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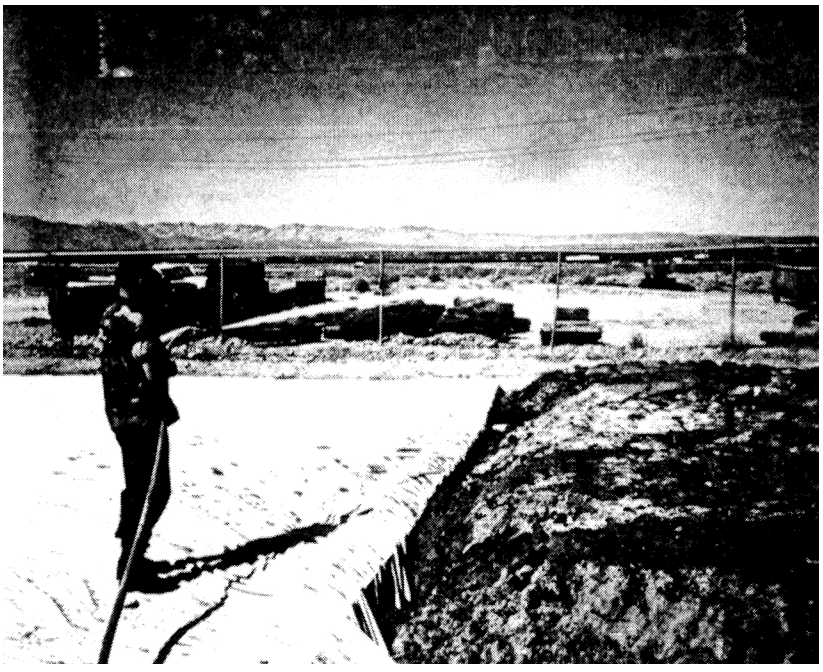
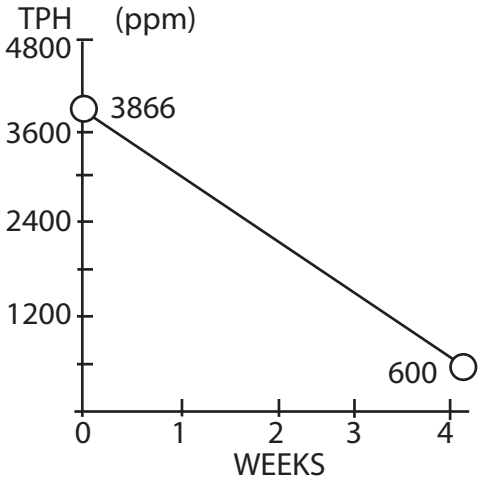
DIESEL CONTAMINATION CLEANUP SUMMARY 27 July 1993
U.S. Marine Corps, 29 Palms, CA

CONTAMINANT: 89 cubic yards of aged Diesel Contaminated Soil. The soil was spread out in a rectangle approximately 33 inches deep. NOTE: Our instructions specify no deeper than 18 inches.

PROCEDURE: 29 Palms initial composite sample was 3,986 ppm TPH using EPA Test 8015 modified. 29 Palms applied 40 gallons of OSE II mixed with 2,000 gallons of pond water to the contaminated soil. They used a tanker truck and fire hose to apply the liquid.





29 Palms did not disc or add any additional water to the contaminated soil for the next four (4) weeks. NOTE: Our instructions specify to disc the soil at least once a week and keep the soil at a level of approximately 30% humidity.

29 Palms took samples after 4 weeks and had a composite reading of 600 ppm TPH.
THE ACCEPTABLE LEVEL IS 1,000 ppm TPH.

COMMENT: EVEN THOUGH 29 PALMS . . .

1. Piled the contaminated soil almost twice as deep as our instructions specify, and

2. Did not disc the contaminated soil at all during the 4 weeks, and

3. Did not add additional water to the contaminated soil in the desert climate –

"OIL SPILL EATER" II W O R K E D!!

4. Think of what the TPH level might have been had 29 Palms followed our OSEI Procedures?

Q. A. (George) Lively
Rear Admiral (RET)
President

UNITED STATES MARINE CORPS
NATURAL RESOURCES and ENVIRONMENTAL AFFAIRS
Marine Corps Air Ground Combat Center
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5090
MEMORANDUM 9
15 Oct 93

From: Installation Restoration (IR) Specialist
TO: FILE

SUBJ: TESTING AND EVALUATION OF ENZYMATIC CATALYSIS FOR THE REMEDIATION OF PETROLEUM CONTAMINATED SOILS.

1. On 20 July 1993, MCAGCC began a testing and evaluation demonstration of a commercially available product of a natural biological enzymatic catalyst for the remediation of petroleum contaminated soils. The product, Oil Spill Eater II (OSE II), is on the National Contingency Plan Product Schedule of Biological Additives and is authorized for use by On-Scene Coordinators on releases of petroleum oil.

2. Before the Combat Center deploys this additive on a petroleum spill site or in the remediation of soils resulting from a spill, the Command decided to try the product on a small scale for its effectiveness. A summary of the results are as follows:

- A control pile was constructed by berming and double lining (2–40 mil thick HDPE Liners) of a test area 21 feet x 42 feet. Non-hazardous soils under 40 CFR or Title 22 of CFR was placed in a 2' 9" high lift on top of the liner; resulting in approximately 69 cubic yards of petroleum contaminated soils from oil/water separators (OWS) to be tested with the product.

- Three soil samples were obtained on 26 July 93 within the pile and were sent to an off-site laboratory for the analysis of BETZ by EPA 8020. Total Fuel Hydrocarbon by EPA 8015 (modified) as Diesel and Organic Lead by DHS Method.

- On 28 July 1993, the test product was mixed according to manufacture application specifications of 40 gallons of product to 2,400 gallons of water. Application over the pile was accomplished by spraying with a 1,000 gallon water truck equipped with a 50 gpm pump. The pile was then covered with a black 12 mil thick plastic.

- On 30 August 1993, three additional samples were taken to check progress of remediation. The samples were sent to an offsite laboratory for the same analysis of the initial sampling event. Due to lack of manpower, sampling could not begin being conducted at a two week interval.

3. The results are as of the testing as follows:

INITIAL SAMPLING EVENT OF 26 July 93 (1)

	Sample Number	OS-1	OS-2	OS-3
Analyte	Reporting Limit mg/kg		Concentration mg/kg	
Benzene	0.005	<0.05	<0.05	<0.05*
Toluene	0.005	<0.05	<0.05	0.77
Ethylbenzene	0.005	<0.05	<0.05	0.26
Xylene, total	0.015	<0.15	<0.15	1.6
BTEX, total	---	---	---	2.6
TPH as diesel	10	2000	1400	8200
Organic Lead**	0.5	0.5	0.5	1.2

SAMPLING EVENT OF 30 AUGUST 1993

	Sample Number	OS1-A*	OS1-B*	OS1-C*
Analyte	Reporting Limit mg/kg		Concentration mg/kg	
Benzene	0.005	<0.05	<0.05	<0.05
Toluene	0.005	<0.05	<0.05	<0.05
Ethylbenzene	0.005	<0.05	<0.05	<0.05
Xylene, total	0.015	<0.15	<0.15	<0.15
BTEX, total	---	---	---	---
TPH as diesel	10	820	380	600
Organic Lead	0.5	<0.5	<0.5	<0.05

(1) Holding time was missed due to shipping of initial sampling delays.
* Reporting limit raised due to matrix effect (foaming).
** Extraction by DHS Method. Results are calculated on a wet weight basis. Total Organic Lead in Soil by Flame AA – DHS.

Subj: TESTING AND EVALUATION OF ENZYMATIC CATALYSIS FOR THE REMEDIATION OF PETROLEUM CONTAMINATED SOILS.

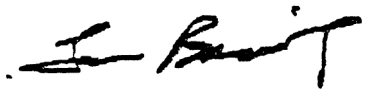
4. It is assumed the reason for the matrix foaming of the samples are due to surfactants in the soil and from the test product.

5. On the 30 August 1993 sampling event, soil samples were moist to saturated from the application of product. No tilling or turning of soils were required as recommended by the contractor.

6. Results indicate bioremediation of soils within acceptable levels required by the Regional Water Quality Control Board (RWQCB) for the soils to be used as landfill cover.

7. A request for disposal of remediated soils at the MCAGCC Class III landfill will be forwarded to the RWQCB.

8. Additional, test piles will be run in the future utilizing OWS, JP-5 and diesel contaminated soils based on the availability of manpower.



LEON BOWLING