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**Date: November 5-27 2012**

### **Shell Nigeria Demonstration/ testing of OSE II in the Ogoniland in the field Summary**

**On November 5 2012, Shell Oil Company officials received OSE II from Dinetuks Corporation LTD of Nigeria for use on soil in the field in the Ogoniland. Shell officials mixed and applied OSE II to the soil themselves, they monitored the site, extracted the soil samples, and delivered them to the lab for analysis for TPH and PAH's.**

**Shell officials performed two extractions on five different dates November 6, through November 27 2012 from the soil where they had applied OSE II.**

**The results show OSE II was very successful in remediating the oil TPH, approximately 95.4% from the samples extracted from the top of the wind row in 21 days, and 97.55% from the bottom of the wind rows in the soil where OSE II was applied for this clean up demonstration.**

**OSE II remediated the soil extractions from the top of the wind row 551 mg/l per day, and at the end of 21 days the TPH level was 532mg/l, which can be extrapolated to show that the TPH level would have been non detect at the end of 22 days. The 21 day percent reduction was 95.4% for TPH for the top of the soil area.**

**The soil extractions from the bottom of the wind rows showed a TPH reduction of 911 mg/l per day and at the end of 21 days the TPH level was 469 mg/l, which can be extrapolated to show the bottom area of the soil would have been non detect in 22 days. The 21 day percent reduction was 97.55% for the TPH at the top of the soil area.**

**Shell also tested the PAH's, which according to the US EPA is the more toxic persistent components of oil.**

**OSE II remediated the soil extractions PAH's from the top of the wind row started at 40 mg/l per day, and at the end of 21 days the PAH level was 0.08 mg/l, which can be extrapolated to show that the PAH level would have been non detect at the end of 22 days. The reduction of PAH's on average per day was 1.9 mg/l. The 21 day percent reduction was 99.8% for PAH's for the top of the soil area.**

**The soil extractions PAH's from the bottom of the wind rows started at 46.09 mg/l and at the end of 21days the PAH level was 0.09 , which can be extrapolated to show**

that the PAH level would have been non detect at the end of 22 days. The reduction of PAH's on average per day was 2.91 mg/l. The 21 day percent reduction was 99.805% for the bottom of the soil.

Once OSE II gets the bioremediation process started there is nothing to stop the remediation and until all the detoxified hydrocarbons have been remediated to non detect, which means the enhanced indigenous bacteria have depleted the entire food source, the detoxified hydrocarbons.

The Shell oil company tests/demonstration in the field on the Ogoniland proves there is a safe effective means to clean up Shells Nigerian spills.

**Steven Pedigo**  
**Chairman/CEO OSEI Corporation**

Signed laboratory test reports follow:



**LABORATORY ANALYTICAL REPORT**

REPORT NO.:	KNL/LAB/011220/11/2012/PH	INCIDENCE :	LEGACY
CLIENT:	SHELL PETROLEUM DEVELOPEMENT CO	SAMPLED BY:	SPDC/KNL
TYPE OF SAMPLE:	SOIL SAMPLE	DATE SAMPLED:	05-13/11/2012
SAMPLE ORIGIN:	B-DERE	DATE RECEIVED:	07-01-2013
SAMPLE SOURCE:	OSEL II TEST	DATE OF REPORTING:	19-01-2013

S/N	PARAMETERS	METHODS	UNIT	SPC max INTERVENTION LIMIT	RESULT					
					B5 <sub>top</sub>	B5 <sub>bot</sub>	A1 <sub>top</sub>	A1 <sub>bot</sub>	A7 <sub>top</sub>	A7 <sub>bot</sub>
<b>PHYSICAL CHARACTERISTICS</b>										
1	TEMPERATURE	-	°C	-	-	-	-	-	-	-
2	pH	ASTM D1292B	-	-	6.40	6.40	6.40	6.40	6.60	6.70
3	DISSOLVED OXYGEN	APHA 422B	mg/l	-	-	-	-	-	-	-
4	ELECTRICAL CONDUCTIVITY	ASTM D1129	µS/cm	-	-	-	-	-	-	-
5	SALINITY	APHA 2520	mg/kg	-	-	-	-	-	-	-
6	TOTAL SUSPENDED SOLIDS	ASTM D1888	-	-	-	-	-	-	-	-
7	TOTAL DISSOLVED SOLID	ASTM D1888	-	-	-	-	-	-	-	-
8	TURBIDITY	APHA 2130	NTU	-	-	-	-	-	-	-
9	ODOR	-	-	-	-	-	-	-	-	-
<b>PHYSICOCHEMICALS</b>										
1	NITRATE	ASTM D1887	mg/kg	-	-	-	-	-	-	-
2	SULPHATE	ASTM D516	-	-	-	-	-	-	-	-
3	HYDROGEN SULPHIDE	ASTM D4638	-	-	-	-	-	-	-	-
4	CYANIDE	APHC 408C	-	-	-	-	-	-	-	-
5	BICARBONATES	ASTM D1887	-	-	-	-	-	-	-	-
<b>METALS:</b>										
1	ARSENIC	ASTM D2972	mg/kg	55	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
2	BARIUM	ASTM D4392	-	625	108.48	94.87	95.20	96.87	95.70	85.24
3	CADMIUM	ASTM D2570D	-	12	2.11	1.81	1.01	1.01	0.79	0.81
4	COBALT	ASTM D3558A	-	240	17.65	18.20	11.88	12.30	10.35	9.83
5	CHROMIUM	ASTM D2972	-	380	21.38	19.12	19.01	17.25	18.61	13.75
6	COPPER	ASTM D1584D	-	190	31.22	35.58	30.59	30.80	29.25	29.80
7	NICKEL	ASTM D1886C	-	210	63.37	42.60	42.41	31.28	21.15	21.41
8	MERCURY	ASTM D3229	-	10	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
9	LEAD	ASTM D3559	-	350	82.09	71.85	69.16	61.14	39.43	36.60
10	ZINC	ASTM D1691 C	-	720	168.13	172.66	154.09	151.36	115.53	102.62
<b>HYDROCARBONS</b>										
1	TPH	GC (FID)	mg/kg	5000	12,115.23	19,615.40	5,702.07	7,477.86	2,437.17	2,684.23
2	BTEX	-	-	206	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
3	PAH	-	-	40	40.60	46.09	17.75	20.50	12.62	13.70
4	PHENOL	-	-	40	-	-	-	-	-	-
5	TOG	UV-SPEC	-	-	-	-	-	-	-	-
<b>BIOLOGICALS</b>										
1	BOD	APHA 507	mg/l	-	-	-	-	-	-	-
2	COD	ASTM D1212	-	-	-	-	-	-	-	-
3	COLIFORM	MPS COUNT	MPN / 100ml	-	-	-	-	-	-	-
4	TOTAL HETEROTROPHIC BACTERIA	-	-	-	8.50x10 <sup>3</sup>	5.60x10 <sup>3</sup>	3.40x10 <sup>3</sup>	3.60x10 <sup>3</sup>	3.40x10 <sup>3</sup>	3.70x10 <sup>3</sup>
5	HYDROCARBON DEGRADING BAC.	-	-	-	3.90x10 <sup>3</sup>	4.20x10 <sup>3</sup>	2.80x10 <sup>3</sup>	3.10x10 <sup>3</sup>	2.80x10 <sup>3</sup>	2.20x10 <sup>3</sup>
6	TOTAL HETEROTROPHIC FUNGI	-	-	-	2.10x10 <sup>3</sup>	1.95x10 <sup>3</sup>	1.20x10 <sup>3</sup>	1.92x10 <sup>3</sup>	1.40x10 <sup>3</sup>	1.20x10 <sup>3</sup>
7	HYDROCARBON DEGRADING FUNGI	-	-	-	1.30x10 <sup>3</sup>	1.00x10 <sup>3</sup>	1.10x10 <sup>3</sup>	1.30x10 <sup>3</sup>	0.90x10 <sup>3</sup>	0.80x10 <sup>3</sup>

FOR: KNL LAB COORDINATOR

APPROVED BY: KNL: MANAGING DIRECTOR



**LABORATORY ANALYTICAL REPORT**

REPORT NO.:	KNL/LAB.011221/11/2012/PH	INCIDENCE :	LEGACY
CLIENT:	SHELL PETROLEUM DEVELOPEMENT CO.	SAMPLED BY:	SPDC/KNL
TYPE OF SAMPLE:	SOIL SAMPLE	DATE SAMPLED:	20 -27/ 11/ 2012
SAMPLE ORIGIN:	B-DERE	DATE RECEIVED:	07 - 01 - 2013
SAMPLE SOURCE:	OSEL II TEST	DATE OF REPORTING:	11 - 01 - 2013

S/N	PARAMETERS	METHODS	UNIT	DPR Max. INTERVENTION LIMIT	RESULT				Detection limit
					A14 <sub>TOP</sub>	A14 <sub>BOT.</sub>	A21 <sub>TOP</sub>	A21 <sub>BOT.</sub>	
	<b>PHYSICAL CHARACTERISTICS</b>				20-11-2012	20-11-2012	27-11-2012	27-11-2012	
1	TEMPERATURE	-	°C	-	-	-	-	-	-
2	pH	ASTM D1293B	-	-	6.70	6.70	6.80	6.80	1 X 10 <sup>-2</sup>
3	DISSOLVED OXYGEN	APHA 422B	mg/l	-	-	-	-	-	-
4	ELECTRICAL CONDUCTIVITY	ASTM D1125	µS/cm	-	-	-	-	-	-
5	SALINITY	APHA 2520	mg/kg	-	-	-	-	-	-
6	TOTAL SUSPENDED SOLIDS	ASTM D1868	"	-	-	-	-	-	-
7	TOTAL DISSOLVED SOLID	ASTM D1868	"	-	-	-	-	-	-
8	TURBIDITY	APHA 2130	NTU	-	-	-	-	-	-
9	ODOR	-	-	-	-	-	-	-	-
	<b>PHYSIOCHEMICALS</b>								
1	NITRATE	ASTM D3867	mg/kg	-	-	-	-	-	-
2	SULPHATE	ASTM D516	"	-	-	-	-	-	-
3	HYDROGEN SULPHIDE	ASTM D4658	"	-	-	-	-	-	-
4	CYANIDE	APHE 408C	"	-	-	-	-	-	-
5	BICARBONATES	ASTM D3867	"	-	-	-	-	-	-
1	<b>METALS:</b> ARSENIC	ASTM D2972	mg/kg	55	<0.001	<0.001	<0.001	<0.001	1 X 10 <sup>-2</sup>
2	BARIUM	ASTM D4382	"	625	85.46	85.26	48.10	48.95	1 X 10 <sup>-2</sup>
3	CADMIUM	ASTM D2576D	"	12	1.72	1.90	0.01	0.01	1 X 10 <sup>-2</sup>
4	COBALT	ASTM D3558A	"	240	21.32	20.90	19.03	18.11	1 X 10 <sup>-2</sup>
5	CHROMIUM	ASTM D2972	"	380	16.85	16.91	8.02	7.89	1 X 10 <sup>-2</sup>
6	COPPER	ASTM D1688D	"	190	29.40	29.73	21.90	21.92	1 X 10 <sup>-2</sup>
7	NICKEL	ASTM D1886C	"	210	10.52	9.04	8.41	9.63	1 X 10 <sup>-2</sup>
8	MERCURY	ASTM D3229	"	10	<0.001	<0.001	<0.001	<0.001	1 X 10 <sup>-2</sup>
9	LEAD	ASTM D3559	"	350	19.86	15.00	9.86	9.88	1 X 10 <sup>-2</sup>
10	ZINC	ASTM D1691 C	"	720	56.32	52.56	48.55	50.40	1 X 10 <sup>-2</sup>
1	<b>HYDROCARBONS</b> TPH	GC (FID)	mg/kg	5000	935.54	972.19	532.03	469.11	0.05
2	BTEX	"	"	206	<0.05	<0.05	<0.05	<0.05	0.05
3	PAH	"	"	40	9.08	8.10	0.08	0.09	0.05
4	PHENOL	"	"	40	-	-	-	-	-
5	TOG	UV-SPEC.	"	-	-	-	-	-	-
	<b>BIOLOGICALS</b>								
1	BOD	APHA 507	mg/l	-	-	-	-	-	-
2	COD	ASTM D1252	"	-	-	-	-	-	-
3	COLIFORM	MPN COUNT	MPN/100ml	-	-	-	-	-	N/A
4	TOTAL HETEROTROPHIC BACTERIA			-	3.60x10 <sup>4</sup>	3.60x10 <sup>4</sup>	2.50x10 <sup>4</sup>	3.00x10 <sup>4</sup>	"
5	HYDROCARBON DEGRADING BAC.			-	1.90x10 <sup>3</sup>	2.00x10 <sup>3</sup>	1.30x10 <sup>3</sup>	1.80x10 <sup>3</sup>	"
6	TOTAL HETEROTROPHIC FUNGI			-	1.40x10 <sup>3</sup>	1.20x10 <sup>3</sup>	1.05x10 <sup>3</sup>	1.00x10 <sup>3</sup>	"
7	HYDROCARBON DEGRADING FUNGI			-	0.90x10 <sup>3</sup>	0.90x10 <sup>3</sup>	0.60x10 <sup>3</sup>	0.69x10 <sup>3</sup>	"

 FOR: KNL  

 LAB.COORDINATOR

 APPROVED BY: KNL:  

 MANAGING DIRECTOR

The Nigeria Shell test/demonstration site was contaminated with Nigerian crude oil, there were areas with some surface water. The area was cleared of debris and the soil was plowed/tilled into rows, and the application of OSE II was performed by Shell employees. Shell employees performed sampling of the soil from the top of the wind row and the bottom of the wind rows on 5 different occasions starting just before the application of OSE II to get a starting point.

The following pictures shows the site before tilling/plowing and application of OSE II and after application of OSE II.



Nigeria, Shell site where oil had spilled into the soil and ground water



Nigeria Shell's areas of the spill where there was associated debris before clearing the debris





Nigeria, Shells spill contaminating soil and surface ground water



Nigeria, Shells spill contaminating soil and more surface ground water





Nigeria, the clean up contractor Giolee Global Resources LTD preparing the soil for application of OSE II



Nigeria Shell spill site final handling of the soil before application of OSE II



Nigeria Shell spill site, after the application of OSE II, the soil TPH remediated from the top of the soil 97.55% in 21 days, from the bottom of the soil the TPH remediated 95.4% in 21 days, the PAH's from the top of the soil remediated 99.8% in 21 days and the PAH's from the bottom of the soil remediated 99.805% in 21 days, proving OSE II is the solution to clean up the Nigerian Shell Ogoniland spill.