

Oil Spill Response Methodology Listed on NCP Schedule: Bioremediation Agent Type Enzyme Additive [EA] Category

Efficacy Documentation Summary: EPA NETAC & other Tests, Trials, Long Term Field Application Of Oil Spill Eater II (OSE II) – US Military Designated Sole Sourced EA Type Agent for First Response Oil Spill Cleanup

Since 1989, a one of a kind EA Type agent has **effectively cleaned up** more than **23,000 hydrocarbon based spills**.

The product, ***Oil Spill Eater II***™ (OSEII) has **been independently and rigorously tested** in scientific settings the world over.

It is **distributed in more than 40 Countries**, listed on the US EPA's National Contingency Plan for Oil Spills (NCP); OSE II is also listed in the U.S. Defense Logistics supply chain and the Navy DENIX system as BAA Book 18 number 14.

Can be used safely and cost effectively used anywhere on oil spills, wastewater treatment, groundwater contamination sites, harbors, airports, refineries and any oil or fuel spill prone location or storage facility. It is also safe and non-toxic in sensitive habitats such as salt water marshes, fresh water environments, ocean and marine eco systems, rivers, inlets, public beaches etc.

The lingering and persistent impact of the BP Oil Spill in the Gulf of Mexico has brought about a re-examination of the efficacy of current spill response systems, especially in light of the toxic side effects of dispersants.

There is growing demand for alternatives to chemical dispersants. This is an executive summary of hundreds of pages of documentation supporting this dispersant-alternative response method.

ENZYME ADDITIVE BIOREMEDIATION – MODE OF ACTION

THE PROCESS

When this EA Type Agent is applied to a spill:

- The [biosurfactants](#) attack the molecular structure of the Hydrocarbon, by breaking the spill into small particles, then the oil is solubilized which increases the oil/water interface--all in approximately 30 minutes.
- During this process the OSE II [enzymes](#) form protein binding sites that act as catalysts to induce the enhanced bacteria to utilize the broken down hydrocarbon as a food source.
- concurrently, OSE II's nutrient system is rapidly colonizing indigenous bacteria (OSE II does not introduce non indigenous bacteria into any eco system).
- once these reactions have taken place, several conditions become evident:
 - a. the oil is broken up, adhesion properties are diminished (which causes oil to release from marsh grass, vessels, BIRDS, marine species, beaches and more)
 - b. the fire hazard is reduced (which protects responders & ports)
 - c. the oil is caused to float (which prevents secondary contaminated areas and water column oxygen depletion) and most importantly
 - d. the oil is detoxified so it can be used as a food source at which point the oil is digested to an end point of CO₂ and water;
- As the indigenous bacteria run out of the OSE II nutrients the bacteria then utilize the only food source left, the detoxified oil.
- There are also [constituents](#) in OSE II that once mixed and activated with water in the same region cause OSE II constituents to molecularly adhere to hydrocarbons. Hence, no matter where the current or tidal action pushes the oil, OSE II will stay with it.

SCIENTIFIC TESTING, THIRD PARTY ENDORSEMENTS

EFFICACY TESTS, SCIENTIFIC STUDIES

OSE II can be used on the surface, below the surface, on the ocean floor, in marshes, estuaries, and sand or soil, beaches on rocks, in bays, ports and harbors. Ample case studies are available to prove it's workability in all mediums. OSE II is virtually non-toxic and extremely effective in breaking down oil and fuels. We suggest you go to OSEI Corporation's [Technical Library](#) to view the following:

(to view documentation and actual test reports, click the blue links below)

Salt Water Efficacy Tests:

- U.S. EPA / NETAC 21 Day & 28 Day Bioremediation Test - Biodegraded Alaskan Crude 98% in 21/28 days. (pg 25-35)
- U.S. Respirosity Test – EPA determined OSE II to reduce hydrocarbons by 98% and aromatics by 85% which was better than any other product tested. (pg 41-44)
- University of Alaska (Dr. Brown) PAH Test – Demonstrates that OSE II with mineral nutrients and hydrocarbons is **300%** more effective than without OSE II. (pg 45-49)
- Mega Borg Ship Spill in Gulf (South African Crude Oil) Test – In 216 hours OSE II lowered TPH from 100,070 ppm to 516 ppm for a 99.5% reduction. (pg 50-52)
- BETX Bioremediation Test- OSE II can even work well on Benzene, Ethyl Benzene, Toulene and Xylene ratios demonstrate the potential to biodegrade as much as 98%. (pg 53-56)

Fresh Water Efficacy Tests:

- Chevron Crude Oil Bioremediation Test- OSEII on Chevron Crude in 24 days reduced 95,200 ppm to 690 ppm or 99.8% effective on biodegrading this oil.

Soil Efficacy Tests:

- U.S. Marine Corps Base 29 Palms California (Cleanup Won Environmental Award) (pg 1-5)

Salt Water Species Marine Toxicity Tests

- U.S. EPA / NETAC Mysid Toxicity Test (this test was run twice) – LC50 Test, at 96 hours OSE II greater than 2100 mg/L.
- Both Mummichog and Artemia Salina Toxicity Test – LC50 Test, at 48 hours OSE II is 5285 mg/L. (pg 14-23)

EPA/NETAC testing performed by the University of Western Florida under contract from the US EPA Hap Prichard Gulf Breeze Florida performed toxicity testing with OSE II where in a simulated open water test OSE II was applied to oil and the effluent was tested on two different species and the average LC 50 was above 5000 showing OSE II is virtually non toxic which is a good indicator of how OSE II would work in the field. This test also tested for degradation of the oil and the tests showed OSE II was impressive at remediating the oil. The link to their test information is <http://www.nbiap.vt.edu/brarg/brasym95/kavanaugh95.htm>

Toxicity testing from the above open water mesocosim effluent as well as toxicity testing the US EPA, Environment Canada, as well as toxicity tests for the South Korean government approval, and others proving OSE II is non toxic to salt water and fresh water species is at the following link <http://osei.us/wp-content/uploads/18-Toxicity-test-with-4-2012-Log0.pdf>

See Appendix I at end of this document for Summary of EPA Testing and work with Enzyme Additive Bioremediation

Fresh Water Species Marine Toxicity Tests:

- Rainbow Trout Toxicity Test by Environment Canada-Toxicity tests state 1000 mg/L or less is toxic. Anything higher is acceptable and considered non-toxic. OSE II, test result 10,000 mg/L = non-toxic.

Beneficial Environment Effects:

- Biological Oxygen Demand for OSE II –OSE II has minimal impact on BOD, less than 7%.
- Dispersant Swirling Flask Test - Proves OSE II causes oil to float

THE SCIENCE & MODE OF ACTION- NRT BIOREMEDIATION FACT SHEET REVISION

See Link:

Bioremediation Techniques, Category Definitions, and Mode of Action in Marine and Freshwater Environments

Environmental Organizations have vetted OSE II and advocate its use as a non-toxic alternative for dispersants. The Science & Technology Advisory Board of the Lawrence Anthony Earth Organization (LAEO) published a significant position paper entitled [***A Call for a Twenty-First-Century***](#)

[Solution in Oil Spill Response](#). This paper lists OSE II as a workable alternative to toxic dispersants for cleaning up oil spills.

PRODUCT DEMONSTRATIONS/BRIEFINGS

Dubai

https://www.dropbox.com/s/0q9bl9238qqxq2q/IMG_2325-1.MOV

ARABIAN GULF

<http://osei.us/archives/1135>

Thane Creek India

<http://youtu.be/3mBT7XcsfzY>

WHERE BIOREMEDIATION ENZYME ADDITION TYPE/OSE II CAN BE USED

http://osei.us/Tech%20Manual/OSEII_Contaminates_OSEII_has_bioremediated.pdf

Shoring up Mother Nature's own remedies, [Oil Spill Eater II](#) is a one of a kind environmentally safe and cost effective bioremediation process for the mitigation of hazardous waste, spills and contamination--virtually anywhere and of any size.

LOW COST CLEANUP—SEE THE NUMBERS

OSE II is the least expensive means to clean up a spill, the easiest to apply and actually address 100% of a spill and the safest for the responders and the environment.

There is no secondary clean up when using the product (anything to haul off or move which does not eliminate toxins from the environment) and there is only one application of OSE II required. OSE II is easily applied by mixing it 50 to one in tanks with spray applicators and in the example above, apply one liter or gallon of the OSE II and water mixture to each liter or gallon of spilled hydrocarbons. Or you can educt OSE II at 2% from fire trucks, or vessels, barges and some ports; and apply 1 gallon or liter of 50-1 mixture to each gallon or liter spilled.

With effectiveness of dispersants now in question, alternative cost effective solutions are in high demand.

The attachment entitled **Economic Comparison** will show you why OSE II can save money on spill response cost, and natural resource damages.



OSE II CLEAN UP COST: \$2.00 per gallon of spill
(Cost to clean up one gallon of oil or other spill such as gasoline, jet fuel etc.)

vs. ESTIMATED MECHANICAL CLEAN UP COST: \$ 100 a gallon

vs. ESTIMATED DISPERSANTS COST: \$ 50.00 a gallon

1 OSE II DRUM CLEANS UP: 2750 gals of oil or other hydrocarbon based spills

The technical information and almost everything you need to know about OSE II can be found at www.osei.us---click on the technical library.

OTHER ENDORSEMENTS PRODUCT DEMONSTRATIONS, STATE OFFICIALS

For a product overview from TV News and demonstrations see:

- [WLOX News](#) OSEI Corp and Oil Spill Eater II are demonstrated for all the Senators and members of Mississippi DEQ. The product shows how quickly Oil Spill Eater II. Can work to begin breaking down an Oil Spill.
 - After seeing this demonstration, [Senator Tommy Gollott](#) of Mississippi sent a [formal request](#) to the Coast Guard and EPA response team members requesting the use of OSE II.
- [Department of Environmental Quality ALABAMA Demonstration:](#)

- DEQ Rep Contacted the Navy to verify they use OSE II
 - “This meets the criteria that the State of Alabama is looking for because it’s not adding a ‘superbug’ it is a simple process, there is no magic” Alabama DEQ Rep.
 - After demo, Senator Hank Erwin sent [formal request](#) to use OSE II to EPA.
- [Demonstration Video](#) on DWH Oil on private property.

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APPENDIX 1-EPA/INTERAGENCY TESTING AND DOCUMENTATION

US federal government and RRT groups that have associated with the OSEI Corporations product Oil Spill eater II since 1989.

OSE II is on the US EPA National contingency Plan for Oil Spills List.

Link <http://www.epa.gov/oem/content/ncp/products/oseater.htm>

This was the **5th time OSE II** had been successfully tested with this same method EPA method to get bioremediation products listed on the EPA NCP list.

EPA contractor utilizing OSE II on US navigable waters, on the Osage Indian Reservation in Oklahoma



The US EPA also spent millions testing OSE II through NETAC for bioremediation protocol development. OSE II's successful efficacy tests on Tier II which were peer reviewed by 31 scientist established the fact that OSE II should be tested in Tier II open water mesocosm tests. Tier III initial efficacy tests showed OSE II working well, Tier III also included toxicity testing on two separate marine species, which showed OSE II was practically non toxic. Link <http://osei.us/technical-library-documents> efficacy tests pages 25-28 and toxicity tests pages 99-101

EPA/NETAC testing performed by the University of Western Florida under contract from the US EPA Hap Prichard Gulf Breeze Florida performed toxicity testing with OSE II where in a simulated open water test OSE II was applied to oil and the effluent was tested on two different species and the average LC 50 was above 5000 showing OSE IIN is virtually non toxic which is a good indicator of how OSE II would work in the field. This test also tested for degradation of the oil and the tests showed OSE II was impressive at remediating the oil. The link to their test information is <http://www.nbiap.vt.edu/brarg/brasym95/kavanaugh95.htm>

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[Video proof OSE II is not toxic to fresh water marine species or plants, OSE II being applied directly to the waters surface with Koi fish swimming through the OSE II being applied to oil on the waters surface.](#)

[This body of water with exotic plants and fish has had OSE II applied to it for over 2 years with no adverse effects to the fish or the plants see video at link http://osei.us/archives/1150](http://osei.us/archives/1150)

[Video proof OSE II is non toxic to salt water marine species, this video also shows OSE II is non toxic to responders, and once OSE II has been applied to oil the oil will not adversely effect humans or adhere to humans as well. The end of the video shows how effective OSE II is at decontaminating equipment made of hydrocarbons and you can see how well OSE II cleans up shorelines as well. See link http://osei.us/archives/1135 see the frames on the video at time 9 minutes and 12 seconds, which shows a small fish swimming under the oil that has OSE II applied with no adverse effects!](http://osei.us/archives/1135)

EPA RRT VII tested OSE II on heavy waste oil in nine aquariums with pictures of the successful testing of OSE II in triplicate on heavy waste oil with water from a lake, Spring Lake, and from the Missouri River. The NRT/RRTIV guidance documents had stated bioremediation would not remediate heavy oils, the EPA/RRT VII has proven this is not the case.

EPA/RRT VII See Link: <http://www.osei.us/pdf%20files/RRT%20plus%20testing.pdf>



EPA Al Venosa literature review of Bioremediation/OSE II see link <http://www.osei.us/pdf%20files/EPA%20peer%20review%20of%20OSE%20II.pdf>

EPA RRT VI phone conversation with OSEI CEO Steven Pedigo, Jim Staves, Ragan Broyles, and Steve Mason, Jim Staves stated the EPA could not find a scientific reason why not to use OSE II April 16, 2012!

EPA RRT IV personnel viewed a successful demonstration of OSE II on sandy beach and marsh grass contaminated with BP Macondo well oil with Corexit attached. <http://osei.us/archives/819>



Oil Spill Eater II demonstrated for members of the Mississippi DEQ and EPA RRT IV members.

The US Navy used OSE II on US navigable waters spills in San Diego Bay on hundreds of spills, with whales and dolphins around without any adverse effects to any marine species while reducing their clean up cost over 87%. The US EPA Debra Dietrich and Nich Nichols met with the Navy officials with the OSEI Corporation in San Diego where EPA officials learned about the 100's of clean ups performed by the US Navy for 3 and ½ years.

Opening link to OSEI home page <http://osei.us/>

US Coast Guard Groton, Connecticut sent a letter during the BP spill requesting the FOSC to take action with OSE II. The US Coast Guard has purchased and utilized OSE II since 1990 themselves.

Coast Guard link <http://www.osei.us/pdf%20files/Coast%20Guard%20BP%20spill%20approval%201.pdf>

Coast Guard Commandent Paul Yost Class mate of Coast Guard (Ret) Admiral Lively of the OSEI Corporation requested the responsible party of the Valdez spill to test OSE II. Exxon tested OSE II in the winter of 1990 in Florham Park New Jersey along with at least 10 other products Exxon thought were the best products in the world. Dr. Brown of the University of Alaska witnessed the test and relayed to us OSE II was 92% more effective than the next best product which included the toxic Inipol product Exxon had purchased the rights for. Exxon understood in the winter of 1990 what product would be the most effective product to clean up the Valdez spill, and because they were not going to make money on it they did not use it.

The US Department of Interior performed a test comparing OSE II to dispersants (Corexit 9527A and 9500A), and mechanical clean up. OSE II cleaned up 67% of the oil while the dispersants were not successful at being effective (sinking oil into the water column) and the mechanical clean up was able to clean up its normal 2 to 8%. OSE II was proven by DOI to be the superior clean up method. **This RRT trustee's test proves what is the most effective clean up response that meets the Clean water act**

requirements of permanently removing oil from the environment. See test summary at link <http://osei.us/brochures> click on US Department of Interior study, this will allow you to read the summary of the test as well.

<http://www.google.com/search?client=safari&rls=en&q=OSEI+summary+of+Department+of+interior+test&ie=UTF-8&oe=UTF-8>

US DOI link

[//www.bsee.gov/uploadedFiles/BSEE/Research_and_Training/Technology_Assessment_and_Research/aa\(3\).pdf](http://www.bsee.gov/uploadedFiles/BSEE/Research_and_Training/Technology_Assessment_and_Research/aa(3).pdf)

US NOAA officials visited a demonstration of OSE II, in Mo Hang Port South Korea, where the gentleman in the yellow jacket the head of the South Korean Coast Guard explained the great successful testing of OSE II, which led to a successful demonstration on the shoreline with South Korean government officials and the approval of OSE II for South Korea as well. These are pictures of NOAA officials wearing NOAA caps at the successful demonstration.



The conclusion of the successful test showed OSE II remediating the Bunker C oil to CO₂ and water, and showed there were small crabs that were living in the water for the duration of the test unharmed. See link <http://osei.us/photoalbums/south-korea-hebie-spirit-2> scroll to the bottom of this picture set to see NOAA officials.

NOAA official Charlie Henry letter. See link

<http://www.osei.us/pdf%20files/NOAA%20Charlie%20Henry%20final%201%2025%202011%20.pdf>

US Department of Energy use of OSE II at their Sunoco Terminal



LOCATION OF SUNOCO TERMINAL



Environmental Advisory Committee
April 22, 2002



METER SKID BACKGROUND

- Originally located at Weeks Island
- Transferred to SUNOCO terminal
- Inserted into the terminal pipeline system
- Operational for approximately one year
- Measures the amount of crude oil transferred

Environmental Advisory Committee
April 22, 2002



PICTURES FROM SPILL AREA



Environmental Advisory Committee
April 22, 2002



RESPONSIBILITY AND JURISDICTION

- DynMcDermott is responsible for:
 - The Spill
 - Cleanup activities
 - Management of the contaminated material
- RRC is the spill governing authority
- RRC requirements must be followed

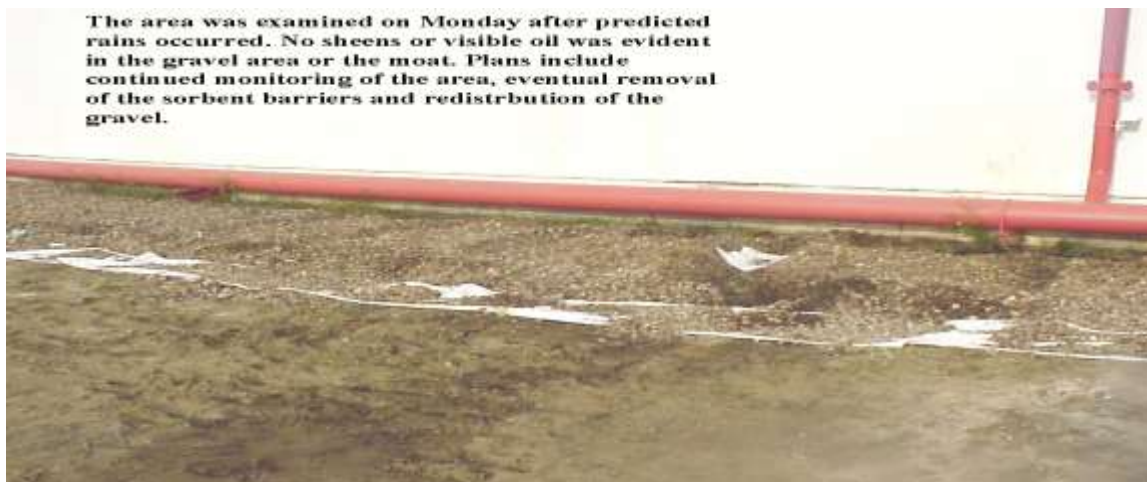
Environmental Advisory Committee
April 22, 2002



"Oil Spill Eater" was sprayed onto the gravel walkway to enhance the "passive" bioremediation process.



Oil Spill Eater was also sprayed onto the affected ground to encourage the biodegradation of the "oil stain"



The area was examined on Monday after predicted rains occurred. No sheens or visible oil was evident in the gravel area or the moat. Plans include continued monitoring of the area, eventual removal of the sorbent barriers and redistribution of the gravel.

Oil Spill Eater II was used to successfully finish the Clean up of the storage tank mixer failing that produced this spill. The gravel around the storage tank did not have to be removed since OSE remediated the oil from site to CO2 and water.

SEE Department of Energy link at <http://osei.us/photoalbums/department-of-energy-use-of-ose-ii-2>

States that have requested the use of OSE II

Valdez Spill

Alaska spring of 1990 Alex Viteri of Alaska department of environment quality, requested the EPA and Exxon to do a small demonstration test with OSE II on the Valdez spill, EPA never responded.

BP spill

State Of Louisiana

- [A letter from the Office of A.G. Crowe requesting the use of OSE II](#)

State of Mississippi

- [A letter from Senator Gollot of Mississippi requesting the use of OSE II.](#)

State of Alabama

- [A letter from Senator Hank Erwin to RRT4 Alabama State Senator support for OSE II](#)

This letter was sent to Unified command after ADAM viewed a demonstration of OSE II and tried OSE II themselves on tar balls from the BP Macondo spill see link <http://osei.us/archives/858>

City of Destin after seeing a demonstration of OSE II

<http://osei.us/archives/1005> The minutes of the special session to view the OSE II demonstration, as well as the minutes from 8/2/2010 where the city council unanimously voted to request to unified command the use of OSE II are under the video.

- [A certified letter from the Office of A.G. Crowe to Barack Obama at The White House demanding the use of OSE II](#)

Governor Jindal of Louisiana attempted to have OSE II demonstrated on the BP Macondo spill on May 6, 2010, and RRT VI EPA stopped the Governor from utilizing OSE II to protect his states natural resources.

The preponderance of the evidence, demonstrations, videos, tests, and clean ups on US Navigable waters, as well as all the members of the RRT's that have tested and or utilized OSE II, has proven OSE II is the safer for responders, non toxic to marine species as well as plants, and permanently removes oil from the environment shows OSE II is the means to protect natural resources and return spills sites to pre spill conditions while protecting the environment.
