OIL SPILL EATER INTERNATIONAL, CORP.

13127 Chandler Drive
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BOD COD SUMMARY
(Biological Oxygen Demand / Concentrated Oxygen Demand)

When a given area receives or becomes contaminated with a given carbon based contaminate the BOD/COD is automatically affected!

Oil Spill Eater II **(OSE II)** in and of itself only slightly affects BOD/COD regardless of the application rates of OSE II. The effect of using OSE II would, at most, be 5% to 10% on the BOD.

In any area where there is water movement or tidal action, the BOD/COD uptakes effects would be minimal to the alternative of leaving an untreated contaminant in place where it could potentially affect the BOD/COD or harm waterfowl, birds, mammals, fish and plant life.

The potential of long-term problems of leaving a contaminant in place should be of more concern than minutely affecting the BOD/COD by using OSE II.

In our experience, BOD and COD problems really only need to be addressed where you want to treat a contaminant in a closed system or a small body of water where there is no inflow of water. Even in these systems, the BOD/COD can be maintained simply by pumping air into the system or pumping the water into the air, or by causing an inflow of water to the area that has become contaminated.

Oil Spill Eater II was used on a 3-acre pond with fish and wildlife swimming in the water where approximately 1 1/2 acres of the pond was covered with crude oil from a pipeline break. We applied our product on the shoreline to remove the crude oil from the grasses, plant life and marsh area. OSE II was then applied to the main body of the spill. A circulation pump was set out in the middle of the pond where water was pumped up in the air. There were fish, snakes and turtles observed swimming in the water away from the spill and no fish or wildlife died. It took 3 days for bacteria growth to be visible to the human eye and in 5 days visible clean patches started appearing in the crude oil where the bacteria was converting the oil to CO_2 and water.

SUMMARY

BOD/COD concerns where there is an open system is minimal, compared to long term problems of leaving a contaminant in place untreated. If you want to or feel addressing the BOD/COD problem is needed, then pumping air into the area or moving the water is easily performed and should be attempted over leaving an untreated contaminant in place.

The RRT/Onscene Commanders require even one gallon spills to be reported and mechanically cleaned up. How can they authorize leaving a large spill (25,000 gallons) in place and untreated. If there is enough contaminate to adversely affect the BOD/COD in any eco system, then the contaminant itself would choke the life out of everything.

We would think that you would want to return any given eco system to it's pre-spill conditions as fast as possible by utilizing a product such as OSEI.

BY: Steven R. Pedigo
Chairman

SRP/AJL

To Whom this may concern,

re: OSEI's product for petroleum hydrocarbon remediation in aquatic environments.

This report is in response to concerns expressed by U.S. EPA regulatory officials about the use of OSEI's product in surface waters for remediation of petroleum hydrocarbon spills. I understand that this concern is for the potential increase in biochemical oxygen demand (BOD) as a result of administering OSEI's product to remediate contaminated water. My research over the last several years has been involved in testing various aeration and management techniques used to overcome severe oxygen depletion in the hypolimnion of eutrophic lakes. I have even evaluated the use of Bact-A-Pur® for its potential to reduce sediment organic matter. Specific goals have included remedial practices for winterkill prevention, maintaining an oxidized microzone at the sediment surface to minimize dissolution of iron, manganese, sulfides, reduced organic acids and methane into the water column of eutrophic lakes. In performing these tests it has been necessary to isolate, measure and model sources of oxygen depletion including sediment chemical and biological oxygen demand, phytoplankton respiration and methanogeneses in anaerobic sediments. This research has culminated in the completion of a Ph.D. thesis under the direction of W.C. Mackay and Dave Schindler at the University of Alberta and several publications have been submitted or are currently being written concerning this aspect of limnology. Further, I was indirectly involved in but have extensively reviewed the data and discussed the results of bioremediation testing with the experts involved in the Exxon Valdez disaster in Alaska.

After review of information provided to me by George Lively, President of OSEI, Inc. I have the following comments.

Bioremediation, and specifically the OSEI product, is undoubtedly an effective and inexpensive approach for the remediation of petroleum hydrocarbon spills. In addition, although the efficacy of earlier tests for bioremediation products in rivers ans streams was questionable the OSEI product particularly appears to emulsify, and maintain the oil at the surface as it proceeds to degrade the spill. This characteristic is particularly beneficial in its use in lentic systems and has and will continue to prove to be an ideal application of this new technology. Specifically, there are several factors which should be pointed out which support this position and explain why this application will have minimal or no impact on the BOD in lentic aquatic systems.

1. The specific species of bacteria which the enzyme and nutrient solution are designed to target are but a tiny minority of the aerobic bacterial community of freshwater and marine ecosystems. Hence, there will be only a minuscule increase in the overall bacterial community with a concomitant minuscule (although not likely measurable), increase in BOD.

The small addition of nutrients may, however, temporarily enhance the phytoplankton population in very small bodies of water.

2. This possibility would be even further reduced for a hydrocarbon spill in freshwater or coastal wetlands. This is because theses systems are inherently hypereutrophic and hence already possess large amounts of organic matter with associated high rates of BOD. (I have observed such water bodies to range in DO from > 15 mg L^{-1} in mid-afternoon to 0 mg L^{-1} for several pre-dawn hours). Hence, an additional small amount of BOD would likely neither be observed nor have any

additional ecological impacts to the present system. Further, the small nutrient additions will likely not exceed background values for nitrogen and phosphorus in these productive systems

3. One of the greatest merits of this product is that, because the oil-degrading bacteria use only petroleum hydrocarbons as substrates, these populations will diminish to pre-spill low abundance once hydrocarbons are oxidized. Hence, after just a few weeks of treatment the aquatic ecosystem will revert to pre-spill conditions.

4. Even an accidental excessive dose of the OSEI product would have no toxicological consequences and would result only in a minor and temporary increase in nutrients and possible phytoplankton growth. In comparison with other remediation techniques which require dredging, pumping and treating or air stripping, the use of this product is much cheaper, incurs minimal collateral ecological damage and leaves no physical, toxicological or ecological impairment.

T. G. Miller

Theron G. Miller
President, Aquatic Solutions, LLC

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TEST ON MOBILIZING

PRUDHOE BAY CRUDE

Performed by Steve Hinton - Exxon U.S.A.

A Shaker Flask Test was performed using Prudhoe Bay Crude and "OIL SPILL EATER II" mixed 50 parts seawater to One (1) part OSE II.

Rocks covered with 400 grams of Prudhoe Bay Crude were coated with 400 ml of diluted "OIL SPILL EATER II". Steve Hinton at Exxon claimed that OSE II mobilized all the Prudhoe Bay Crude in about 6 to 8 hours.

This shows OSE II is very effective in cleaning oil off of rocks and was proven by Exxon.

Test was performed on January 4th and 5th, 1990.

Steven R. Pedigo
Chairman

SRP/AJL

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April 23, 1990

Percolation Rate of
Oil Spill Eater

1. Objective of experiment was to determine the depth of percolation of Oil Spill Eater the rate of percolation involving several potential beach materials.

2. 4 clear troughs 24" L x 18" W x 10" D were used with ¼" markings on all sides.

   A. Trough number 1, had a sand and gravel mixture of ¼" sand and ½" ⅛" gravel 6" deep. It was placed on a screen held 1" above the bottom of the trough. Screen contained slits that were 5 microns in size.

   B. Trough number 2, had a predominately gravel base with a small amount of sand mixed in. Gravel was 1" rock diameter, and this gravel was placed on a screen held 1" above the bottom of the trough. Screen contained slits that were 5 microns in size.

   C. Trough number 3, used small boulders of 6" in diameter. Boulders were placed on a screen held 1" above the bottom of the trough. Screen contained slits that were 5 microns in size.

   D. Trough number 4, a mixture of 1" gravel and 6" boulders were placed on a screen held 1" above the bottom of the trough. The screen contained slits that were 5 microns in size. The screen was covered with a 2" layer of 1" rock. The 2" layer of rock was then coated with an ⅛" of an inch of Prudoe Bay Crude.

3. All 4 troughs material was saturated with Alaskan sea water that was 40°f. Red dye was mixed with OSE to visually observe percolation depth.

5. A ¼" of an inch layer of OSE was then applied and visual data was then noted.

PERCOLATION TEST

Results

Once of the volume of the 50 to 1 OSE had percolated to the bottom of the trough, then time was noted. Depth of Red Dye was used as a leading edge indicator.

A. Trough number 1, OSE percolated quickly to 4" then slowed somewhat, and at 47 minutes of the original OSE volume was measured in the bottom of the trough.

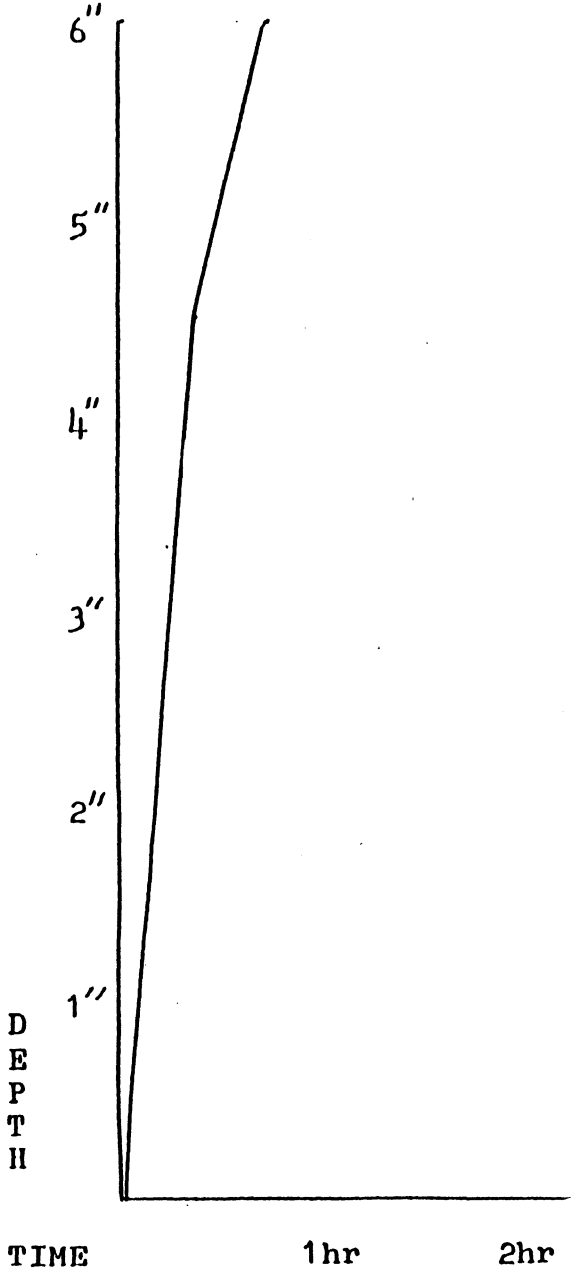
B. Trough number 2, OSE percolated quickly to 4½ inches and still proceeded quickly and at 28 minutes, of the original OSE volume was measured in the bottom of the trough.

C. Trough number 3, OSE percolated to the bottom of the trough about as fast as it was applied.

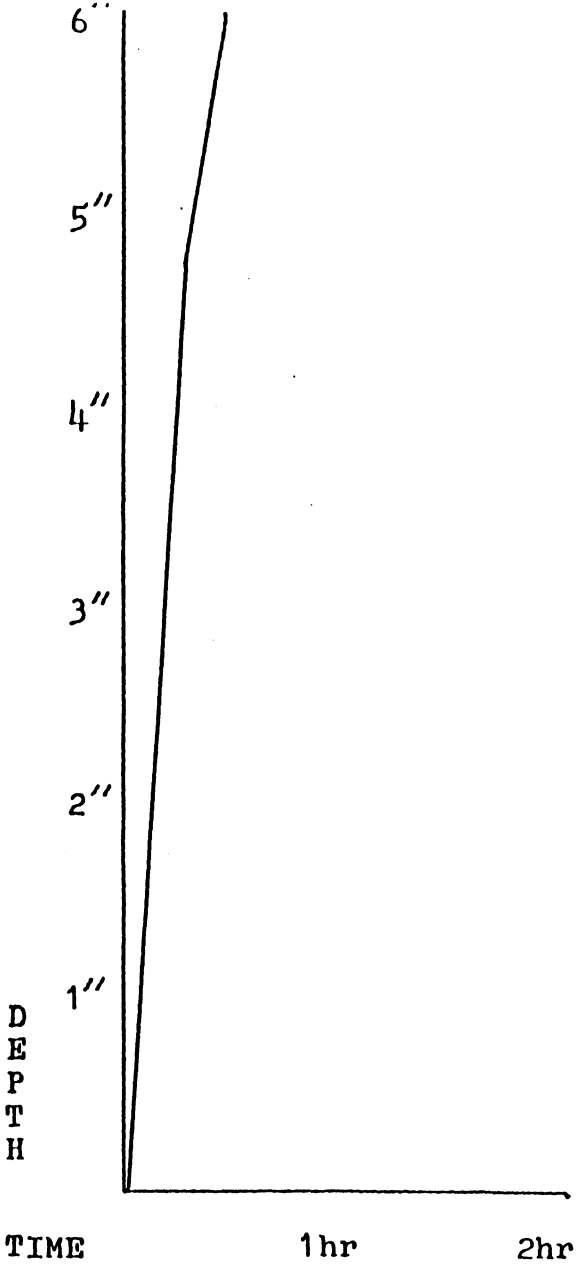
D. Trough number 4, OSE percolated almost as fast as it was applied to the depth of the 1" rocks coated with the Alaskan crude. Once OSE reached the point of contact with the crude, percolation slowed substantially. What was reaching the bottom of the trough was OSE and the Alaskan crude. In 3 hours and 53 minutes, a volume of of the original OSE volume was noted. However, this may not have been precise since the crude that was being mobilized and percolating may have made up some of this volume. Percolation may have slowed due to the OSE adhering to the crude, then mobilizing the crude and then this mixture percolated slower.

Tests were preformed by Steven R. Pedigo.

Steven R. Pedigo
Chairman



TROUGH #1



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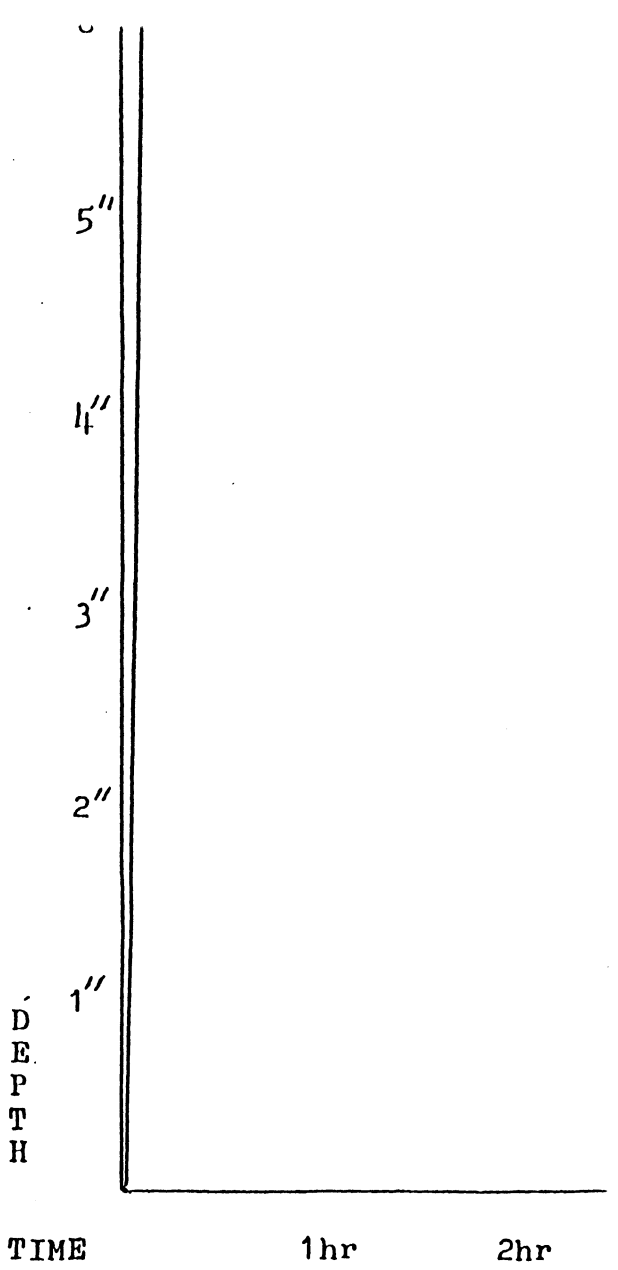
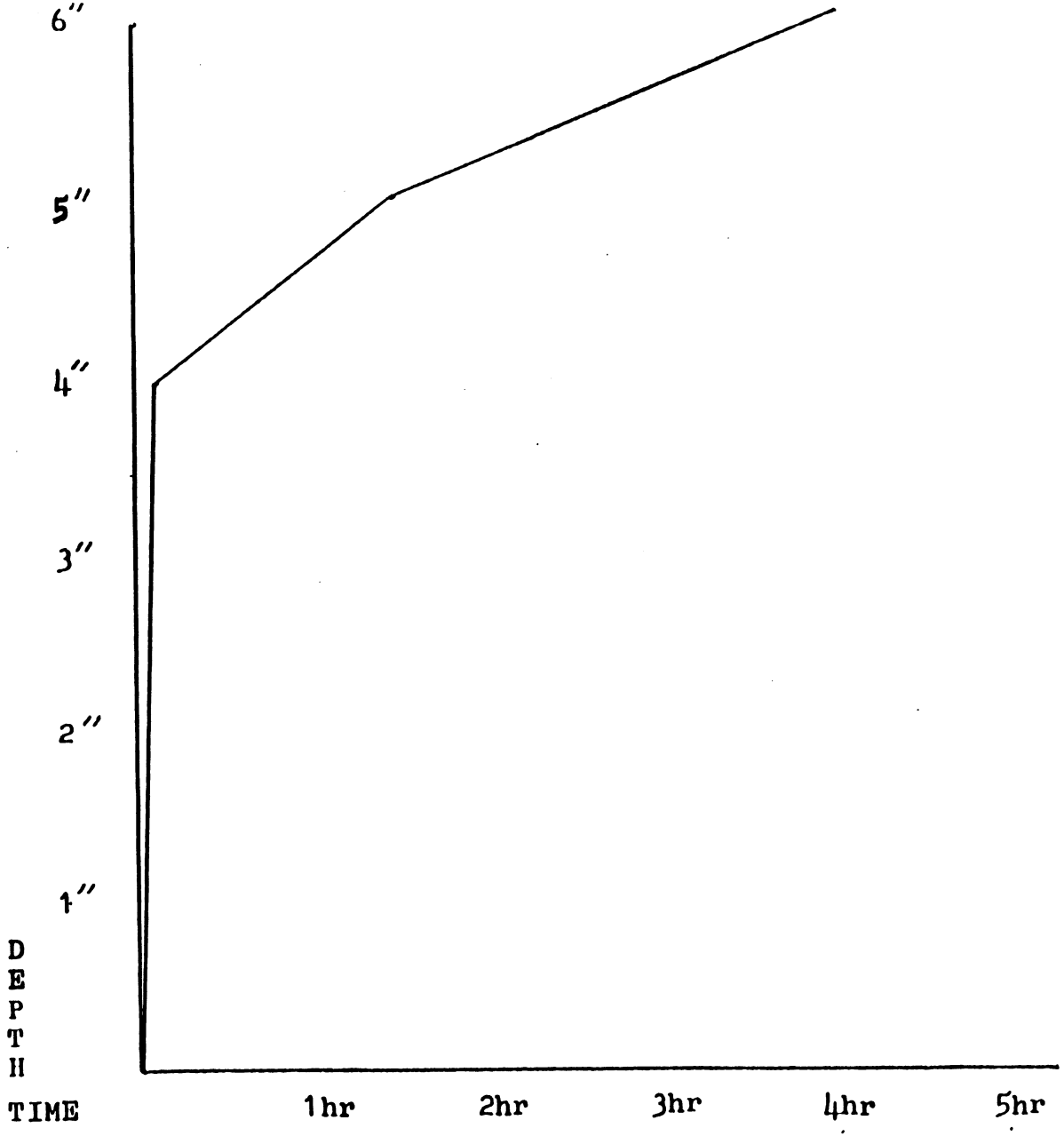


TROUGH #3

PERCOLATION RATES



TROUGH #4 PERCOLATION RATE

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June 23, 1999

"OIL SPILL EATER" II (OSE II)

SWIRLING FLASK DISPERSANT EFFECTIVENESS TEST

The attached test by the Southwest Research Institute in San Antonio shows the following information as to the effectiveness of "OIL SPILL EATER" II as a Dispersant for oil:

Note: Time of test is 30 minutes.

1. Percent of Dispersed Oil due to OSE II:

   Effectiveness = 0%

2. Percent Dispersed Oil without OSE II:

   Effectiveness = 62%

3. Since the molecular weight of the crude oil tested is many times that of diesel, jet fuel, or gasoline, OSE II will prevent these lighter oils from sinking into the water column.

4. When you have a spill and have to wait for the clean-up crew or contractor to rig booms and skimmers, the elapsed time could be hours. This would allow a greater percentage of the oil to sink into the water column.

5. By immediately applying "OIL SPILL EATER" II to the spill, you:

   A. Keep the oil out of the water column.

   B. Eliminate the fire hazard.

   C. Protect the Eco-System.

   D. Get rid of the oil through Bioremediation (turns into CO_2 and water).

O. A. (George) Lively
President

OAL/AJL

SOUTHWEST RESEARCH INSTITUTE

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PETROLEUM PRODUCTS TEST REPORT

June 22, 1999

George Lively
Oil Spill Eater International, Corp. (OSEI)
13127 Chandler Drive
Dallas, TX 75243
(972)-669-3390
(972)-644-8359 FAX

RE: Swirl Flask Dispersant Effectiveness Test

SwRI Project Number: 08-2326-088 Workorder: 8783

Dear Mr. Lively:

The "Oil Spill Eater II Concentrate (OSEI)" sample you submitted for Swirl Flask Dispersant Effectiveness Test has as been completed. We received the 8-oz glass jar in good condition on June 8, 1999. The test results are summarized in the attached test report.

Test aliquots were taken in accordance with the manufacturer-suggested procedure. Test conditions are outline in Federal Register/ Volume 59. Testing was performed in accordance with the test procedure used with on deviation or modifications. The analyses pertain only to the sample received by Southwest Research Institute and represent only a sampling of a batch. This report shall not be reproduced exempt in full without the express written permission of Southwest Research Institute.

If we may be of further assistance, or if there are any questions concerning this analysis, please contact me at (210) 522-2024.

Sincerely,

Rose Hill Ward
Research Scientist
Petroleum Products Research Department
Automotive Products and Emissions Research Division

SAN ANTONIO, TEXAS
HOUSTON, TEXAS • DETROIT, MICHIGAN • WASHINGTON, DC

PETROLEUM PRODUCTS TEST REPORT

Oil Spill Eater II Concentrate (OSE II)

Swirl Flask Dispersant Effectiveness Test

TEST	RESULTS	DATE TESTED
% Dispersed with no Dispersant (OSE II)	$EFF_c=(C_{mean}/C_{tot})*100$ **$EFF_c=62.00\%$**	6/21/99
% Dispersed oil with dispersant (OSE II) added	$EFF_a=(C_{mean}/C_{tot})*100$ **$EFF_a=14.56\%$**	6/21/99
% Dispersed oil due to dispersant (OSE II) only	$EFF_D= EFF_a- EFF_c$ $EFF_D=14.56\%-62.00\%$ **$EFF_D=0.00\%$**	6/21/99

Two standards used for this testing were Prudhoe Bay and South Louisiana Reference oils and were obtained through Resource Technology Corporation. The standards were used to determine the response factor.

The OSEI II test dilution is a 1:10 ratio.

The "% Dispersed Oil with no dispersant (OSE II)" contained only the reference oil. The control was used to determine the maximum amount of oil that would naturally leach into the synthetic seawater.

The '% Dispersed oil with dispersant (OSE II) added" contained the oil and an OSEI II as dispersant to determine the effectiveness of the dispersant.

The "% Dispersed Oil due to dispersant (OSE II) only" was a calculated average of eight determinations (four replicates from the South Louisiana reference oil and four replicates from the Prudhoe Bay reference oil).

The results of this testing determine that the OSE II product is totally **ineffective** dispersant according to "Swirling Flask Dispersant Effectiveness Test."

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