

LOUISIANA BIO-ENVIRONMENTAL SERVICES

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As a result of the Deep Water Horizon spill, BP contracted with Ralph J. Portier, Ph.D., Professor of Environmental Sciences at Louisiana State University to test the microbial products listed on the NCPPL with crude oil and water from Barataria Bay. The following are quotations from the interim report dated March 3, 2011 and the final report dated August, 2011.

"This interim report summarizes the products evaluated at the laboratory scale. Specifically, the BCST (BioChem Strike Team) determined that 10 products listed on the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) Product Schedule warranted further testing to determine their effectiveness in degrading oil under the specific environmental, climate, and ecological conditions generated by the 2010 Gulf oil spill. Using pre-defined test protocols, each product was evaluated and compared to natural (inherent) biodegradation occurring through indigenous microflora and micronutrients present in Gulf waters. The selected products were analyzed in a controlled flask-study to determine their remediation potential on weathered crude oil recovered from south Louisiana marshes."

"However, the study does demonstrate the need for accelerated biodegradation strategies so as to minimize the toxicological legacy of the spill over time."

RE: The Oppenheimer Formula: "Almost complete reduction of alkanes was seen by the end of the test study as 99.9% of the alkane constituents were degraded. 98.5% of the PAHs were degraded by the end of week 12. In total, approximately 99.8% of the weathered crude oil, both alkane and PAH constituents, were degraded by Oppenheimer Formula by the end of 12 weeks."

"The product was most effective of the eight tested products in reducing the total volume of oil over the test period."

A summary of the products tested is on the back of this page.

As demonstrated, the Oppenheimer Formula destroyed 98.5% of the PAH constituents of Heavily Weathered Crude Oil and Bay Water. The tests also proved that naturally occurring microbes could not destroy PAHs. No other product on the list destroyed even 80% of the PAHs.

Samples of Gulf water and "red" gulf oil with dispersant were secured from inside a boom, next to an island SE of Venice, LA. and transported to Austin Analytical. Samples were treated with the Oppenheimer Formula and on July 9, 2010, the laboratory reported that 85 % of the oil with dispersant was destroyed in 24 hours. 91% of the "red" Gulf oil was destroyed in 48 hours.

Louisiana Bio sells, distributes and applies only microbes furnished by Oppenheimer Biotechnology Inc.. The microbes are Archaea, acquired from sources around the world by Carl H. Oppenheimer, Ph.D, Professor Emeritus, University of Texas.

Louisiana Bio has the ability to quickly supply product and application technology anywhere in the world. Louisiana Bio has the technology to clean contaminated oyster beds, protect coral reefs, bayous, wetlands, the banks of rivers, streams and lakes. Apply Our Microbes in emergency response after evacuating product in catch basins and storm drains. Our microbes will quickly remove oil sheens, petroleum vapors and dissolved contaminants and preserve sensitive environments. Our Microbes remediate heavy oils on rocky shores in ocean environments.¹

Use as Green Remediation, eliminate excavation and save carbon credits. We will help with SPCC, NPDES and FRPs. Please visit www.louisianabio.net or call 504-388-3670 and ask for Claude L. Klein.

1. Bioremediation on the Shore after an Oil Spill from the Nakhodka in the Sea of Japan. Marine Pollution Bulletin. Vol. 40. No. 4. pp. 3

Analytical Summary: Laboratory Screening of Commercial Bioremediation Agents for the Deepwater Horizon Spill Response

Ralph J. Portier, Ph.D., Louisiana State University, August 2011.

Comp- onent	Week 0 mg/kg	Week 12 average mg/kg	Week 12 % reduction	Comp- onent	Week 0 mg/kg	Week 12 average mg/kg	Week 12 % reduction	Comp- onent	Week 0 mg/kg	Week 12 average mg/kg	Week 12 % reduction
Positive Control 1 : Slightly weathered crude				Positive Control 2: Slightly weathered crude, nutrients added				Product A: Slightly weathered crude, nutrients added, Bio Accelerator			
Alkanes	21200	24067	-19.5	Alkanes	21900	959	95.6	Alkanes	23933	988	95.9
PAHS	437	312	28.7	PAHS	412	344	16.5	PAHS	285	253	11.2
TPH	21637	24378	-12.7	TPH	22312	1303	94.2	TPH	24218	1241	94.9
DRO	17664	20301	-14.9	DRO	17778	624	96.5	DRO	18186	677	96.3
ORO	15244	17521	-14.9	ORO	15075	752	95	ORO	18004	672	96.3
Product B: Heavily weathered Crude, contains surfactant				Product C: Heavily weathered crude, Gulf Water				La.Bio/OBI: Heavily weathered crude, nutrients, Gulf Water			
Alkanes	8797	121	98.6	Alkanes	17400	1977	88.6	Alkanes	13667	17	99.9
PAHS	382	233	38.9	PAHS	428	92	78.6	PAHS	586	•J	98.5
TPH	9178	354	96	TPH	17828	2068	88.4	TPH	14253	26	99.8
DRO	6027	94	98.4	DRO	12792	1516	88.2	DRO	9227	17	99.8
ORO	6683	76	98.9	ORO	12789	1115	91.3	ORO	9568	2.7	100
Product E: Slightly Weathered crude, nutrients added, Gulf Water				Product F: Moderately Weathered crude, contains enzymes & surfactant				Product G: Slightly Weathered crude, contains enzymes & surfactant			
Alkanes	23367	355	98.5	Alkanes	18567	3687	80.1	Alkanes	28133	5300	81.2
PAHS	322	316	1.8	PAHS	506	105	79.3	PAHS	421	218	48.2
TPH	23688	671	97.2	TPH	19073	3792	80.1	TPH	28555	5518	80.7
DRO	18719	161	99.1	DRO	14016	2696	80.8	DRO	23210	3639	84.3
ORO	17323	294	98.3	ORO	13320	2350	82.4	ORO	19764	3456	82.5
Product H: Slightly Weathered crude, nutrients added, contains enzymes & surface washing additive				Product I: Slightly Weathered crude, nutrients added, contains enzymes				Product J: Slightly Weathered crude, nutrients added, contains humic acid, amino acids and a surfactant			
Alkanes	22967	1108	95.2	Alkanes	28500	438	98.5	Alkanes	27733	332	98.8
PAHS	316	227	28.1	PAHS	461	369	20	PAHS	521	338	35
TPH	23283	1335	94.3	TPH	28961	807	97.2	TPH	28254	670	97.6
DRO	18407	828	96.4	DRO	23234	168	99.3	DRO	21830	170	99.2
ORO	17011	743	95.6	ORO	20803	383	98.2	ORO	20132	290	98.6