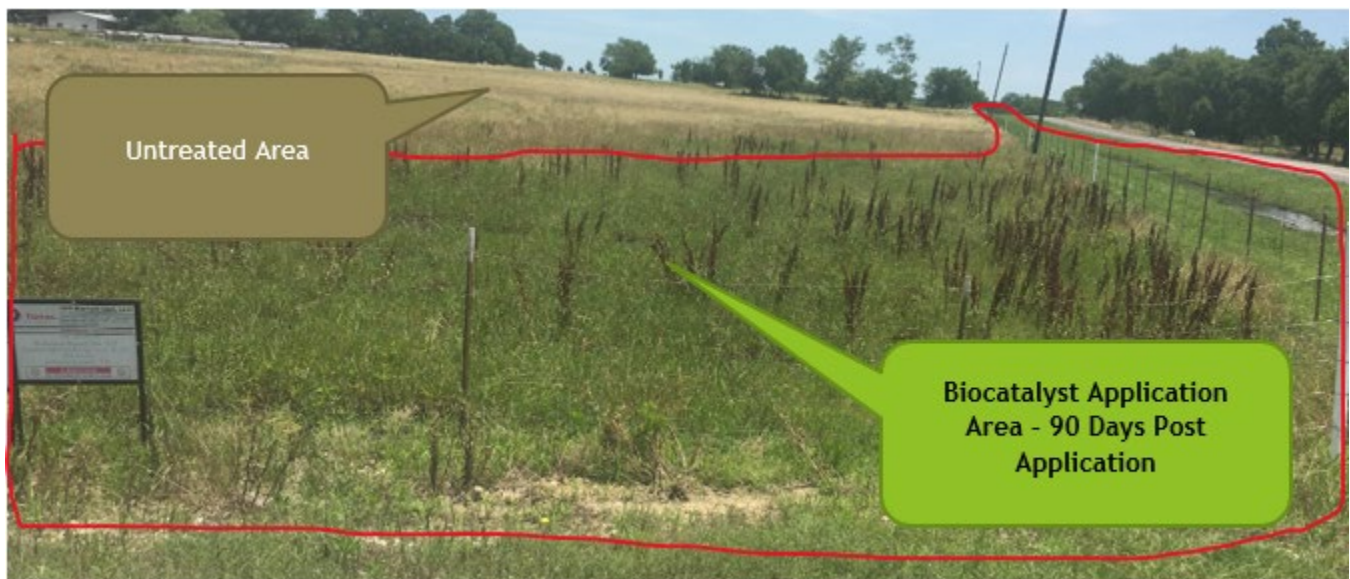
Corporate Social Responsibility (CSR)

- No negative impact to the Environment
- No mass heavy haul traffic to alert unnecessarily
- Happy landowners
- Happy customers

ENVIRONMENTAL IMPACT BENEFIT:

The SPUR/CATAWATER team's remediation system allows our customer to remain at the center while also focusing on the environment as our main objective. The Catalyst has many proven applications that meets both goals and will change the environmental model for our customers.

- No soil or vegetation disruption – if applied early enough, no visual impact to current growth
- No additional contamination to landfill
- Enhanced future vegetation – breaks down barriers to water absorption resulting in stronger growth potential without fertilization



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SAFETY PLAN

Attached is a summary of SPUR's comprehensive safety plan, which outlines SPUR's policies and standards. The fundamentals of SPUR's Safety Plan, as they relate to this Project are as follows:

- All SPUR personnel and subcontractors have completed SAGE NATURAL RESOURCES Safety Orientation and will communicate to all personnel, SAGE NATURAL RESOURCES safety absolutes.
- SPUR promotes a drug free workplace and drug screening is performed on all employees.
- Safety will be promoted, monitored, and reported as follows:
 - Initial Safety refresher training to meet SPUR's Safety Plan
 - Daily Tail-board meetings to discuss hazards, site conditions, and safety issues for the planned work that day. One JSA, job safety analysis, report is completed daily.
 - Weekly Safety Walks and Weekly Safety Review with all employees
 - Semi-monthly Safety Review with outsourced Safety Professional
 - All SPUR employees and subcontractors will wear the appropriate personal protective equipment while at the Project location.
 - All SPUR employees and subcontractors will be certified on the equipment they are operating.
 - All SPUR employees and subcontractors will follow the appropriate safety procedures for operating equipment and the work that they are performing on the Project site.
 - All safety issues will be documented and reported immediately to SAGE NATURAL RESOURCES and SPUR. These issues will be discussed during the daily safety meetings.

The SPUR safety plan is available on-line at ISNetworld ID Number: 400-199782

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ENGINEERING SIGNOFF

Thank you for the opportunity to present the Project Results Report for the Sage Natural Resources - Crown-Riley Hydrocarbon Release. We trust that our performance meets your requirements. I certify the accuracy of the data provided in this report. If you have any questions or require further information, please contact Steve Trammell.

Title: Vice President Environmental Services

Name: Steve Trammell

Date: June 12, 2019

Signature: Steve Trammell

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SPUR ENVIRONMENTAL & CATAWATER HHO INTRODUCTION

Organization

Organization Name:

Spur Environmental Services

Organization Address:

DFW & Home Office

West Texas Satellite Office

1420 Hughie Long Rd

4710 SCR 1311

Cresson, TX 76035

Odessa, Texas 79765

Organization URL: <http://www.spurenvironmental.com>

Contact Name:

Graham Laing

Steve Trammell

Vice President

Vice President

Office: (817) 293-1515

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glaing@spurenvironmental.com

strammell@spurenvironmental.com

ISNetworld ID Number: 400-199782

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PERFORMANCE CAPABILITY

FACILITY INFORMATION

SPUR is located at 1420 Hughie Long Rd. Our 23,500 sq. ft. manufacturing and warehouse facility permits us the requisite capability to effectively manage the requirements of your project in a controlled and highly organized environment. Our materials, equipment, and trained professionals remain on-call and 100% primed for any emergency or non-emergency environmental response at a moment's notice. We are fully capable and prepared to tackle any job as soon as we receive the Notice to Proceed.

SPUR also maintains a second location at 4710 SCR 1311, Odessa, Texas 79765 and is the base for all our West Texas Environmental Response requirements.

CAPABILITIES

SPUR is fully capable of performing the following activities:

- Emergency Response
- Mechanical Remediation
- In Situ Remediation
- Waste Stream Management
- Containments
- Release Response & Management
- Site Analytical
- NORM Decontamination
- Construction Program Management
- Civil and Mechanical Installation
- Materials Fabrication
- Structural Steel

CATAWATER HHO - IN SITU REMEDIATION

CATAWATER's proprietary technology is tested and utilized for in situ remediation applications for Produced Fluid (Oils & Water) releases. The in-situ remediation application has proven to speed up the remediation process to as little as 28 days after the first application is performed. In addition, the CATAWATER

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application has proven to reduce lease operating expense (LOE) for remediation activities as compared to not utilizing CATAWATER. CATAWATER is non-toxic and environmentally safe for air, soil and water.

Produced Water releases have been remediated within 28 days from initial Release event with baselines sample results for chlorides of 20,000 ppm remediated to < 3,000 ppm. In addition, lab results have shown that if treated within 24 hrs. after a Hydrocarbon release has occurred, the vegetation and trees/shrubs can survive a high chloride concentrated Release.

Oil releases, as like produced water releases, have shown a similar time frame for remediation results ranging from 30 days to 6 months. The fastest remediation time for an oil release was within 10 days after the release occurred. The same area where the oil release occurred was treated with CATAWATER five months prior to the release. Without any further treatment, the samples for TPH were tested and the levels were all below the <1 % TPH, which met the closure requirements for the regulatory body. CATAWATER is currently being tested as a pre-release agent to minimize the Environmental impacts of an actual release.

CATAWATER has also shown to eliminate salt scarring from releases within 30 days of initial application.

CATAWATER HHO – WASTEWATER – TITRATION/INJECTION

Water treatment (SWD)

CATAWATER was injected into a SWD facility gun barrel tank. The study was to see if there were any effects of dropping out suspended solids coming into the SWD versus going down hole and to see if there would be an increase of oil skimming within the process. After 28 days of the application, water samples were pulled from the SWD pipeline inlet and at the SWD injection line downstream of the pump to see if there were positive results. The analytical showed a suspended solid reduction of 90% and that the skimmed oil increased by 0.5 percent based on average 1,200 bbls/day throughput.

NORM

CATAWATER has also been injected into SWD facility gun barrel tanks. The study was conducted to see if there were any effects of dropping out BSW or to the well head tubing pressure and injection rate and to see if there would be a reduction to the NORM measured in the gun barrel. After 31 days of the application, data showed a 13% increase of water injected and a 9% drop in tubing pressure at the well head. The NORM was reduced from 80 uR/hr to 35 uR/hr in the gun barrel tank and the BSW was reduced from 7' 6" to 3' within 31 days. The analytical showed a reduction in metals, TSS, turbidity and tph levels. The skimmed oil increased by 0.4 percent based on average 1,200 bbls/day throughputs.

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ATTACHMENT 1

See Attached Reports:

- Pre-Application Analytical provided by Sage
- Crown-Riley Post-Application Analytical

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