GUIDE TO USING THE NCP SUBPART J PRODUCT SCHEDULE TECHNICAL NOTEBOOK

NOVEMBER 2015
(11/16/2015)

FOREWORD

The U.S. Environmental Protection Agency's (EPA) Office of Emergency Management (OEM) Regulations Implementation Division (RID) compiled the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) Product Schedule, as required by the Clean Water Act, the Oil Pollution Act of 1990 (OPA 90), and the NCP. This NCP Product Schedule Technical Notebook contains a compilation of product bulletins summarizing data requirements and test results for those products listed on EPA's NCP Product Schedule.

Manufacturers/contacts of products on the Schedule are required to amend their technical product bulletins whenever there are changes in product formulation, application rates, and handling procedures. Updates to this Notebook, such as the addition of new products to the Schedule, or modifications and/or deletions of listed products, will be indicated in bold.

For additional information, please leave a message on EPA's NCP Subpart J Information Line at (202) 260-2342.

Written requests may be mailed to:

NCP Product Schedule Manager
U.S. Environmental Protection Agency
Office of Emergency Management (OEM)
Regulations Implementation Division (RID)
William Jefferson Clinton Building
1200 Pennsylvania Avenue, NW (Mail Code 5104A, Room 6450CC)
Washington, DC 20460

Currently Listed Products by Category:	
Dispersants	19
Surface Washing Agents	56
Surface Collecting Agents	2
Bioremediation Agents	27
Biological Additives (20)	
Microbiological Cultures (19)	
Enzyme Additives (1)	
Nutrient Additives (7)	
Miscellaneous Oil Spill Control Agents	**15**
Solidifiers (10)	
Total Products	**119**

Changes to the Schedule:	New Listing
New listings to the Schedule:	CAS 100© (M-31)
New deletions from the Schedule:	None
Products no longer manufactured:	INIPOL EAP (B-10) and PRISTINE SEA II (B-54)
Contact information and product availability cannot be verified (no response to queries as of 11/19/2014):	NEOS AB3000 (D-2); CN-110 (SW-9); SOC-10 (SW-5); INIPOL EAP (B-10); BET BIOPETRO (B-48); PRISTINE SEA II (B-54); LAND AND SEA RESTORATION PRODUCT 001 (VELITE) (B-55); JE1058BS (B-58); SUMP SAFE BIO-RECLAIM (B-69); WASTE-SET #3200® (M-19); and WASTE-SET #3400® (M-20)

All changes and additions to the NCP Product Schedule Technical Notebook are indicated in bold under the applicable product listing.

Updated: 11/16/2015

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ALPHABETICAL LISTING - NCP PRODUCT SCHEDULE NOTEBOOK

PRODUCT	PRODUCT NUMBER
ACCELL CLEAN® DWD	D-16
ACCELL CLEAN® SWA	SW-60
ACT TERRA FIRMA	B-71
ACT-TF (see ACT TERRA FIRMA)	B-71
AGROREMED (see SPILLREMED (MARINE)®)	B-57
ALL PURPOSE CLEANER & REMEDIATOR (see GREEN BEAST™ OIL SPILL & ODOR REMEDIATOR)	SW-40
ALSOCUP	M-23
AQUACLEAN	SW-16
AQUA N-CAP™ POLYMER (see OIL SOLUTIONS POWDER)	M-25
AWAN PRA OIL FIELD SOLUTION™ (see EPA OIL FIELD SOLUTION™)	SW-61
B&S INDUSTRIAL (see STEP-ONE)	B-43
BET BIOPETRO (formerly BET BIOPETRO HEAVY)	B-48
BG-CLEAN™ 401	SW-32
BIODISPERS (formerly PETROBIODISPERS)	D-9
BIOGRASS® EXTRA	SW-46
BIO-REGEN HYDROCARBON (see SOIL RX)	B-61
BIOREM-2000 OIL DIGESTER™	B-63
BIOREM-2000 SC (see BIOREM-2000 OIL DIGESTER™)	B-63
BIOSOLVE® HYDROCARBON MITIGATION™ AGENT	SW-20
BIOWORLD BIOREMEDIATION HYDROCARBON TREATMENT PRODUCTS	B-59
CAS 100©	**M-31**
CAST OFF™ (see FORMULA 206-1x BIO-WASH™)	SW-66
CIAGENT (formerly CI AGENT, CHEAP INSURANCE, & PETRO-CAPTURE)	M-17
CLEAN GREEN	SW-44
CLEANGREEN® PLANET WASH (see CLEAN GREEN)	SW-44
CLEAN SPLIT (see SPLIT DECISION SC)	SW-22
CN-110	SW-9
COREXIT® EC9500A (formerly COREXIT 9500)	D-4
COREXIT® EC9500B	D-19
COREXIT® EC9527A (formerly COREXIT 9527)	D-1
COREXIT® EC9580A (formerly COREXIT 9580 SHORELINE CLEANER)	SW-10
CORIBA 700 ER (see CORIBA 700 SR)	SW-55
CORIBA 700 OS (see CORIBA 700 R)	SW-55
CORIBA 700 SR	SW-55
CORIBA 713 ER (see CORIBA 7013SR)	SW-56
CORIBA 713 OS (see CORIBA 713 SR)	SW-56
CORIBA 713 SR	SW-56
CYTOSOL	SW-19
DE-SOLV-IT CLEAN AWAY APC SUPER CONCENTRATE	SW-49
DE-SOLV-IT INDUSTRIAL FORMULA	SW-11

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DISPERSIT SPC 1000™ D-5
DO-ALL #18 SW-24
DRYLET™ MB BIOREMEDIATION B-64
DUALZORB® B-65
DUO-SPLIT (see SPLIT DECISION) SW-22
DYNAMIC GREEN™ SW-51
ECOVOOM-MARINE (see JEP-MARINE CLEAN) SW-57
ELASTOL M-26
ENVIROCLEAN (formerly ENVIRO CLEAN 165) SW-31
ENVIRONMENTAL 1 CRUDE OIL CLEANER SW-47
ENVIRONMENTAL 1 WASHING AGENT (see ENVIRONMENTAL 1 CRUDE OIL CLEANER) SW-47
EO ALL PURPOSE SOAP-LAVENDER SW-50
EPA OIL FIELD SOLUTION™ SW-61
ERGOFIT MICRO MIX AQUA B-67
E-SAFE© SW-33
ETHOS CLEAN SW-58
F-500 SW-30
FFT-SOLUTION® D-17
FINASOL® OSR 52 D-11
FIREMAN'S BRAND SPILLCLEAN (see SPILLCLEAN) SW-36
FORMULA 206-1x (see FORMULA 206-1x BIO-WASH™) SW-66
FORMULA 206-1x BIO-WASH™ SW-66
G-CLEAN OSC-1809 SW-39
GELCO 200 M-29
GLOBAL ENVIRONMENTAL CLEANER™ (see EPA OIL FIELD SOLUTION™) SW-61
GOLD CREW SW SW-26
GREEN BEAST OIL SPILL & ODOR REMEDIATOR SW-40
GREEN BEAST WASHING AGENT (see GREEN BEAST OIL SPILL & ODOR REMEDIATOR) SW-40
GREEN TECHNOLOGIES SOLUTIONS-OIL RECOVERY (GTS-OR) SW-63
HYDRO-CLEAN™ (see EPA OIL FIELD SOLUTION™) SW-61
HYDROREMED (see SPILLREMED (MARINE)®) B-57
INIPOL EAP 22 (No Longer Manufactured) B-10
JD-109 D-6
JD-2000™ D-7
JEP-MARINE CLEAN SW-57
JE1058BS B-58
LAND AND SEA RESTORATION PRODUCT 001 B-55
LIQUID ELASTOL (see ELASTOL) M-26
MARE CLEAN 200 (formerly MARE CLEAN 505) D-3
MARINE D-BLUE CLEAN™ D-18
MARINE GREEN CLEAN™ SW-42
MARINE GREEN CLEAN PLUS™ SW-43
MARI-ZYME (see ZYME-FLOW) M-18

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MICRO-BLAZE® B-41
MICRO CLEAN (see NATURE'S WAY HS) SW-18
MICROSORB SC (see OPPENHEIMER FORMULA) B-36
MUNOX SR® B-60
NALE-IT SW-28
NATURAMA G3 A-5 SW-53
NATURE'S WAY HS SW-18
NATURE'S WAY PC (see NATURE'S WAY HS) SW-18
NEOS AB3000 D-2
NOKOMIS 3-AA D-14
NOKOMIS 3-F4 D-8
NOKOMIS 5-W SW-38
NONTOX™ SURFACE WASHING AGENT SW-64
NORSOREX® APX M-30
OIL BOND® M-27
OILCLEAN w/ACTIVATOR (see PRO-ACT) B-62
OIL SOLUTIONS POWDER M-25
OIL SPILL CLEANUP (see G-CLEAN OSC-1809) SW-39
OIL SPILL EATER II (OSE II) B-53
OPFLEX® M-28
OPPENHEIMER FORMULA B-36
OSR-10 SW-59
PES-51 M-12
PETRO-CLEAN

SW-23
PETRO-GREEN ADP-7

SW-17
PETROMAX PSC 3

SW-62
PETROMAX SOIL CLEANING AND WASHING AGENT (see PETROMAX PSC 3)

SW-62
PETROTECH 25

SW-21
POWERCLEAN (see NATURE'S WAY HS)

SW-18
PREMIER 99

SW-12

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PRISTINE SEA II (formerly MICROPRO D; No Longer Manufactured) B-54
PRO-ACT B-62
PROCLEANS SW-35
PX-700™ M-22
RAPIDGRAB 2000™ M-24
REMEDIADE™ B-66
RHAMNOWASH 10 SW-67
S-200C (formerly S-200) B-56
SAFE KLEEN SW-54
SAF-RON GOLD D-12
SANDKLENE 950 SW-48
SC-1000™ SW-25
SEA BRAT #4 D-10
SEACARE ECOSPERSE 52 (see FINASOL® OSR 52) D-11
SEACARE E.P.A. (see DISPERSIT SPC 1000™) D-5
SEPARATE (see ELASTOL) M-26
SF-GOLD DISPERSANT (see SAF-RON GOLD) D-12
SHAMANTRA BIO (see SHAMANTRA GREEN) B-68
SHAMANTRA GREEN B-68
SHEEN-MAGIC© SW-34
SILTECH OP-40 S-6
SIMPLE GREEN® SW-15
SIMPLE GREEN® 2013 Reformulation SW-65
SOC-10 SW-45
SOIL RX B-61
SP 7010 (see REMEDIADE™) B-66
SPILLCLEAN SW-36
SPILLCLEAN ["CONCENTRATE"] (see SPILLCLEAN) SW-36
SPILLREMED (INDUSTRIAL; see SPILLREMED (MARINE)®) B-57
SPILLREMED (MARINE)® B-57
SPLIT DECISION SC (formerly SPLIT DECISION) SW-22
STEP ONE B-43
SUMP SAFE BIO-RECLAIM B-69
SUPERALL #38 (see TOPSALL #30) SW-2
SUPERSPERSE™ WAO2500 D-15
SYSTEM E.T. 20 (formerly MCW.B 20) B-45
THE OPPENHEIMER FORMULA 1 (see OPPENHEIMER FORMULA) B-36
THICKSLICK 6535 S-5
TOPSALL #30 SW-2
TRAILZORB (see DUALZORB®) B-65
TULXA SW-41
TXCHEM HE-1000™ SW-37
UNITED 658 PETRO-ZYME (see ZYME-FLOW) M-18
VAPORREMED (see SPILLREMED (MARINE)®) B-57
VB591™, VB997™, BINUTRIX® B-42

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VERU-SOLVE™ MARINE 200 HP SW-52
WASTE AWAY® B-70
WASTE-SET #3200® M-19
WASTE-SET #3400® M-20
WHITZORB (see DUALZORB®) B-65
WMI-2000 B-19
ZI-400 D-13
ZI-400 OIL SPILL DISPERSANT (see ZI-400) D-13
ZYME-FLOW M-18
ZYME-TREAT (see ZYME-FLOW) M-18

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NCP PRODUCT SCHEDULE NOTEBOOK LISTING BY PRODUCT TYPE

DISPERSANTS	PRODUCT NUMBER
ACCELL CLEAN® DWD	D-16
BIODISPERS (formerly PETROBIODISPERS)	D-9
COREXIT® EC9500A (formerly COREXIT 9500)	D-4
COREXIT® EC9500B	D-19
COREXIT® EC9527A (formerly COREXIT 9527)	D-1
DISPERSIT SPC 1000™	D-5
FFT-SOLUTION®	D-17
FINASOL® OSR 52	D-11
JD-109	D-6
JD-2000™	D-7
MARE CLEAN 200 (formerly MARE CLEAN 505)	D-3
MARINE D-BLUE CLEAN™	D-18
NEOS AB3000	D-2
NOKOMIS 3-AA	D-14
NOKOMIS 3-F4	D-8
SAF-RON GOLD	D-12
SEA BRAT #4	D-10
SEACARE ECOSPERSE 52 (see FINASOL® OSR 52)	D-11
SEACARE E.P.A. (see DISPERSIT SPC 1000™)	D-5
SF-GOLD DISPERSANT (see SAF-RON GOLD)	D-12
SUPERSPERSE™ WAO2500	D-15
ZI-400	D-13
ZI-400 OIL SPILL DISPERSANT (see ZI-400)	D-13

SURFACE WASHING AGENTS	PRODUCT NUMBER
ACCELL CLEAN® SWA	SW-60
ALL PURPOSE CLEANER & REMEDIATOR (see GREEN BEAST™ OIL SPILL & ODOR REMEDIATOR)	SW-40
AQUACLEAN	SW-16
AWAN PRA OIL FIELD CLEANER™ (see EPA OIL FIELD SOLUTION™)	SW-61
BG-CLEAN™ 401	SW-32
BIOGRASS® EXTRA	SW-46
BIOSOLVE® HYDROCARBON MITIGATION™ AGENT	SW-20
CAST OFF™ (see FORMULA 206-1x BIO-WASH™)	SW-66
CLEAN GREEN	SW-44
CLEANGREEN® PLANET WASH (see CLEAN GREEN)	SW-44
CLEAN SPLIT (see SPLIT DECISON SC)	SW-22
CN-110	SW-9
COREXIT® EC9580A (formerly COREXIT 9580 SHORELINE CLEANER)	SW-10
CORIBA 700 ER (see CORIBA 700 SR)	SW-55
CORIBA 700 OS (see CORIBA 700 SR)	SW-55
CORIBA 700 SR	SW-55

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CORIBA 713 ER (see CORIBA 7013SR) SW-56
CORIBA 713 OS (see CORIBA 713 SR) SW-56
CORIBA 713 SR SW-56
CYTOSOL SW-19
DE-SOLV-IT CLEAN AWAY APC SUPER CONCENTRATE SW-49
DE-SOLV-IT INDUSTRIAL FORMULA SW-11
DO-ALL #18 SW-24
DUO-SPLIT (see SPLIT DECISION) SW-22
DYNAMIC GREEN™ SW-51
ECOVOOM-MARINE (see JEP-MARINE CLEAN)

SW-57
ENVIROCLEAN (formerly ENVIRO CLEAN 165)

SW-31
ENVIRONMENTAL 1 CRUDE OIL CLEANER SW-47
ENVIRONMENTAL 1 WASHING AGENT (see ENVIRONMENTAL 1 CRUDE OIL CLEANER) SW-47
EO ALL PURPOSE SOAP-LAVENDER SW-50
EPA OIL FIELD SOLUTION™ SW-61

E-SAFE© SW-33
ETHOS CLEAN SW-58
F-500 SW-30
FIREMAN'S BRAND SPILLCLEAN (see SPILLCLEAN) SW-36
FORMULA 206-1x (see FORMULA 206-1x BIO-WASH™) SW-66
FORMULA 206-1x BIO-WASH™ SW-66
G-CLEAN OSC-1809 SW-39
GLOBAL ENVIRONMENTAL CLEANER™ (see EPA OIL FIELD SOLUTION™) SW-61
GOLD CREW SW SW-26
GREEN BEAST OIL SPILL & ODOR REMEDIATOR SW-40
GREEN BEAST WASHING AGENT (see GREEN BEAST OIL SPILL & ODOR REMEDIATOR) SW-40
GREEN TECHNOLOGIES SOLUTIONS-OIL RECOVERY (GTS-OR) SW-63
HYDRO-CLEAN™ (see EPA OIL FIELD SOLUTION™) SW-61
JEP-MARINE CLEAN SW-57
MARINE GREEN CLEAN™ SW-42
MARINE GREEN CLEAN PLUS™ SW-43
MICRO CLEAN (see NATURE'S WAY HS) SW-18
NALE-IT SW-28
NATURAMA G3 A-5 SW-53
NATURE'S WAY HS SW-18
NATURE'S WAY PC (see NATURE'S WAY HS) SW-18
NONTOX™ SURFACE WASHING AGENT SW-64

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NOKOMIS 5-W SW-38
OIL SPILL CLEANUP (see G-CLEAN OSC-1809) SW-39
OSR-10 SW-59
PETRO-CLEAN SW-23
PETRO-GREEN ADP-7 SW-17
PETROTECH 25 SW-21
POWERCLEAN (see NATURE'S WAY HS) SW-18
PREMIER 99 SW-12
PETROMAX PSC 3

SW-62
PETROMAX SOIL CLEANING AND WASHING AGENT (see PETROMAX PSC 3)

SW-62
PROCLEANS SW-35
RHAMNOWASH 10 SW-67
SAFE KLEEN SW-54
SANDKLENE 950 SW-48
SC-1000™ SW-25
SHEEN-MAGIC© SW-34
SIMPLE GREEN® SW-15
SIMPLE GREEN® 2013 Reformulation SW-65
SOC-10 SW-45
SPILLCLEAN SW-36
SPILLCLEAN ["CONCENTRATE"] (see SPILLCLEAN) SW-36
SPLIT DECISION SC (formerly SPLIT DECISION) SW-22
SUPERALL #38 (see TOPSALL #30) SW-2
TOPSALL #30 SW-2
TULXA SW-41
TXCHEM HE-1000™ SW-37
VERU-SOLVE™ MARINE 200 HP SW-52

SURFACE COLLECTING AGENTS **PRODUCT NUMBER**
SILTECH OP-40 S-6
THICKSLICK 6535 S-5

BIOREMEDIATION AGENTS **PRODUCT NUMBER**
ACT TERRA FIRMA B-71
ACT-TF (see ACT TERRA FIRMA) B-71
AGROREMED (see SPILLREMED (MARINE)®) B-57
B&S INDUSTRIAL (see STEP ONE) B-43
BET BIOPETRO (BET BIOPETRO HEAVY) B-48
BIOREM-2000 OIL DIGESTER™ B-63
BIOREM-2000 SC (see BIOREM-2000 OIL DIGESTER™) B-63
BIO-REGEN HYDROCARBON (see SOIL RX) B-61

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BIOWORLD BIOREMEDIATION HYDROCARBON TREATMENT PRODUCTS B-59
DRYLET™ MB BIOREMEDIATION B-64
DUALZORB® B-65
ERGOFIT MICRO MIX AQUA B-67
HYDROREMED (see SPILLREMED (MARINE)®) B-57
INIPOL EAP 22 (No Longer Manufactured) B-10
JE1058BS B-58
LAND AND SEA RESTORATION PRODUCT 001 B-55
MICRO-BLAZE® B-41
MICROSORB SC (see OPPENHEIMER FORMULA) B-36
MUNOX SR® B-60
OILCLEAN w/ACTIVATOR (see PRO-ACT) B-62
OIL SPILL EATER II (OSE II) B-53
OPPENHEIMER FORMULA B-36
PRISTINE SEA II (formerly MICROPRO D; No Longer Manufactured) B-54
PRO-ACT B-62
REMEDIADE™ B-66
S-200C (formerly S-200) B-56
SHAMANTRA BIO (see SHAMANTRA GREEN) B-68
SHAMANTRA GREEN B-68
SP 7010 (see REMEDIADE™) B-66
SPILLREMED (INDUSTRIAL; see SPILLREMED (MARINE)®) B-57
SPILLREMED (MARINE)® B-57
SOIL RX B-61
STEP ONE B-43
SUMP SAFE BIO-RECLAIM B-69
SYSTEM E.T. 20 (formerly MCW.B.20) B-45
THE OPPENHEIMER FORMULA 1 (see OPPENHEIMER FORMULA) B-36
TRAILZORB (see DUALZORB®) B-65
VAPORREMED (see SPILLREMED (MARINE)®) B-57
VB591™, VB997™, BINUTRIX® B-42
WASTE AWAY® B-70
WHITZORB (see DUALZORB®) B-65
WMI-2000 B-19

MISCELLANEOUS OIL SPILL CONTROL AGENTS **PRODUCT NUMBER**
ALSOCUP M-23
AQUA N-CAP™ POLYMER (see OIL SOLUTIONS POWDER) M-25
CAS 100© **M-31**
CIAGENT (formerly CI AGENT, CHEAP INSURANCE, & PETRO-CAPTURE) M-17
ELASTOL M-26
GELCO 200 M-29
LIQUID ELASTOL (see ELASTOL) M-26
MARI-ZYME (see ZYME-FLOW) M-18

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NORSOREX® APX M-30
OIL BOND® M-27
OIL SOLUTIONS POWDER M-25
OPFLEX® M-28
PES-51 M-12
PX-700™ M-22
RAPIDGRAB 2000™ M-24
SEPARATE (see ELASTOL) M-26
UNITED 658 PETRO-ZYME (see ZYME-FLOW) M-18
WASTE-SET 3200® M-19
WASTE-SET 3400® M-20
ZYME-FLOW M-18
ZYME-TREAT (see ZYME-FLOW) M-18

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TECHNICAL PRODUCT BULLETIN #D-1
USEPA, OEM REGULATIONS IMPLEMENTATION DIVISION
ORIGINAL LISTING DATE: MARCH 10, 1978
REVISED LISTING DATE: DECEMBER 18, 1995
"COREXIT® EC9527A"
(formerly COREXIT 9527)

I. NAME, BRAND, OR TRADEMARK
COREXIT® EC9527A
Type of Product: Dispersant

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT
Nalco Environmental Solutions LLC
7705 Highway 90-A
Sugar Land, TX 77478
Product Management:
Office: (281) 263-7709
Mobile: (832) 851-5164
E-mail: debby.theriot@nalco.com
(Ms. Debby Theriot)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS
Nalco Environmental Solutions LLC
7705 Highway 90-A
Sugar Land, TX 77478
Product Management:
Office: (281) 263-7709
Mobile: (832) 851-5164
E-mail: debby.theriot@nalco.com
(Ms. Debby Theriot)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION
1. Flammability: COREXIT® EC9527A is not classified as flammable by either DOT or IMO regulations.
2. Ventilation: Avoid prolonged breathing of vapors. Use with ventilation equal to unobstructed outdoors in moderate breeze.
3. Skin and eye contact; protective clothing; treatment in case of contact: Avoid eye contact. In case of eye contact, immediately flush eyes with large amounts of water for at least 15 minutes. Get prompt medical attention. Avoid contact with skin and clothing. In case of skin contact, immediately flush with large amounts of water, and soap if available. Remove contaminated clothing, including shoes, after flushing has begun. If irritation persists, seek medical attention. For open systems where contact is likely, wear long sleeve shirt, chemical resistant gloves, and chemical protective goggles.

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4.a. Maximum storage temperature: 170°F
4.b. Minimum storage temperature: -30°F
4.c. Optimum storage temperature range: 40°F to 100°F
4.d. Temperatures of phase separations and chemical changes: COREXIT® EC9527A is not adversely affected by changes in storage temperature unless evaporation is allowed to occur.

V. SHELF LIFE
The shelf life of unopened drums of COREXIT® EC9527A is unlimited. Containers should always be capped when not in use to prevent contamination and evaporation of solvents.

VI. RECOMMENDED APPLICATION PROCEDURE
1. Application Method: COREXIT® EC9527A is most effectively applied by aircraft, however, application with boat spray booms, boat fire monitors, and by hand held sprayers and back packs has been successfully done on a number of spills and trials.

Aerial Spraying - Aircraft provide the most rapid method of applying dispersants to an oil spill and a variety of aircraft can be used for spraying. For aerial spraying, COREXIT® EC9527A is applied undiluted. Typical application altitudes of 30 to 50 feet have been used, although higher altitudes may be effective under certain conditions. Actual effective altitudes will depend on the application equipment, weather and aircraft. Careful selection of spray nozzles is critical to achieve desired dose levels, since droplet size must be controlled. Many nozzles used for agricultural spraying are of low capacity and produce too fine a spray. A quarter-inch open pipe may be all that is necessary if the aircraft travels at 120 mph (104 knots) or more, since the air shear at these speeds will be sufficient to break the dispersant into the proper sized droplets.

Boat Spraying - COREXIT® EC9527A may be applied by workboats equipped with spray booms mounted ahead of the bow wake or as far forward as possible. The preferred and most effective method of application from a workboat is to use a low-volume, low-pressure pump so the chemical can be applied undiluted. Spray equipment designed to provide a five to ten percent diluted dispersant solution to the spray booms can also be used. COREXIT® EC9527A should be applied as droplets, not fogged or atomized. Natural wave or boat wake action usually provides adequate mixing energy to disperse the oil.

Recent tests have indicated that a fire monitor modified with a screen cap for droplet size may also be useful for applying COREXIT® EC9527A. Due to the increased volume output and the greater reach of the fire monitor, significantly more area can be covered in a shorter period of time.

System Calibration - Spray systems should be calibrated at temperatures anticipated to insure successful application and dosage control.
2. Concentration/Application Rate: A treatment rate of about 2 to 10 U.S. gallons per acre, or a dispersant to oil ratio of 1:50 to 1: 10 is recommended. This rate varies depending on the type of oil, degree of weathering, temperature, and thickness of the slick.
3. Conditions for Use: As with all dispersants, timely application ensures the highest degree of success. Early treatment with COREXIT® EC9527A, even at reduced treat rates, can reduce the

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"mousse" forming tendencies of the spilled oil. COREXIT® EC9527A is useful on oil spills in salt water.

VII. TOXICITY AND EFFECTIVENESS

a. Toxicity:

Material Tested	Species	LC50 (ppm)
COREXIT® EC9527A	Menidia beryllina	14.57 96-hr
	Mysidopsis bahia	24.14 48-hr
No. 2 Fuel Oil	Menidia beryllina	10.72 96-hr
	Mysidopsis bahia	16.12 48-hr
COREXIT® EC9527A &	Menidia beryllina	4.49 96-hr
No. 2 Fuel Oil (1:10)	Mysidopsis bahia	6.60 48-hr
Reference Toxicant (DSS)	Menidia beryllina	7.07 96-hr
	Mysidopsis bahia	9.82 48-hr

NOTE: This toxicity data was derived using the concentrated product. See Section VI of this bulletin for information regarding the manufacturer's recommendations for concentrations and application rates for field use.

b. Effectiveness:

SWIRLING FLASK DISPERSANT EFFECTIVENESS TEST WITH SOUTH LOUISIANA (S/L) AND PRUDHOE BAY (P/B) CRUDE OIL

Oil	Effectiveness (%)
Prudhoe Bay Crude	37.4
South Louisiana Crude	63.4
Average of Prudhoe Bay and South Louisiana Crudes	50.4

VIII. MICROBIOLOGICAL ANALYSIS

NA

IX. PHYSICAL PROPERTIES

1. Flash Point: 163°F
2. Pour Point: < - 40°F
3. Viscosity: 160 cSt at 32°F
4. Specific Gravity: 0.98 - 1.02
5. pH: 6.1
6. Surface Active Agents: CONFIDENTIAL
7. Solvents: Water, Propylene Glycol, 2-Butoxyethanol
8. Additives: CONFIDENTIAL
9. Solubility: Complete

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X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

	Compound Concentration (ppm)
Arsenic	<0.005
Cadmium	<0.01
Chromium	1.0
Copper	<0.2
Lead	<0.1
Mercury	<0.003
Nickel	<0.1
Zinc	0.1
Cyanide	<0.01
Chlorinated Hydrocarbons	<0.01

ED_001324_00005599-00016

EPA HAS NOT RECEIVED UPDATED CONTACT INFORMATION FOR THIS PRODUCT: 11/19/14

TECHNICAL PRODUCT BULLETIN #D-2
USEPA, OEM REGULATIONS IMPLEMENTATION DIVISION
ORIGINAL LISTING DATE: APRIL 22, 1985
REVISED LISTING DATE: JANUARY 26, 1996
"NEOS AB3000"

I. NAME, BRAND, OR TRADEMARK
NEOS AB3000
Type of Product: Dispersant (Hydrocarbon Solvent Based)

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT
NEOS Company Limited
Daisan Kendai Building
1-2, 3-chome Isobedori
Chuo-ku, Kobe, 651-0084 Japan
Phone: (81) 78-331-9384
(Mr. T. Ishii, Manager)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS
NEOS Company Limited
Daisan Kendai Building
1-2, 3-chome Isobedori
Chuo-ku, Kobe, Japan
Phone: (81) 78-331-9384
(Mr. T. Ishii, Manager)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION
1. Flammability: NEOS AB3000 is flammable; keep away from open flame.
2. Ventilation: Special ventilation is not required; however, natural ventilation is recommended.
3. Skin and eye contact; protective clothing; treatment in case of contact: Contact may cause skin and eye irritation. Goggles and rubber clothing are recommended during application.
In case of contact with skin or eye, flush with copious amounts of fresh water. If severe, consult a doctor.
4.a. Maximum storage temperature: 158°F
4.b. Minimum storage temperature: 32°F
4.c. Optimum storage temperature range: 50°F to 140°F
4.d. Temperatures of phase separations and chemical changes: Phase separation and chemical changes do not appear between the temperature range of 32°F to 158°F.

V. SHELF LIFE

The shelf life is five (5) years.

VI. RECOMMENDED APPLICATION PROCEDURE

1. Application Method: Spray neat concentrate on the oil slick in atomized form by means of a manual pump, or spray with a pump system incorporating an ejector system for drawing concentrate from the drum or stock tank.

For aerial application, use a spray boom with pressure nozzles or rotating atomizers mounted on helicopters or airplanes.

2. Concentration/Application Rate: The application rate is 65 gallons of dispersant per ton of oil. Five (5) to fifteen (15) parts of dispersant to suctioned water is recommended for ejector systems.

For aerial application, 75 to 125 gallons per ton of oil is recommended.

3. Conditions for Use: NEOS AB3000 can be used in salt water. It is effective with crude and residual heavy oil. The dispersant is also effective at controlling volatile emissions from the oil.

VII. TOXICITY AND EFFECTIVENESS

a. Toxicity:

Material Tested	Species	LC50 (ppm)
NEOS AB3000	Menidia beryllina	91.1 96-hr
	Mysidopsis bahia	33.0 48-hr
No. 2 Fuel Oil	Menidia beryllina	201.8 96-hr
	Mysidopsis bahia	11.5 48-hr
NEOS AB3000 &	Menidia beryllina	57.0 96-hr
No. 2 Fuel Oil (1:10)	Mysidopsis bahia	25.0 48-hr
Reference Toxicant (DSS)	Menidia beryllina	1.5 96-hr
	Mysidopsis bahia	9.3 48-hr

NOTE: This toxicity data was derived using the concentrated product. See Section VI of this bulletin for information regarding the manufacturer's recommendations for concentrations and application rates for field use.

b. Effectiveness:

SWIRLING FLASK DISPERSANT EFFECTIVENESS TEST WITH SOUTH LOUISIANA (S/L) AND PRUDHOE BAY (P/B) CRUDE OIL

Oil	Effectiveness (%)
Prudhoe Bay Crude	19.7
South Louisiana Crude	89.8
Average of Prudhoe Bay and South Louisiana Crudes	54.8

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VIII. MICROBIOLOGICAL ANALYSISNA

IX. PHYSICAL PROPERTIES
1. Flash Point: No flash point to 212°F
2. Pour Point: Less than 32°F
3. Viscosity: 30.7 cSt at 104°F
4. Specific Gravity: 0.924 at 59°F
5. pH: 8.0 (5wt % aq., at 77°F)
6. Surface Active Agents: Nonionic and Cationic surfactants
7. Solvents: Paraffin
8. Additives: None
9. Solubility: NA

X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

Compound	Concentration (ppm)
Arsenic	<0.1
Cadmium	<0.1
Chromium	0.26
Copper	<0.05
Lead	0.21
Mercury	<0.001
Nickel	0.076
Zinc	1.1
Cyanide	<0.05
Chlorinated Hydrocarbons	<0.10

ED_001324_00005599-00019

TECHNICAL PRODUCT BULLETIN #D-3
USEPA, OEM REGULATIONS IMPLEMENTATION DIVISION
ORIGINAL LISTING DATE: FEBRUARY 23, 1988
REVISED LISTING DATE: JANUARY 26, 1996
"MARE CLEAN 200"
(formerly MARE CLEAN 505)

I. NAME, BRAND, OR TRADEMARK
MARE CLEAN 200
Type of Product: Dispersant (Solvent-Based)

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT
Taihokohzai Company, Ltd.
Mita Twin Building
East Wing 8F, 4-2-8 Shibaura
Minatoku, Tokyo, Japan
Phone: (81) 3-6414-5601
Fax: (81) 3-6414-5621
(Mr. Y. Imai)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS
Klinview Corporation
8001 Irvine Center Drive, Suite 450
Irvine, CA 92618
Phone: (949) 753-0821
Fax: (949) 753-0812
(Mr. T. Tanaka)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION
1. Flammability: The flash point is 212 "@ 20°F
2. Ventilation: Is required. Use in closed room is not recommended.
3. Skin and eye contact; protective clothing; treatment in case of contact: Use protective goggles to avoid eye contact. In case of eye contact, wash immediately with plenty of water and consult with physician.
4.a. Maximum storage temperature: 122°F
4.b. Minimum storage temperature: 21°F
4.c. Optimum storage temperature range: 32°F to 86°F
4.d. Temperatures of phase separations and chemical changes: Phase separation does not relate to temperatures. Chemical changes may occur at temperatures above 194°F.

V. SHELF LIFE
The shelf life of MARE CLEAN 200 is 10 years when stored indoors. (Container will deteriorate before contents.)

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VI. RECOMMENDED APPLICATION PROCEDURE

1. Application Method: Sprinkle the dispersant on the oil spill, then 5-10 minutes later stir the surface intensively. For convenience, MARE CLEAN 200 may be diluted with water if desired.
2. Concentration/Application Rate: Use 53-66 gallons of MARE CLEAN 200 per ton of oil
3. Conditions for Use: The performance of MARE CLEAN 200 is not affected by water salinity. At temperatures below 40°F or in case of heavy crude oil spill, MARE CLEAN 200 should be used without dilution. MARE CLEAN 200 is an effective dispersant for any liquid hydrocarbon.

VII. TOXICITY AND EFFECTIVENESS

1. Toxicity:

Material Tested	Species	LC50 (ppm)	
MARE CLEAN 200	Menidia beryllina	1996.00	96-hr
	Mysidopsis bahia	938.00	48-hr
No. 2 Fuel Oil	Menidia beryllina	10.72	96-hr
	Mysidopsis bahia	16.12	48-hr
MARE CLEAN 200 and	Menidia beryllina	42.00	96-hr
No. 2 Fuel Oil (1:10)	Mysidopsis bahia	9.84	48-hr
Reference Toxicant (SDS)	Menidia beryllina	7.07	96-hr
	Mysidopsis bahia	9.82	48-hr

NOTE: This toxicity data was derived using the concentrated product. See Section VI of this bulletin for information regarding the manufacturer's recommendations for concentrations and application rates for field use.

b. Effectiveness:

SWIRLING FLASK DISPERSANT EFFECTIVENESS TEST WITH SOUTH LOUISIANA (S/L) AND PRUDHOE BAY (P/B) CRUDE OILS

Oil	Effectiveness (%)
Prudhoe Bay Crude	63.97
South Louisiana Crude	84.14
Average of Prudhoe Bay and South Louisiana Crudes	74.06

VIII. MICROBIOLOGICAL ANALYSIS

NA

IX. PHYSICAL PROPERTIES

1. Flash Point: 212 "@ 20°F
2. Pour Point: 14 @" 10°F
3. Viscosity: 2.4 @ 5 cSt at 104°F
4. Specific Gravity: 0.95 @ 0.03 at 77°F
5. pH: 7.7 @" 1.0 (10% solution)
6. Surface Active Agents: A mixture of sorbitan fatty acid esters, polysorbates, and polyoxyethylene fatty acid esters.
7. Solvents: Paraffinic hydrocarbons (CAS 74664-93-0)

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8. Additives: None
9. Solubility: NA

X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

Compound	Concentration (ppm)
Arsenic	<0.50
Cadmium	<0.100
Chromium	<0.500
Copper	<0.250
Lead	<2.50
Mercury	<0.0200
Nickel	<0.250
Zinc	0.611
Cyanide	<0.01
Chlorinated Hydrocarbons	<0.10

ED_001324_00005599-00022

TECHNICAL PRODUCT BULLETIN #D-4
USEPA, OEM REGULATIONS IMPLEMENTATION DIVISION
ORIGINAL LISTING DATE: APRIL 13, 1994
REVISED LISTING DATE: DECEMBER 18, 1995
"COREXIT® EC9500A"
(formerly COREXIT 9500)

I. NAME, BRAND, OR TRADEMARK
COREXIT® EC9500A
Type of Product: Dispersant

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT
Nalco Environmental Solutions LLC
7705 Highway 90-A
Sugar Land, TX 77478
Product Management:
Office: (281) 263-7709
Mobile: (832) 851-5164
E-mail: debby.theriot@nalco.com
(Ms. Debby Theriot)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS
Nalco Environmental Solutions LLC
7705 Highway 90-A
Sugar Land, TX 77478
Product Management:
Office: (281) 263-7709
Mobile: (832) 851-5164
E-mail: debby.theriot@nalco.com
(Ms. Debby Theriot)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION
1. Flammability: IMO - Non-flammable; DOT - Non-hazardous.
2. Ventilation: Use with ventilation equal to unobstructed outdoors in moderate breeze.
3. Skin and eye contact; protective clothing; treatment in case of contact: Avoid eye contact. In case of eye contact, immediately flush eyes with large amounts of water for at least 15 minutes. Get prompt medical attention. Avoid contact with skin and clothing. In case of skin contact, immediately flush with large amounts of water, and soap if available. Remove contaminated clothing, including shoes, after flushing has begun. If irritation persists, seek medical attention. For open systems where contact is likely, wear long sleeve shirt, chemical resistant gloves, and chemical protective goggles.
4.a. Maximum storage temperature: 170°F
4.b. Minimum storage temperature: -30°F

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4.c. Optimum storage temperature range: 40°F to 100°F
4.d. Temperatures of phase separations and chemical changes: None

V. SHELF LIFE
The shelf life of unopened drums of COREXIT® EC9500A is unlimited. Containers should always be capped when not in use to prevent contamination and evaporation of solvents.

VI. RECOMMENDED APPLICATION PROCEDURE
1. Application Method: COREXIT® EC9500A contains the same surfactants present in COREXIT® EC9527A and a new improved oleophilic solvent delivery system.

Aerial Spraying - Aircraft provide the most rapid method of applying dispersants to an oil spill and a variety of aircraft can be used for spraying. For aerial spraying, COREXIT® EC9500A is applied undiluted. Typical application altitudes of 30 to 50 feet have been used, although higher altitudes may be effective under certain conditions. Actual effective altitudes will depend on the application equipment, weather and aircraft. Careful selection of spray nozzles is critical to achieve desired dose levels, since droplet size must be controlled. Many nozzles used for agricultural spraying are of low capacity and produce too fine a spray. A quarter-inch open pipe may be all that is necessary if the aircraft travels at 120 mph (104 knots) or more, since the air shear at these speeds will be sufficient to break the dispersant into the proper sized droplets.

Boat Spraying - COREXIT® EC9500A may also be applied by workboats equipped with spray booms mounted ahead of the bow wake or as far forward as possible. The preferred and most effective method of application from a workboat is to use a low-volume, low-pressure pump so the chemical can be applied undiluted. Spray equipment designed to provide a five to ten percent diluted dispersant solution to the spray booms can also be used. COREXIT® EC9500A should be applied as droplets, not fogged or atomized. Natural wave or boat wake action usually provides adequate mixing energy to disperse the oil.

Recent tests have indicated that a fire monitor modified with a screen cap for droplet size control may also be useful for applying COREXIT® EC9500A. Due to the increased volume output and the greater reach of the fire monitor, significantly more area can be covered in a shorter period of time.

System Calibration - Spray systems should be calibrated at temperatures anticipated to insure successful application and dosage control. Application at sub-freezing temperatures may require larger nozzle, supply lines and orifices due to higher product viscosity.
2. Concentration/Application Rate: A treatment rate of about 2 to 10 U.S. gallons per acre, or a dispersant to oil ratio of 1:50 to 1:10 is recommended. This rate varies depending on the type of oil, degree of weathering, temperature, and thickness of the slick.

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3. Conditions for Use: As with all dispersants, timely application ensures the highest degree of success. Early treatment with COREXIT® EC9500A, even at reduced treat rates, can also counter the "mousse" forming tendencies of the spilled oil. COREXIT® EC9500A is useful on oil spills in salt water.

VII. TOXICITY AND EFFECTIVENESS

a. Toxicity

Material Tested	Species	LC50 (ppm)
COREXIT® EC9500A	Menidia beryllina	25.20 96-hr
	Mysidopsis bahia	32.23 48-hr
No. 2 Fuel Oil	Menidia beryllina	10.72 96-hr
	Mysidopsis bahia	16.12 48-hr
COREXIT® EC9500A &	Menidia beryllina	2.61 96-hr
No. 2 Fuel Oil (1:10)	Mysidopsis bahia	3.40 48-hr
Reference Toxicant (SDS)	Menidia beryllina	7.07 96-hr
	Mysidopsis bahia	9.82 48-hr

NOTE: This toxicity data was derived using the concentrated product. See Section VI of this bulletin for information regarding the manufacturer's recommendations for concentrations and application rates for field use.

b. Effectiveness:

SWIRLING FLASK DISPERSANT EFFECTIVENESS TEST WITH SOUTH LOUISIANA (S/L) AND PRUDHOE BAY (P/B) CRUDE OILS

Oil	Effectiveness (%)
Prudhoe Bay Crude	45.3
South Louisiana Crude	54.7
Average of Prudhoe Bay and South Louisiana Crudes	50.0

VIII. MICROBIOLOGICAL PROPERTIES

NA

IX. PHYSICAL PROPERTIES

1. Flash Point: 181.4°F
2. Pour Point: <-71°F
3. Viscosity: 22.5 cSt at 104°F
4. Specific Gravity: 0.95 at 60°F
5. pH: 6.2
6. Chemical Name and Percentage by Weight of the Total Formulation: CONFIDENTIAL
7. Surface Active Agents: CONFIDENTIAL
8. Solvents: CONFIDENTIAL
9. Additives: None
10. Solubility: Miscible

ED_001324_00005599-00025

X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

Compound	Concentration (ppm)
Arsenic	0.16
Cadmium	ND
Chromium	0.03
Copper	0.10
Lead	ND
Mercury	ND
Nickel	ND
Zinc	ND
Cyanide	ND
Chlorinated hydrocarbons	ND

ED_001324_00005599-00026

TECHNICAL PRODUCT BULLETIN #D-5USEPA, OEM REGULATIONS IMPLEMENTATION DIVISION
ORIGINAL LISTING DATE: APRIL 22, 1999
"DISPERSIT SPC 1000™"
(aka, SEACARE E.P.A. (ECOSPERSE™ POLLUTION ABATEMENT))

I. NAME, BRAND, OR TRADEMARK
DISPERSIT SPC 1000™
(aka, SEACARE E.P.A. (ECOSPERSE™ POLLUTION ABATEMENT))
Type of Product: Dispersant (Water Based)

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT
U.S. Polychemical Corp.
584 Chestnut Ridge Road
Chestnut Ridge, NY 10977
Phone: (845) 356-5530
Fax: (845) 356-6656
E-mail: bruceg@uspoly.com
(Mr. Bruce Gebhardt)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS
Maritime Solutions, Inc.
17 Battery Place, Suite 913
New York, NY 10004
Phone: (201) 541-0939
(212) 747-9044
Fax: (212) 747-9240
(Mr. Chris Constantine or Mr. Richard Fredricks)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION
1. Flammability: IMO: Non-flammable; DOT: Non-hazardous
2. Ventilation: None normally required. Adequate to maintain fume levels below the TLV.
3. Skin and eye contact; protective clothing; treatment in case of contact: Avoid prolonged contact with skin and eyes. Flush eyes with plenty of water for at least 15 minutes. Get medical attention. Wear long sleeve shirt, chemical resistant gloves, and chemical protective goggles in case of exposure to mist.
4.a. Maximum storage temperature: 180°F
4.b. Minimum storage temperature: -25°F
4.c. Optimum storage temperature range: 40°F to 140°F
4.d. Temperatures of phase separations and chemical changes: None

ED_001324_00005599-00027

V. SHELF LIFE

The shelf life of DISPERSIT SPC 1000™ is unlimited in unopened containers. Containers must be kept closed when not in use to prevent contamination.

VI. RECOMMENDED APPLICATION PROCEDURE

1. Application Method: The dispersant may be applied by any conventional methods such as 1) aerial spraying and 2) boat spraying to accommodate weather conditions.
2. Concentration/Application Rate: A dispersant to oil ratio ranging from 1 part dispersant to 50 parts oil to 1 part dispersant to 10 parts oil; or an application rate of about 2-10 gallons (7.6 liters-37.9 liters) per acre (4840 square meters) is suggested. These rates will be dependent on the type of oil, degree of weathering, temperature and extent of oil slick.
3. Conditions for Use: Timely application ensures the highest degree of successful dispersion of the oil spill.

VII. TOXICITY AND EFFECTIVENESS

a. Toxicity:

Material Tested	Species	LC50 (ppm)
DISPERSIT SPC 1000™	Menidia beryllina	3.5 96-hr
	Mysidopsis bahia	16.6 48-hr
No. 2 Fuel Oil	Menidia beryllina	11.6 96-hr
	Mysidopsis bahia	11.7 48-hr
DISPERSIT SPC 1000™	Menidia beryllina	7.9 96-hr
& No. 2 Fuel Oil (1:10)	Mysidopsis bahia	8.2 48-hr
Reference Toxicant (SDS)	Menidia beryllina	6.3 96-hr
	Mysidopsis bahia	11.7 48-hr

b. Effectiveness:

SWIRLING FLASK DISPERSANT EFFECTIVENESS TEST WITH SOUTH LOUISIANA (S/L) AND PRUDHOE BAY (P/B) CRUDE OIL

Oil	Effectiveness (%)
Prudhoe Bay Crude	40
South Louisiana Crude	105
Average of Prudhoe Bay and South Louisiana Crudes	73

VIII. MICROBIOLOGICAL ANALYSIS

NA

IX. PHYSICAL PROPERTIES

1. Flash Point, ASTM D-56-87: 208°F
2. Pour Point, ASTM D-97-87: <-20°C
3. Viscosity, ASTM D-445-88: 144CPS, @ 68°F
4. Specific Gravity, ASTM D-1298-85(90): 0.995, @ 68°F
5. pH, ASTM D-1293-84(90): 10.0
6. Surface Active Agents: Anionic and non-ionic, proprietary, surfactants
7. Solvents: Proprietary, non-petroleum based
8. Additives: None

ED_001324_00005599-00028

9. Solubility in Water: Complete

X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

Compound	Concentration (ppm)
Arsenic	<1.00
Cadmium	<2.00
Chromium	<2.00
Copper	<2.00
Lead	<1.00
Mercury	<0.04
Nickel	<10.00
Zinc	<2.00
Cyanide	<2.00
Chlorinated Hydrocarbons	<5.00

ED_001324_00005599-00029

TECHNICAL PRODUCT BULLETIN #D-6
USEPA, OEM REGULATIONS IMPLEMENTATION DIVISION
LISTING DATE: SEPTEMBER 20, 2000
"JD-109"

I. NAME, BRAND, OR TRADEMARK
JD-109
Type of Product: Dispersant

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT
GlobeMark Resources Ltd.
1312 Mill Creek Drive
Salado, TX 76571
Mobile: (254) 231-2251
E-mail: joannie@globemarkresources.com or fiddler656@gmail.com
Website: www.globemarkresources.com
(Ms. Joannie Docter)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS
GlobeMark Resources Ltd.
1312 Mill Creek Drive
Salado, TX 76571
Mobile: (254) 231-2251
E-mail: joannie@globemarkresources.com or fiddler656@gmail.com
Website: www.globemarkresources.com
(Ms. Joannie Docter)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION
1. Flammability: IMO - Nonflammable; DOT - Nonhazardous
2. Ventilation: Use with ventilation equal to unobstructed outdoors in a moderate breeze.
3. Skin and eye contact, protective clothing, treatment in case of contact: Avoid skin and clothing contact. If skin contact occurs, immediately wash with large amounts of soap and water (if possible). Remove any contaminated clothing and shoes. Launder before reusing. If irritation persists, seek medical assistance. For areas where contact is likely, wear long sleeve shirt, chemical resistant gloves, and chemical resistant goggles.
4.a. Maximum storage temperature: 120°F
4.b. Minimum storage temperature: - 4°F
4.c. Optimum storage temperature range: 32°F to 90°F
4.d. Temperatures of phase separations and chemical changes: None

V. SHELF LIFE
The shelf life of unopened drums of JD-109 in unlimited. Containers should be capped when not being used to prevent contamination and evaporation.

ED_001324_00005599-00030

VI. RECOMMENDED APPLICATION PROCEDURE

1. Application Method: The most rapid and effective method of applying JD-109 to a oil spill is by spraying. Temperature ranges for application should not drop below 32°F or exceed 120°F.

Aerial Spraying - Typical application altitudes of 30 to 50 feet are advised although higher altitudes may be used if conditions warrant. Spray nozzle should be about ¼ inches in diameter flying at 104 knots or more to create enough water shear sufficient to break the dispersant into proper sized droplets. A ½ inch diameter nozzle may be needed for temperatures below 50EF.

Boat Spraying - JD-109 can also be applied by workboats with spray booms mounted as far forward as possible of the bow or wake. The most effective application from a workboat is a low-volume, low-pressure pump.

2. Concentration/Application Rate: A treatment rate of about 2 to 10 US gallons (7.6 to 37.9 liters) per acre (4,840 square meters) or a dispersant to oil ratio of 1:50 to 1:10 is recommended. The rate may vary depending on the type of oil, degree of weathering, temperature and thickness of slick.

3. Conditions for Use: As with any oil related spill, timely application of a dispersant will ensure the highest degree of success. Timely treatment with JD-109, even at low application rates, can counter the "mousse" forming effect of the spilled oil.

VII. TOXICITY AND EFFECTIVENESS

a. Toxicity:

Material Tested	Species	LC50 (ppm)
JD-109	Menidia beryllina	1.90 96-hr
	Mysidopsis bahia	1.18 48-hr
No. 2 Fuel Oil	Menidia beryllina	9.35 96-hr
	Mysidopsis bahia	3.13 48-hr
JD-109 & No. 2 Fuel Oil	Menidia beryllina	3.84 96-hr
(1:10)	Mysidopsis bahia	3.51 48-hr
Reference Toxicant (SRT)	Menidia beryllina	2.63 96-hr
	Mysidopsis bahia	8.06 48-hr

b. Effectiveness:

SWIRLING FLASK DISPERSANT EFFECTIVENESS TEST WITH SOUTH LOUISIANA (S/L) AND PRUDHOE BAY (P/B) CRUDE OIL

Oil	Effectiveness (%)
Prudhoe Bay Crude	26
South Louisiana Crude	91
Average of Prudhoe Bay and South Louisiana Crudes	58.5

ED_001324_00005599-00031

VIII. MICROBIOLOGICAL ANALYSISNA

IX. PHYSICAL PROPERTIES
1. Flash Point, ASTM D3278-89: 93°C
2. Pour Point, ASTM D97-87: -19°C
3. Viscosity, ASTM D445-88: 202.9 cSt
4. Specific Gravity, ASTM D1298-85 (90): 1.02
5. pH, ASTM D1293-84 (90): 9.45
6. Surface Active Agents: Anionic and nonionic, proprietary, surfactants
7. Solvents: Proprietary, ester based
8. Additives: None
9. Solubility in Water: Miscible in oil, water, and solvents

X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

Compound	Concentration (ppm)
Arsenic	<10
Cadmium	<10
Chromium	<10
Copper	<10
Lead	<10
Mercury	<1
Nickel	<10
Zinc	<10
Cyanide	<0.5
Chlorinated Hydrocarbons	<1.4

ED_001324_00005599-00032

TECHNICAL PRODUCT BULLETIN #D-7
USEPA, OEM REGULATIONS IMPLEMENTATION DIVISION
LISTING DATE: AUGUST 06, 2001
"JD-2000™"

I. NAME, BRAND, OR TRADEMARK
JD-2000™
Type of Product: Dispersant

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT
GlobeMark Resources Ltd.
1312 Mill Creek Drive
Salado, TX 76571
Mobile: (254) 231-2251
E-mail: joannie@globemarkresources.com or fiddler656@gmail.com
Website: www.globemarkresources.com
(Ms. Joannie Docter)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS
GlobeMark Resources Ltd.
1312 Mill Creek Drive
Salado, TX 76571
Mobile: (254) 231-2251
E-mail: joannie@globemarkresources.com or fiddler656@gmail.com
Website: www.globemarkresources.com
(Ms. Joannie Docter)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION
1. Flammability: IMO - Non-flammable. This product is not regulated by DOT when shipped domestically by land.
2. Ventilation: Use with ventilation equal to unobstructed outdoors in a moderate breeze.
3. Skin and eye contact; protective clothing; treatment in case of contact: Avoid skin and clothing contact. If skin contact occurs, immediately wash with large amounts of soap and water (if possible). Remove any contaminated clothing and shoes. Launder before reusing. If irritation persists, seek medical assistance. For areas where contact is likely, wear long sleeve shirt, chemical resistant gloves, and chemical resistant goggles.
4.a. Maximum storage temperature: 120°F
4.b. Minimum storage temperature: -30°F
4.c. Optimum storage temperature range: 30°F to 90°F
4.d. Temperatures of phase separations and chemical changes: None

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V. SHELF LIFE

The shelf life of unopened drums of JD-2000™ is unlimited. Containers should be capped when not being used to prevent contamination and evaporation. Opened container should be used within 1 year for optimal performance. Poly containers are recommended for storage near wet environments, i.e., ships, harbors, ports, etc.

VI. RECOMMENDED APPLICATION PROCEDURE

1. Application Method: JD-2000™ is free of phosphates, aromatic chlorinated solvents, branched ethoxylated alcohols, and hydrotreated distillates. Optimum temperature for application is above 30°F.

Aerial Spraying - Typical application altitudes of 30 to 50 feet are advised although higher altitudes may be used if conditions warrant. Spray nozzle should be about ¼ inch in diameter flying at 104 knots or more to create enough air shear sufficient to break the dispersant into proper sized droplets. A ½ inch diameter nozzle may be needed for temperatures from 30EF to 30°F.

Boat Spraying - JD-2000™ can also be applied by workboats with spray booms mounted as far forward as possible of the bow or wake. The most effective application from a workboat is a low-volume, low-pressure pump.

2. Concentration/Application Rate: JD-2000™ is an oil spill dispersant concentrate that may be diluted by 5 to 10 percent with water if needed. A treatment rate of about 2 to 10 U.S. gallons (7.6 to 37.9 liters) per acre (4,840 square meters) or a dispersant to oil ratio of 1:50 to 1:10 is recommended. The rate may vary depending on the type of oil, degree of weathering, temperature, and thickness of slick.

3. Conditions for Use: As with any oil related spill, timely (preferably within 48 hours) application of a dispersant will ensure the highest degree of success. Timely treatment with JD-2000™, even at low application rates, can counter the "mousse" forming effect of the spilled oil.

VII. TOXICITY AND EFFECTIVENESS

a. Toxicity:

Material Tested	Species	LC50 (ppm)
JD-2000™	Menidia beryllina	407.00 96-hr
	Mysidopsis bahia	90.50 48-hr
No. 2 Fuel Oil	Menidia beryllina	8.39 96-hr
	Mysidopsis bahia	2.58 48-hr
JD-2000™ & No. 2 Fuel Oil	Menidia beryllina	3.59 96-hr
(1:10)	Mysidopsis bahia	2.19 48-hr
Reference Toxicant (SDS)	Menidia beryllina	2.22 96-hr
	Mysidopsis bahia	10.50 48-hr

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2. Effectiveness:SWIRLING FLASK DISPERSANT EFFECTIVENESS TEST WITH SOUTH LOUISIANA (S/L) AND PRUDHOE BAY (P/B) CRUDE OIL

Oil	Effectiveness (%)
Prudhoe Bay Crude	60.4
South Louisiana Crude	77.8
Average of Prudhoe Bay and South Louisiana Crudes	69.1

VIII. MICROBIOLOGICAL ANALYSIS

NA

IX. PHYSICAL PROPERTIES

1. Flash Point (SW1010): 212°F
2. Pour Point (ASTM D97): -36°F
3. Viscosity (ASTM D445):65.2 cSt
4. Specific Gravity 60/60 (ASTM D287): 0.99
5. pH (EPA 150.1): 7.54
6. Surface Active Agents: CONFIDENTIAL
7. Solvents: CONFIDENTIAL
8. Additives: None
9. Solubility in Water: Dispersible in fresh and salt water. Miscible in oil, water, and solvents

X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

Compound	Concentration (ppm)
Arsenic	<0.24
Cadmium	<0.10
Chromium	<0.10
Copper	<0.10
Lead	0.43
Mercury	<0.10
Nickel	<0.10
Zinc	0.11
Cyanide	<0.20
Chlorinated Hydrocarbons	<2.00

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TECHNICAL PRODUCT BULLETIN #D-8USEPA, OEM REGULATIONS IMPLEMENTATION DIVISION
ORIGINAL LISTING DATE: MARCH 04, 2002
"NOKOMIS 3-F4"

I. NAME, BRAND, OR TRADEMARK
NOKOMIS 3-F4
Type of Product: Dispersant

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT
Mar-Len Supply, Inc.
23159 Kidder Street
Hayward, CA 94545
Phone: (510) 782-3555
Fax: (510) 782-2032
(Mr. Frank Winter)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS
Mar-Len Supply, Inc.
23159 Kidder Street
Hayward, CA 94545
Phone: (510) 782-3555
Fax: (510) 782-2032
(Mr. Frank Winter)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION
1. Flammability: Non-flammable (water based)
2. Ventilation: No special requirements
3. Skin and eye contact; protective clothing; treatment in case of contact: In case of eye contact, flush with water; in case of skin contact, wash with water; and if swallowed, drink water to dilute and induce vomiting.
4.a. Maximum storage temperature: 212°F
4.b. Minimum storage temperature: 32°F
4.c. Optimum storage temperature range: 50°F
4.d. Temperatures of phase separations and chemical changes: NA

V. SHELF LIFE
15 years or more if stored correctly in plastic drums.

VI. RECOMMENDED APPLICATION PROCEDURES
1. Application Method: Application of the product may be made directly from 33 and 35 gallon drums (marketing sizes) by fitting the drum with a "T" connection and pumping fresh or salt water across the junction, which will pull the dispersant from the drum into the water stream and onto the oil spill.

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2. Concentration/Application Rate: For heavy concentrations of crude or Bunker C oil, apply the product undiluted. Where lighter fractions of petroleum are involved, the product can be diluted up to one part dispersant to 30 parts water.
3. Conditions for Use: Effective in salt water, and can be used on water of any temperature.

VII. TOXICITY AND EFFECTIVENESS

a. Toxicity:

Material Tested	Species	LC50 (ppm)
NOKOMIS 3-F4	Menidia beryllina	29.80 96-hr
	Mysidopsis bahia	32.20 48-hr
No. 2 Fuel Oil	Menidia beryllina	100.00 96-hr
	Mysidopsis bahia	72.70 48-hr
NOKOMIS 3-F4 &	Menidia beryllina	100.00 96-hr
No. 2 Fuel Oil (1:10)	Mysidopsis bahia	58.40 48-hr
Reference Toxicant (DSS)	Menidia beryllina	159.60 96-hr
	Mysidopsis bahia	267.70 48-hr

b. Effectiveness:

SWIRLING FLASK DISPERSANT EFFECTIVENESS TEST WITH SOUTH LOUISIANA (S/L) AND PRUDHOE BAY (P/B) CRUDE OIL

Oil	Effectiveness (%)
Prudhoe Bay Crude	62.20
South Louisiana Crude	64.90
Average of Prudhoe Bay and South Louisiana Crudes	63.55

VIII. MICROBIOLOGICAL ANALYSIS

NA

IX. PHYSICAL PROPERTIES

1. Flash Point: None
2. Pour Point: 28°F
3. Viscosity: 290 cps at 20°C (68°F)
4. Specific Gravity: 1.0065g/cc at 20°C (68°F)
5. pH: 10.3 (at room temperature)
6. Surface Active Agents: Confidential
7. Solvents: None
8. Additives: None
9. Solubility: Completely water soluble

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X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

	Compound Concentration (ppm)
Arsenic	0.30
Cadmium	<5.00
Chromium	<10.00
Copper	<10.00
Lead	<10.00
Mercury	<0.05
Nickel	<10.00
Zinc	<10.00
Cyanide	<2.00
Chlorinated Hydrocarbons	<1.00

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TECHNICAL PRODUCT BULLETIN #D-9
USEPA, OEM REGULATIONS IMPLEMENTATION DIVISION
ORIGINAL LISTING DATE: JUNE 28, 2002
"BIODISPERS"
(formerly PETROBIODISPERS)

I. NAME, BRAND, OR TRADEMARK
BIODISPERS
Type of Product: Dispersant

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT
Petrotech America Corporation
130 William Street, Suite 802
New York, NY 10038
Phone: (212)933-9071, ext. 7001
Fax: (877) 226-4028
Email: Info@helpenvironmental.com
(Mr. Lawrence Gallo)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS

Petrotech America Corporation
130 William Street, Suite 802
New York, NY 10038
Phone: (212)933-9071, ext. 7001
Fax: (877) 226-4028
Email: Info@helpenvironmental.com
(Mr. Lawrence Gallo)

H.E.L.P. Environmental
926 3rd Avenue
Brooklyn, NY 11232

Manufacturing Plant:
Clariant Corp.
Charlotte, NC

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION
1. Flammability: Non-flammable
2. Ventilation: Use general ventilation to minimize exposure to vapor or mist.
3. Skin and eye contact; protective clothing; treatment in case of contact: Skin contact – immediately flush with copious amounts of water. Remove and wash contaminated clothing and shoes. If irritation persists, see a doctor. Eye contact – may cause eye irritation. In case of contact, immediately flush eyes with plenty of water. If irritation persists, immediately see a doctor. Hygienic practices – wear safety glasses. Wear gloves in accordance with routine laboratory safety precautions.
4.a. Maximum storage temperature: >70°C
4.b. Minimum storage temperature: -25°C

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4.c. Optimum storage temperature range:
4.d. Temperatures of phase separations and chemical changes: No phase or chemical separation observed.

V. SHELF LIFE
The product has unlimited shelf life.

VI. RECOMMENDED APPLICATION PROCEDURE
1. Application Method: Recommended application is by aircraft, fireboat monitors or similar apparatus.
2. Concentration/Application Rate: Concentration varies with spilled material - Solvents at 5%, light oils at 10%, medium oils at 10%, and heavy oils at 10%.
3. Conditions for Use: Data is for water temperature of 40°F to 65°F. There are no known application restrictions.

VII. TOXICITY AND EFFECTIVENESS
a. Toxicity:

Material Tested	Species	LC50 (ppm)
BIODIPSERS	Menidia beryllina	13.46 96-hr
	Mysidopsis bahia	78.90 48-hr
No. 2 Fuel Oil	Menidia beryllina	12.42 96-hr
	Mysidopsis bahia	2.82 48-hr
BIODIPSERS &	Menidia beryllina	5.95 96-hr
No. 2 Fuel Oil (1:10)	Mysidopsis bahia	2.66 48-hr
Reference Toxicant (SDS)	Menidia beryllina	11.84 96-hr
	Mysidopsis bahia	21.81 48-hr

b. Effectiveness:
SWIRLING FLASK DISPERSANT EFFECTIVENESS TEST WITH SOUTH LOUISIANA (S/L) AND PRUDHOE BAY (P/B) CRUDE OIL

Oil	Effectiveness (%)
Prudhoe Bay Crude	51.0
South Louisiana Crude	63.0
Average of Prudhoe Bay and South Louisiana Crudes	57.0

VIII. MICROBIOLOGICAL ANALYSIS
NA

IX. PHYSICAL PROPERTIES
1. Flash Point, ASTM Method D56: 193°F
2. Pour Point, ASTM Method D97: - 26°F
3. Viscosity at 40°C, ASTM Method D445: Initial boil point 104.2°C, at 50 mL 109°C, at 70 mL 111°C, at 80 mL 113.7°C, final temperature 307.1°C)
4. Specific Gravity: 0.965
5. pH: 7
6. Surface Active Agents: CONFIDENTIAL

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7. Solvents: Water
8. Additives: None
9. Solubility: Product is 100% soluble in water.

X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

Compound	Concentration (ppm)
Arsenic	<2.50
Cadmium	<0.75
Chromium	<0.75
Copper	<0.50
Lead	<5.00
Nickel	<1.20
Zinc	<0.50
Cyanide	3.90*
Chlorinated Hydrocarbons	<5.00

*During the analysis of cyanide on sample #V202057-01 (Petrotech Dispersant) analyst encountered interferences due to the matrix of sample. Soapy residue created a false positive for cyanide. Sample showed no traces of cyanide. Value related to the soap film turbidity.

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TECHNICAL PRODUCT BULLETIN #D-10
USEPA, OEM REGULATIONS IMPLEMENTATION DIVISION
ORIGINAL LISTING DATE: NOVEMBER 26, 2002
"SEA BRAT #4"

I. NAME, BRAND, OR TRADEMARK
SEA BRAT #4
Type of Product: Dispersant

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT
B.R.A.T. Microbial Products Inc.
P.O. Box 7089
Pasadena, TX 77508
Phone: (713) 724-9226
E-mail: alabastercorp@gmail.com
(Mr. John Sheffield)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS
B.R.A.T. Microbial Products Inc.
P.O. Box 7089
Pasadena, TX 77508
Phone: (713) 724-9226
E-mail: alabastercorp@gmail.com
(Mr. John Sheffield)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION
1. Flammability: Non-flammable
2. Ventilation: Normal.
3. Skin and eye contact; protective clothing; treatment in case of contact:
Wear safety glasses or goggles, gloves, and rubber boots. Wash after each shift. Remove and wash contaminated clothing before reuse. No respiratory protection is required. Local exhaust is desirable. Mechanical exhaust is helpful in congested areas. Skin contact – flush with water. Seek medical attention if irritation persists. Eye contact – flush with water using eye cup or fountain for 15 minutes. Seek medical attention if irritation persists. Ingestion - seek medical attention. Inhalation – no medical attention is required with inhalation.
4.a. Maximum storage temperature: 120°F
4.b. Minimum storage temperature: 35°F
4.c. Optimum storage temperature range: NA
4.d. Temperatures of phase separations and chemical changes: NA

V. SHELF LIFE
Indefinite when stored properly.

VI. RECOMMENDED APPLICATION PROCEDURE

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1. Application Method: Spray affected area with a high pressure pump. Always apply in compliance with federal, state, and local laws.
2. Concentration/Application Rate: Dilution ratios of 1 part SEA BRAT #4 to 9 parts water for a 10 percent solution.
3. Conditions for Use: May be applied to the coastal waters of the U.S. It is designed for hydrocarbon spills on water temperatures between 50°F and 90°F. It is best applied with nozzle pressure of between 80 psi and 100 psi, with a direct hard spray and continuously moving the stream of water over the entire surface.

VII. TOXICITY AND EFFECTIVENESS

a. Toxicity:

Material Tested	Species	LC50 (ppm)
SEA BRAT #4	Menidia beryllina	30.00 96-hr
	Mysidopsis bahia	14.00 48-hr
No. 2 Fuel Oil	Menidia beryllina	16.00 96-hr
	Mysidopsis bahia	14.00 48-hr
SEA BRAT #4 &	Menidia beryllina	23.00 96-hr
No. 2 Fuel Oil (1:10)	Mysidopsis bahia	18.00 48-hr
Reference Toxicant (DSS)	Menidia beryllina	1.14 96-hr
	Mysidopsis bahia	0.98 48-hr

b. Effectiveness:

SWIRLING FLASK DISPERSANT EFFECTIVENESS TEST WITH SOUTH LOUISIANA (S/L) AND PRUDHOE BAY (P/B) CRUDE OIL

VENDOR LAB REPORT:

Oil	Effectiveness (%)
Prudhoe Bay Crude	53.55
South Louisiana Crude	60.65
Average of Prudhoe Bay and South Louisiana Crudes	57.10

VIII. MICROBIOLOGICAL ANALYSIS

NA

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IX. PHYSICAL PROPERTIES1. Flash Point, ASTM Method D56: $200°F
2. Pour Point, ASTM Method D97: 4°F
3. Viscosity (furol seconds): 380 at 77°F
4. Specific Gravity (g/cc): 0.994 at 70°F
5. pH: 9.45
6. Surface Active Agents: Surfactants
7. Solvents: Propylene glycol
8. Additives: None
9. Solubility: Soluble in all ratios.

X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

Compound	Concentration (ppm)
Arsenic	<0.05
Cadmium	<0.05
Chromium	<0.05
Copper	<0.05
Lead	<0.05
Mercury	<0.0002
Nickel	<0.05
Zinc	0.215
Cyanide	<0.05
Chlorinated Hydrocarbons	<0.05

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TECHNICAL PRODUCT BULLETIN #D-11
USEPA, OEM REGULATIONS IMPLEMENTATION DIVISION
ORIGINAL LISTING DATE: JANUARY 30, 2003
"FINASOL® OSR 52"
(aka, SEACARE ECOSPERSE 52)

I. NAME, BRAND, OR TRADEMARK
FINASOL® OSR 52
(aka, SEACARE ECOSPERSE 52)
Type of Product: Dispersant

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT
TOTAL FLUIDES
24 cours Michelet La Défense 10
92069 Paris La Défense Cedex
France
Phone: +33-1-41-35-60-29
United States: (713) 483-5712
24-hour Emergency Number: +33-1-41-35-65-00
E-mail: david.doucet@total.com
Website: www.totalspecialfluids.com
(Mr. David Doucet)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS
Importer/U.S. Distributor
TOTAL PETROCHEMICALS USA, INC.
1201 Louisiana Street, Suite 1800
Houston, TX 77002
Phone: (713) 483-5712
Fax: (713) 483-5700
Website: www.totalspecialfluids.com
(Mr. Peter Egan)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION
1. Flammability: Keep well away from sources of ignition and heat. Avoid the accumulation of static electricity. Provide grounding.
2. Ventilation: Keep containers closed when not in use. Do not inhale vapors, fumes, or mists. In case of inhalation, take the person into fresh air. Ensure adequate ventilation is provided if there is any risk of vapors, mists, or aerosols forming. In the event of serious problems, call a doctor or summon medical assistance urgently.
3. Skin and eye contact; protective clothing; treatment in case of contact: Wear appropriate long sleeve shirts, chemical resistant gloves and goggles. Avoid contact with skin and eyes. In case of contact, wash immediately with plenty of water. Avoid contact with clothing. In case of

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contact, wash immediately and remove contaminated clothing. Prolonged and repeated contact with the skin may cause skin disorders. In case of ingestion, do not induce vomiting to prevent aspiration into the respiratory tract.
4.a. Maximum storage temperature: 65°C
4.b. Minimum storage temperature: -20°C
4.c. Optimum storage temperature range: 5 - 35°C
4.d. Temperatures of phase separations and chemical changes: NA

V. SHELF LIFE
The shelf life of unopened drums of FINASOL® OSR 52 is potentially unlimited when the containers remain capped and sealed to prevent contamination and evaporation of solvents, and are stored in a place with stable temperatures and are unexposed to direct sunlight. After storage, stir the product and assure uniformity before use. Testing of FINASOL® OSR 52 is recommended every three years and then on a yearly basis to ensure it remains fit for its intended usage.

VI. RECOMMENDED APPLICATION PROCEDURE
1. Application Method: FINASOL® OSR 52 is applied effectively by aircraft or from boats. It can also be applied by hand held sprayers as well as with backpack spray units. Spraying must not give too fine or atomized droplets as in fog. It must be done as moderately coarse droplets, with diameters in the range of 500 - 1000 m, whether application is by surface vessel, aircraft, or land-based equipment.
2. Concentration/Application Rate: Use FINASOL® OSR 52 from 1:5 to 1:50, according to the nature of the oil, its state of weathering, temperature, thickness of the slick, and other circumstances of the spill. A 1:10 ratio would correspond appreciatively to 26 gallons per ton of oil.

Aerial spraying – FINASOL® OSR 52 is sprayed undiluted when applied from aircrafts, usually between 30 and 50 feet altitude, or at higher altitude in poor weather conditions.

Boat spraying – FINASOL® OSR 52 is sprayed undiluted using a low-pressure system. Spraying equipment providing 5 to 10% dilution of FINASOL® OSR 52 can also be used.
3. Conditions for Use: Diluted application in low salinity water is not recommended. Use only receptacles, joints, pipes, etc. which are resistant to hydrocarbons. Do not spray at high pressure (> 3 bar). FINASOL® OSR 52 is designed to treat spills in salt water.

VII. TOXICITY AND EFFECTIVENESS
a. Toxicity:

Material Tested	Species	LC50 (ppm)
FINASOL® OSR 52	Menidia beryllina	11.66 96-hr
	Mysidopsis bahia	9.37 48-hr
No. 2 Fuel Oil	Menidia beryllina	5.95 96-hr
	Mysidopsis bahia	2.37 48-hr
FINASOL® OSR 52 &	Menidia beryllina	5.40 96-hr
No. 2 Fuel Oil (1:10)	Mysidopsis bahia	2.37 48-hr

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Reference Toxicant (SDS)	Menidia beryllina	8.54 96-hr
	Mysidopsis bahia	21.81 48-hr

b. Effectiveness:
SWIRLING FLASK DISPERSANT EFFECTIVENESS TEST WITH SOUTH LOUISIANA (S/L) AND PRUDHOE BAY (P/B) CRUDE OIL
VENDOR LAB REPORT:

Oil	Effectiveness (%)
Prudhoe Bay Crude	32.50
South Louisiana Crude	71.60
Average of Prudhoe Bay and South Louisiana Crudes	52.10

VIII. MICROBIOLOGICAL ANALYSIS
NA

IX. PHYSICAL PROPERTIES
1. Flash Point, ASTM Method D-3278-89: 110°C
2. Pour Point, ASTM Method D-97-87: -27°C
3. Viscosity, ASTM Method D-445-88: 58.5 cSt
4. Specific Gravity, ASTM Method D-1298-85 (90): 1.01
5. pH, ASTM Method D-1293-84 (90): 8.57
6. Surface Active Agents: CONFIDENTIAL
7. Solvents: CONFIDENTIAL
8. Additives: CONFIDENTIAL
9. Solubility: Dispersible in water.

X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

Compound	Concentration (ppm)
Antimony	<10.0
Arsenic	<10.0
Barium	<10.0
Cadmium	<10.0
Chromium	<10.0
Copper	<10.0
Lead	<10.0
Mercury	<1.0
Nickel	<10.0
Selenium	<10.0
Silver	<10.0
Zinc	<10.0
Cyanide	<0.4
Chlorinated Hydrocarbons	<4.4

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TECHNICAL PRODUCT BULLETIN #D-12
USEPA, OEM REGULATIONS IMPLEMENTATION DIVISION
ORIGINAL LISTING DATE: JANUARY 03, 2005
"SAF-RON GOLD"
(aka, SF-GOLD DISPERSANT)

I. NAME, BRAND, OR TRADEMARK
SAF-RON GOLD
(aka, SF-GOLD DISPERSANT)
Type of Product: Dispersant

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT
Sustainable Environmental Technologies Inc.
55 Ivan Allen Jr. Boulevard, Suite 850
Atlanta, GA 30308
Customer Service:
Phone: (404) 946-3585
24-hour Emergency Number:
Phone: (281) 845-9919
E-mail: support@sustainable-corp.com / bruce@sustainable-corp.com
Website: www.become-sustainable.com / www.sustainable-corp.com / www.saf-ron.com
(Mr. Bruce Richards)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS
Sustainable Environmental Technologies Inc.
55 Ivan Allen Jr. Boulevard, Suite 850
Atlanta, GA 30308
Customer Service:
Phone: (404) 946-3585
24-hour Emergency Number:
Phone: (281) 845-9919
E-mail: support@sustainable-corp.com / bruce@sustainable-corp.com
Website: www.become-sustainable.com / www.sustainable-corp.com / www.saf-ron.com
(Mr. Bruce Richards)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION
1. Flammability: Non-flammable.
2. Ventilation: Special ventilation is not required.
3. Skin and eye contact; protective clothing; treatment in case of contact: No special equipment required; however, goggles are recommended. Skin contact - if irritation occurs flush with water; seek medical attention if irritation persists. Eye contact - flush with plenty of water; seek medical attention if irritation persists.
4.a. Maximum storage temperature: 120°F
4.b. Minimum storage temperature: 32°F

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4.c. Optimum storage temperature range: 40 - 120°F
4.d. Temperatures of phase separations and chemical changes: NA

V. SHELF LIFE
The shelf life is unlimited in unopened containers.

VI. RECOMMENDED APPLICATION PROCEDURE
1. Application Method: Sprayer, Boat, Aircraft.
2. Concentration/Application Rate: A dispersant to oil ratio ranging from 1:50 to 1:10 is recommended. For heavy high-viscosity oils - 8 gallons of SAF-RON GOLD will disperse approximately 70 gallons of crude oil or bunker C. Also for use with heavy high viscosity oils, SAF-RON GOLD can be used as a concentrate or diluted at a dispersant to water ratio of 1:10. For lighter oils, SAF-RON GOLD can be diluted at mixtures of 1:20 to 1:100. A recommended dispersant to water ratio of 1:40 can be used for most spills. Ratios are dependent upon type of oil and weather conditions.
3. Conditions for Use: Any applicable condition determined by authorities for dispersant use.

VII. TOXICITY AND EFFECTIVENESS
a. Toxicity:

Material Tested	Species	LC50 (ppm)
SAF-RON GOLD	Menidia beryllina	29.43 96-hr
	Mysidopsis bahia	63.00 48-hr
No. 2 Fuel Oil	Menidia beryllina	16.76 96-hr
	Mysidopsis bahia	5.93 48-hr
SAF-RON GOLD	Menidia beryllina	9.25 96-hr
No. 2 Fuel Oil (1:10)	Mysidopsis bahia	3.04 48-hr
Reference Toxicant (SLS)	Menidia beryllina	15.94 96-hr
	Mysidopsis bahia	9.83 48-hr

b. Effectiveness:
SWIRLING FLASK DISPERSANT EFFECTIVENESS TEST WITH SOUTH LOUISIANA (S/L) AND PRUDHOE BAY (P/B) CRUDE OIL
VENDOR LAB REPORT:

Oil	Effectiveness (%)
Prudhoe Bay Crude	84.80
South Louisiana Crude	53.80
Average of Prudhoe Bay and South Louisiana Crudes	69.30

VIII. MICROBIOLOGICAL ANALYSIS
NA

IX. PHYSICAL PROPERTIES
1. Flash Point, ASTM D-56: >100°C
2. Pour Point, ASTM D-97: -2.5°C
3. Viscosity @40°C, ASTM Method D-445: 1.42 cSt

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4. Specific Gravity @60°F/60°F, ASTM Method D-287: 1.014
5. pH: 8.8
6. Surface Active Agents: Proprietary blend of surface-active agents.
7. Solvents: None.
8. Additives: None.
9. Solubility: Fully water soluble.

X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

Compound	Concentration (ppm)
Arsenic	<0.01
Cadmium	<0.005
Chromium	0.140
Copper	0.324
Lead	<0.005
Mercury	<0.020
Nickel	<0.005
Zinc	0.0671
Cyanide	<0.20
Chlorinated Hydrocarbons	<0.80

ED_001324_00005599-00050

TECHNICAL PRODUCT BULLETIN #D-13USEPA, OEM REGULATIONS IMPLEMENTATION DIVISION
ORIGINAL LISTING DATE: JUNE 16, 2005
"ZI-400"
(aka, ZI-400 OIL SPILL DISPERSANT)

I. NAME, BRAND, OR TRADEMARK
ZI-400
(aka, ZI-400 OIL SPILL DISPERSANT)
Type of Product: Dispersant

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT
Z.I. Chemicals
8605 Santa Monica Boulevard, #38201
Los Angeles, CA 90069
Phone: (818) 827-1301
E-mail: sales@zichemicals.com
Website: www.zichemicals.com
(Mr. Barnaby Zelman)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS
Z.I. Chemicals
8605 Santa Monica Boulevard, #38201
Los Angeles, CA 90069
Phone: (818) 827-1301
E-mail: sales@zichemicals.com
Website: www.zichemicals.com
(Mr. Barnaby Zelman)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION
1. Flammability: Non-flammable (DOT: Non-Hazardous).
2. Ventilation: No special requirements.
3. Skin and eye contact; protective clothing; treatment in case of contact: No special equipment or clothing required; however, goggles are recommended. If eye or skin irritation occurs, flush with plenty of water.
4.a. Maximum storage temperature: 120°F continuous, 140°F up to 5 days
4.b. Minimum storage temperature: 35°F
4.c. Optimum storage temperature range: 40 - 120°F
4.d. Temperatures of phase separations and chemical changes: Stable

V. SHELF LIFE
Unlimited in sealed polydrums of totes (as delivered).

VI. RECOMMENDED APPLICATION PROCEDURE

1. Application Method: ZI-400 may be applied by the usual method of aerial or boat spraying. For smaller spills a drum pump with sprayer may be used, mixing with water as required depending on the type and viscosity of oil being treated.
2. Concentration/Application Rate: On heavy oils use ZI-400 directly on the spill, or up to approximately a 1:10 dilution ratio (product:water). Lighter oils will require a 1:10 to 1:30 product to water dilution ratio. Warmer waters (greater than 78°F) and/or good agitation during application will require less product.
3. Conditions for Use: No limitations as to usage within optimum temperature parameters (application may be made at or above 35°F, with optimum above 48°F).

VII. TOXICITY AND EFFECTIVENESS

a. Toxicity:

Material Tested	Species	LC50 (ppm)
ZI-400	Menidia beryllina	31.76 96-hr
	Mysidopsis bahia	20.96 48-hr
No. 2 Fuel Oil	Menidia beryllina	18.05 96-hr
	Mysidopsis bahia	2.66 48-hr
ZI-400	Menidia beryllina	8.35 96-hr
No. 2 Fuel Oil (1:10)	Mysidopsis bahia	1.77 48-hr
Reference Toxicant (SLS)	Menidia beryllina	16.13 96-hr
	Mysidopsis bahia	27.80 48-hr

b. Effectiveness:

SWIRLING FLASK DISPERSANT EFFECTIVENESS TEST WITH SOUTH LOUISIANA (S/L) AND PRUDHOE BAY (P/B) CRUDE OIL

VENDOR LAB REPORT:

Oil	Effectiveness (%)
Prudhoe Bay Crude	50.10
South Louisiana Crude	89.80
Average of Prudhoe Bay and South Louisiana Crudes	69.90

VIII. MICROBIOLOGICAL ANALYSIS

NA

IX. PHYSICAL PROPERTIES

1. Flash Point, ASTM D-56: >93°C
2. Pour Point, ASTM D-97: 12.6°F
3. Viscosity, ASTM D-445: 18.80 cSt @ 40°C
4. Specific Gravity, ASTM D-1298: 1.026 @ 60°F
5. pH, ASTM D-1293: 10.9
6. Surface Active Agents: Proprietary
7. Solvents: Proprietary
8. Additives: None.
9. Solubility: Miscible in oil, water, and solvents.

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X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

Compound	Concentration (ppm)
Arsenic	<10
Cadmium	<10
Chromium	<10
Copper	<10
Lead	<10
Mercury	<1
Nickel	<10
Zinc	<10
Cyanide	<0.5
Chlorinated Hydrocarbons	<1.0

ED_001324_00005599-00053

TECHNICAL PRODUCT BULLETIN #D-14USEPA, OEM REGULATIONS IMPLEMENTATION DIVISION
ORIGINAL LISTING DATE: JULY 31, 2008
"NOKOMIS 3-AA"

I. NAME, BRAND, OR TRADEMARK
NOKOMIS 3-AA
Type of Product: Water-Based Dispersant

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT
Mar-Len Supply, Inc.
23159 Kidder Street
Hayward, CA 94545
Phone: (510) 782-3555
Fax: (510) 782-2032
(Mr. Frank Winter)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS
Mar-Len Supply, Inc.
23159 Kidder Street
Hayward, CA 94545
Phone: (510) 782-3555
Fax: (510) 782-2032
(Mr. Frank Winter)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION
1. Flammability: Non-flammable (water based)
2. Ventilation: No special requirements
3. Skin and eye contact; protective clothing; treatment in case of contact: In case of eye contact, flush with water; in case of skin contact, wash with water; and if swallowed, drink water to dilute and induce vomiting.
4.a. Maximum storage temperature: 160°F
4.b. Minimum storage temperature: 32°F
4.c. Optimum storage temperature range: 32 - 140°F
4.d. Temperatures of phase separations and chemical changes: NA

V. SHELF LIFE
In excess of 24 months or more if stored correctly in plastic drums.

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VI. RECOMMENDED APPLICATION PROCEDURES1. Application Method:
Aerial applied dispersant – spray from an aircraft flying with a controllable speed at altitudes of 30 to 50 feet. Spray nozzles should be sized to cover an area using 5 gallons per surface acre.

Spray from boat: NOKOMIS 3-AA can be applied by ships of workboat with spray booms mounted as far forward as possible. NOKOMIS 3-AA will generally be marketed in 55 gallon plastic drums. Application of the products may be made directly from the drum. By using a direct connection from pump to drum NOKOMIS 3-AA can be applied at full strength to the oil spill. The determination of whether to use NOKOMIS 3-AA at full strength or diluted with water must be determined by observations and evaluations made on-site at the oil spill. Portable engine powered centrifugal water pumps are a satisfactory means of moving the dispersant from the container to the spill's surface. Diesel-powered larger capacity pump may also be used. If the spill is confined to a small area, a hand-pump connected directly to the 55 gallon drum can be used. Hose diameters and lengths will relate to capacities required for the specific situation and distances from the pump to container and the spill. Fire hose has been successfully used, and with hand pumps small diameter hose is adequate. Fog nozzles on the dispersing end of the hose provide a fine spray of NOKOMIS 3-AA full strength or diluted as appropriate. Any type of hose nozzle can be used, but preferable one with the ability to produce a spray rather than a coarse stream.
2. Concentration/Application Rate: NOKOMIS 3-AA may be applied to oil spills at full strength, or diluted with sea water. Where large areas of water may be covered with heavy concentrations of crude or Bunker C oil, it may be advantageous to apply NOKOMIS 3-AA at full strength. Where lighter fractions of petroleum are involved it is possible that dilutions of up to one part NOKOMIS 3-AA to 30 parts water may be applicable. Approximately 5 gallons of NOKOMIS 3-AA can be used for one surface acre of oil spill.
3. Conditions for Use: Once NOKOMIS 3-AA is applied to the water's surface, to obtain the most efficient emulsification of the oil it is necessary to agitate and mix dispersant, oil, and water thoroughly. In open unconfined areas, the use of ship propellers has been determined a practical way of accomplishing this purpose. By passing over the spill area on a grid system, the vessel's propellers will churn the water, causing the needed mixing. For a large spill, two or more vessels may be needed to apply the product and agitate the water. In and around piers and similar confined areas it is necessary to apply the product from small boats, the shore, or pier itself. Where it is impossible or impractical to supply agitation with propellers of a vessel it is necessary to use pumps and a hose, applying salt water in the coarse stream and under sufficient pressure to cause surface turbulences and subsequent mixing.

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VII. TOXICITY AND EFFECTIVENESSa. Toxicity:

Material Tested	Species	LC50 (ppm)
NOKOMIS 3-AA	Menidia beryllina	34.22 96-hr
	Mysidopsis bahia	20.16 48-hr
No. 2 Fuel Oil	Menidia beryllina	22.50 96-hr
	Mysidopsis bahia	11.07 48-hr
NOKOMIS 3-AA &	Menidia beryllina	7.03 96-hr
No. 2 Fuel Oil (1:10)	Mysidopsis bahia	5.56 48-hr
Reference Toxicant ($CuSO_4$)	Menidia beryllina	5.36 96-hr
	Mysidopsis bahia	7.83 48-hr

b. Effectiveness:

SWIRLING FLASK DISPERSANT EFFECTIVENESS TEST WITH SOUTH LOUISIANA (S/L) AND PRUDHOE BAY (P/B) CRUDE OIL

Oil	Effectiveness (%)
Prudhoe Bay Crude	63.20
South Louisiana Crude	65.70
Average of Prudhoe Bay and South Louisiana Crudes	64.50

VIII. MICROBIOLOGICAL ANALYSIS

NA

IX. PHYSICAL PROPERTIES

1. Flash Point: None
2. Pour Point: 25 °F
3. Viscosity: 72.3 sus at 100°F
4. Specific Gravity: 1.031 at 60°F
5. pH: 9.0
6. Surface Active Agents: Confidential
7. Solvents: Propylene glycol and Water
8. Additives: None
9. Solubility: Completely water soluble

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X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

Compound	Concentration (ppm)
Arsenic	<0.12
Cadmium	<0.25
Chromium	<0.25
Copper	<0.25
Lead	<0.12
Mercury	<0.0016
Nickel	<0.25
Zinc	<1.0
Cyanide	0.034
Chlorinated Hydrocarbons	<0.10

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TECHNICAL PRODUCT BULLETIN #D-15
USEPA, OEM REGULATIONS IMPLEMENTATION DIVISION
ORIGINAL LISTING DATE: MARCH 23, 2011
"SUPERSPERSE™ WAO2500 DISPERSANT"

I. NAME, BRAND, OR TRADEMARK
SUPERSPERSE™ WAO2500 DISPERSANT
Type of Product: Dispersant

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT
Baker Petrolite Corporation
12645 West Airport Boulevard
Sugar Land, TX 77478-6120
Customer Services:
Phone: (800) 231-3606
E-mail: david.poelker@bakerhughes.com
(Mr. David Poelker)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS
Baker Petrolite Corporation
12645 West Airport Boulevard
Sugar Land, TX 77478-6120
Customer Services:
Phone: (800) 231-3606
E-mail: david.poelker@bakerhughes.com
(Mr. David Poelker)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION
1. Flammability: IMO-Flammable (water based); DOT – Flammable
2. Ventilation: If used outdoors, mechanical ventilation is not expected to be necessary. If used indoors, mechanical ventilation should be employed. If a risk assessment concludes respiratory protection is warranted use supplied air or air-purifying respirators in compliance with applicable regulatory requirements.
3. Skin and eye contact; protective clothing; treatment in case of contact: Avoid eye contact. In case of eye contact, immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical attention immediately. Avoid contact with skin and clothing. In case of skin contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing and clean shoes thoroughly before reuse. Get medical attention. Wear chemical and safety goggles, chemical resistant gloves and long sleeves to prevent eye and skin contact.
4.a. Maximum storage temperature: 150°F
4.b. Minimum storage temperature: 10°F
4.c. Optimum storage temperature range: 32 to 96°F
4.d. Temperatures of phase separations and chemical changes: None.

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V. SHELF LIFE

The shelf life of unopened drums of SUPERSPERSE™ WAO2500 DISPERSANT (WA02500) is 12 months. Material older than 12 months may still be viable and should be mixed well and then inspected to confirm it is within specifications and suitable for use.

VI. RECOMMENDED APPLICATION PROCEDURES

1. Application Method: The application of WAO2500 is done most effectively by spray type applications. Agitation is necessary and the amount of agitation depends upon the nature of the oil and the thickness of the oil layer to be dispersed. In light oil sheens, only the normal agitation of the water may be necessary, violent agitation is not necessary for controlling crude oil spills. The following method can be used for application:

a. Hand held spraying equipment – 2 to 5 percent dilution. Do not atomize the dispersant.

b. Workboat fitted with spray booms – 2 to 5 percent dilution. The spray should be as far forward as possible from boats wake.

c. Aerial spraying using airplane or helicopter – normally this is done at a height of 40 - 70 feet. Effective altitudes depend on weather, wind and other factors. Spray nozzles used in most agriculture application produce sprays that are too small. A simple quarter inch pipe would suffice in most applications. Regardless of the application method, the chemical should be applied in the form of small droplets never as a fog or mist. This minimizes windage losses and also ensures rapid penetration by the surface active agents to the oil/water interface. If applied by air drop methods, usage rates will vary but tend to fall between 1 to 5 US gallons per acre. Dilution ranges from 1:30 to 1:50 could be used.

2. Concentration/Application Rate: WAO2500 can be used as supplied or diluted with water prior to application. The degree of dilution will depend upon the characteristic of the oil and the amount of oil to be controlled. Laboratory tests indicate that as little as 1-4 gallons of WAO2500 will control and disperse a barrel (42 gallons) of light oil.

3. Conditions for Use: The dispersant should be used as early as possible to combat the spill. Wind and weather also dictate the proper effectiveness of the application. Care should be taken to limit overspray conditions. The dispersant would be more efficient if applied before the oil/water mixture forms and emulsion. Use equipment (pipe, hoses, receptacles, etc.) that is resistant to hydrocarbons. Do not spray at high pressure. A course spray is recommended over fine spray. This product can be used across a wide variety of water temperatures. The water temperature should be between 33°F and 96°F. With warmer temperatures less dispersant should be used. This product can be used on a number of hydrocarbon spills. The higher the API gravity of the hydrocarbon the less dispersant is necessary. The salinity of the water will have a slight impact on the performance of the product with a higher salinity needing more dispersant. Older hydrocarbon spills will require more product. The lighter ends of the hydrocarbon spill will evaporate lowering the API gravity of the hydrocarbon. This product should not be used on hydrocarbons that are soluble in water (e.g., alcohols, glycols, water soluble organics).

VII. TOXICITY AND EFFECTIVENESS

a. Toxicity:

Material Tested	Species	LC50 (ppm)

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WAO2500	Menidia beryllina	37.10	96-hr
	Mysidopsis bahia	17.40	48-hr
No. 2 Fuel Oil	Menidia beryllina	13.70	96-hr
	Mysidopsis bahia	3.59	48-hr
WAO2500 &	Menidia beryllina	3.70	96-hr
No. 2 Fuel Oil (1:10)	Mysidopsis bahia	2.53	48-hr
Reference Toxicant (SDS)	Menidia beryllina	2.69	96-hr
	Mysidopsis bahia	8.15	48-hr

b. Effectiveness:

SWIRLING FLASK DISPERSANT EFFECTIVENESS TEST WITH SOUTH LOUISIANA (S/L) AND PRUDHOE BAY (P/B) CRUDE OIL

Oil	Effectiveness (%)
Prudhoe Bay Crude	77.84
South Louisiana Crude	87.56
Average of Prudhoe Bay and South Louisiana Crudes	82.70

VIII. MICROBIOLOGICAL ANALYSIS

NA

IX. PHYSICAL PROPERTIES

1. Flash Point: 118°F
2. Pour Point: -42°F
3. Viscosity: 25cSt at 20°F
4. Specific Gravity: 0.90
5. pH: 8.39
6. Surface Active Agents: Fatty acid ester, organic surfactant, Confidential
7. Solvents: Distillates, hydrotreated light, water, ethanol
8. Additives: None
9. Solubility: Insoluble

X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

Compound	Concentration (ppm)
Arsenic	<0.25
Cadmium	<0.25
Chromium	<0.25
Copper	<0.25
Lead	<0.25
Mercury	<2.00
Nickel	<0.25
Zinc	<0.25
Cyanide	<0.50
Chlorinated Hydrocarbons	ND

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TECHNICAL PRODUCT BULLETIN #D-16
USEPA, OEM REGULATIONS IMPLEMENTATION DIVISION
ORIGINAL LISTING DATE: JULY 18, 2011
"ACCELL CLEAN® DWD"

I. NAME, BRAND, OR TRADEMARK
ACCELL CLEAN® DWD
Type of Product: Dispersant

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT
Advanced BioCatalytics Corporation
18010 Skypark Circle, #130
Irvine, California 92614-6456
Office Phone: (949) 442-0880
General E-mail: info@abiocat.com
Website: www.abiocat.com
Product Management:
Mobile: (949) 981-6510
E-mail: cpodella@abiocat.com
(Mr. Carl Podella)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS
Advanced BioCatalytics Corporation
18010 Skypark Circle, #130
Irvine, California 92614-6456
Office Phone: (949) 442-0880
General E-mail: info@abiocat.com
Website: www.abiocat.com
Product Management:
Mobile: (949) 981-6510
E-mail: cpodella@abiocat.com
(Mr. Carl Podella)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION
1. Flammability: Combustible as defined by DOT and USCG.
2. Ventilation: Use in well ventilated areas.
3. Skin and eye contact; protective clothing; treatment in case of contact: Protective clothing is recommended. Avoid eye contact. In case of eye contact, immediately flush with large amounts of water for at least 15 minutes. Get prompt medical attention. Avoid direct contact with skin and clothing. In case of skin contact, immediately flush with large amounts of water. Remove contaminated clothing, including shoes, after flushing has begun. If irritation persists, seek medical attention. For open systems were contact is likely, wear long sleeve shirt, chemical resistant gloves, and protective chemical goggles.

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4.a. Maximum storage temperature: 130°F/55°C
4.b. Minimum storage temperature: 30°F/-1°C
4.c. Optimum storage temperature range: 40°F to 100°F/4°C to 38°C
4.d. Temperatures of phase separations and chemical changes: None

V. SHELF LIFE
The shelf life of unopened drums of ACCELL CLEAN® DWD is unlimited. Containers should always remain capped when not in use to prevent contamination and evaporation.

VI. RECOMMENDED APPLICATION PROCEDURES
1. Application Method: Aircrafts provide the most rapid method of applying dispersants to an oil spill and a variety of aircraft can be used for spraying. For aerial spraying, ACCELL CLEAN® DWD is applied undiluted. Typically application altitudes of 30 to 50 feet are recommended, although higher altitudes may be effective under certain conditions. Actual effective altitudes will depend on the application equipment, weather and aircraft. Careful selection of spray nozzles is critical to achieve desired dose levels, since droplet size must be controlled. A quarter-inch open pipe may be all that is necessary if the aircraft travels at 120 mph (104 knots) or more, since the air shear at these speeds will be sufficient to break the dispersant into the proper sized droplets. Agricultural spray delivery systems may not be suitable because of too fine of spray and too little delivery of ACCELL CLEAN® DWD to the affected area.

Boat Spraying: ACCELL CLEAN® DWD may also be applied from boats equipped with spray booms mounted ahead of the bow wake or as far forward as possible. The most effective method of application from a boat is to apply ACCELL CLEAN® DWD using a low-volume, low-pressure pump so the ACCELL CLEAN® DWD can be applied undiluted. ACCELL CLEAN® DWD should not be fogged or atomized. Natural wave or boat wake action usually provides adequate mixing energy to disperse the oil. Application at sub-freezing temperatures may require larger nozzle, supply lines and orifices due to higher product viscosity.
2. Concentration/Application Rate: A treatment rate of about 10 gallons per acre, or a dispersant to oil ratio of 1:10 is optimal. The rate varies depending on the type of oil, degree of weathering, temperatures, and thickness of the slick.
3. Conditions for Use: For optimal results, ACCELL CLEAN® DWD early treatment of oil-contaminated waters is beneficial. ACCELL CLEAN® DWD can be used on weathered oils.

VII. TOXICITY AND EFFECTIVENESS
a. Toxicity:

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Materials Tested	Species	LC50 (ppm)	
ACCELL CLEAN® DWD	Menidia beryllina	5.66	96-hr
	Mysidopsis bahia	2.07	48-hr
No. 2 Fuel Oil	Menidia beryllina	11.10	96-hr
	Mysidopsis bahia	1.68	48-hr
ACCELL CLEAN® DWD	Menidia beryllina	8.05	96-hr
& No. 2 Fuel Oil (1:10)	Mysidopsis bahia	1.32	48-hr
Reference Toxicant (DDS)	Menidia beryllina	6.60	96-hr
	Mysidopsis bahia	30.80	48-hr

b. Effectiveness:
SWIRLING FLASK DISPERSANT EFFECTIVENESS TEST WITH SOUTH LOUISIANA (S/L) AND PRUDHOE BAY (P/B) CRUDE OIL

Oil	Effectiveness (%)
Prudhoe Bay Crude	58.70
South Louisiana Crude	96.03
Average of Prudhoe Bay and South Louisiana Crudes	77.37

VIII. MICROBIOLOGICAL ANALYSIS
NA

IX. PHYSICAL PROPERTIES
1. Flash Point: 130°F/55°C
2. Pour Point: -20.2°F/-29°C
3. Viscosity: 130 SUS @100°F
4. Specific Gravity: 1.0329 @60°F
5. pH: 5.8
6. Surface Active Agents: CONFIDENTIAL
7. Solvents: CONFIDENTIAL
8. Additives: CONFIDENTIAL
9. Solubility: Miscible

X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

Compound	Concentration (ppm)
Arsenic	ND
Cadmium	ND
Chromium	ND
Copper	ND
Lead	ND
Mercury	ND
Nickel	ND
Zinc	ND

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Cyanide	ND
Chlorinated Hydrocarbons	ND

ED_001324_00005599-00064

TECHNICAL PRODUCT BULLETIN #D-17
USEPA, OEM REGULATIONS IMPLEMENTATION DIVISION
ORIGINAL LISTING DATE: NOVEMBER 01, 2011
"FFT-SOLUTION®"

I. NAME, BRAND, OR TRADEMARK
FFT-SOLUTION®
Type of Product: Dispersant

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT
Fog Free Technologies, LLC
4365 Dorchester Road
Building 300, Suite 301
North Charleston, SC 29405
Product Management:
Office Phone: (843) 735-6626
Mobile: (478) 697-2588
E-mail: doc@fogfreetechnologies.com
Website: www.fogfreetechnologies.com
(Mr. William Knight)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS
Fog Free Technologies, LLC
4365 Dorchester Road
Building 300, Suite 301
North Charleston, SC 29405
Product Management:
Office Phone: (843) 735-6626
Mobile: (478) 697-2588
E-mail: doc@fogfreetechnologies.com
Website: www.fogfreetechnologies.com
(Mr. William Knight)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION
1. Flammability: IMO: Non-Flammable, DOT: Non-Hazardous
2. Ventilation: Lowest level of skin protection is acceptable, but no special ventilation is required.
3. Skin and eye contact; protective clothing; treatment in case of contact: Lowest level of skin protection is acceptable. Avoid eye contact. In case of eye contact, immediately flush eyes with large amounts of water for at least 15 minutes. Avoid contact with skin. In case of skin contact, immediately flush with water and soap if available. For open systems where contact is likely, wear long sleeve shirt, chemical resistant gloves and chemical goggles.
4.a. Maximum storage temperature: 170°F

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4.b. Minimum storage temperature: 30°F
4.c. Optimum storage temperature range: 40°F to 105°F
4.d. Temperatures of phase separations and chemical changes: None

V. SHELF LIFE
The shelf life of unopened drums of FFT-Solution® is limited to 60 months. Storage should be in a semi-controlled warehouse, out of direct sunlight.

VI. RECOMMENDED APPLICATION PROCEDURES
1. Application Method: Aerial Spraying – Aircraft provide the most rapid method of applying dispersants to an oil spill and a variety of aircraft can be used for spraying. For aerial spraying, FFT-Solution® is applied undiluted. Typical application altitudes of 30 to 50 feet have been used, although higher altitudes may be effective under certain conditions. Actual effective altitudes will depend upon application equipment, weather, and aircraft. Careful selection of spray nozzles is critical to achieve desired dose levels, since droplet size must be controlled. Many nozzles used for agricultural spraying are of low capacity and product fine a spray. A quarter-inch open pipe may be all that is necessary if the aircraft travels at 120 mph (104 knots) or more, since the air shear at these speeds will be sufficient to break the dispersant into the proper sized droplets. Optimal temperatures for application are between 33°F and 105°F.
Boat Spraying – FFT-Solution® may also be applied by workboats equipped with spray booms mounted on the stern of the vessel. (Mounting boom on the stern prevents any over spray from making contact with boat operators.) The preferred and most effective method of application from a workboat is to use a low-volume, low-pressure pump so the chemical can be applied undiluted. Standard agriculture spray equipment is designed to make dosage adjustments or provide different spray tips that effect dosage rates. Natural wave or boat wake action usually provides adequate mixing energy to disperse the oil. A typical agriculture spray boom can be mounted to the stern to get wide coverage. The booms on shrimp boats also can be retrofitted to cover a much wider path during applications. The manufacturer also recommends that in lieu of spray tips on the booms, spray tips be changed into solid tubing for injection of FFT-Solution® 3 to 5 feet below the water surface. This will get the thicker crude slicks injected faster and with better results. FFT-Solution® should be applied as droplets, not fogged or atomized.
2. Concentration/Application Rate: A treatment rate of about 2 to 10 U.S. gallons per acre, or dispersant to oil ratio of 1:50 to 1:10 is recommended. This rate varies depending on the type of oil, degree of weathering, temperature, and thickness of the slick.
3. Conditions for Use: FFT-Solution® can be applied to weathered oil as well as light, medium, or heavy oils. Early treatment even at reduced treatment rates, can also counter the foaming tendencies of the spilled oil in turbulent waters. FFT-Solution® can be used on any type oil spills in salt water.

VII. TOXICITY AND EFFECTIVENESS
a. Toxicity:

Materials Tested	Species	LC50 (ppm)	
FFT-SOLUTION®	Menidia beryllina	5.34	96-hr
	Mysidopsis bahia	2.72	48-hr
No. 2 Fuel Oil	Menidia beryllina	40.80	96-hr

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	Mysidopsis bahia	5.19	48-hr
FFT-SOLUTION®	Menidia beryllina	5.14	96-hr
& No. 2 Fuel Oil (1:10)	Mysidopsis bahia	2.75	48-hr
Reference Toxicant (SDS)	Menidia beryllina	2.42	96-hr
	Mysidopsis bahia	6.97	48-hr

b. Effectiveness:
SWIRLING FLASK DISPERSANT EFFECTIVENESS TEST WITH SOUTH LOUISIANA (S/L) AND PRUDHOE BAY (P/B) CRUDE OIL

Oil	Effectiveness (%)
Prudhoe Bay Crude	49.97
South Louisiana Crude	48.87
Average of Prudhoe Bay and South Louisiana Crudes	49.42

VIII. MICROBIOLOGICAL ANALYSIS
NA

IX. PHYSICAL PROPERTIES
1. Flash Point: 170°F
2. Pour Point: 23°F
3. Viscosity: 450 SUS @100°F
4. Specific Gravity: 1.0302 @60°F
5. pH: 9.96
6. Surface Active Agents: CONFIDENTIAL
7. Solvents: None
8. Additives: None
9. Solubility: Product is 100% soluble in water

X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

Compound	Concentration (ppm)
Arsenic	ND
Cadmium	ND
Chromium	ND
Copper	ND
Lead	ND
Mercury	ND
Nickel	ND
Zinc	ND
Cyanide	ND
Chlorinated Hydrocarbons	ND

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TECHNICAL PRODUCT BULLETIN #D-18
USEPA, OEM REGULATIONS IMPLEMENTATION DIVISION
ORIGINAL LISTING DATE: APRIL 23, 2012
"MARINE D-BLUE CLEAN™"

I. NAME, BRAND, OR TRADEMARK
MARINE D-BLUE CLEAN™
Type of Product: Dispersant

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT
AGS Solutions, Inc.
5647 Nunn Street
Houston, TX 77087
Phone: (713) 645-4933
Fax: (713) 645-4903
(Mrs. Linda Whiteley)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS
AGS Solutions, Inc.
5647 Nunn Street
Houston, TX 77087
Phone: (713) 645-4933
Fax: (713) 645-4903
(Mrs. Linda Whiteley)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION
1. Flammability: Non-flammable
2. Ventilation: No special requirements. Drums and similar containers should be kept closed. Store in steel or plastic containers.
3. Skin and eye contact; protective clothing; treatment in case of contact: In case of contact with eyes, wash thoroughly with plenty of clean water. Seek medical attention if irritation develops. Rubber protective gloves should be used if prolonged use of product is anticipated. Goggles, long sleeve shirt, and rubber gloves are recommended during application.
4.a. Maximum storage temperature: 170°F
4.b. Minimum storage temperature: 32°F
4.c. Optimum storage temperature range: 40°F to 110°F
4.d. Temperatures of phase separations and chemical changes: Marine D-Blue Clean™ has a pour point of 30°F and may cause chemical changes at temperatures >110°F.

V. SHELF LIFE
Marine D-Blue Clean™ has a shelf life of ≥2 years, if unopened. Cleaner older than 24 months may still be viable. Ensure product is mixed well and then inspect to confirm the product is suitable for application. The product will not lose effectiveness unless the temperatures in >140°F.

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VI. RECOMMENDED APPLICATION PROCEDURES

1. Application Method: Sprayer, boat, aircraft. Marine D-Blue Clean™ is to be used to disperse petroleum-based products in salt water. It may be applied by any conventional methods such as aerial spraying or surface vessel spraying, to accommodate weather conditions. Marine D-Blue Clean™ is to be applied undiluted, for aerial spraying. Timely application provides optimal results. Spray concentrated on the oil slick in atomized form such as with a manual pump or a pump system using moderately coarse droplets rather than a fine mist.

2. Concentration/Application Rate: Marine D-Blue Clean™ can be applied with a variety of spraying equipment, depending upon the type and scale of the water to be cleaned. For heavy concentrations of crude oil spill or temperatures below 40°F, Marine D-Blue Clean™ should be used without dilution in neat form. A dispersant to oil ratio up to 1 part dispersant to 20 parts of oil is suggested. Dose rates may vary depending on type and amount of petroleum spilled, and other site specific conditions such as weather, temperatures and extent of oil slick.

3. Conditions for Use: The performance of Marine D-Blue Clean™ is not affected by water salinity. Marine D-Blue Clean™ is useful on oil spills in salt water. It is effective with crude and residual heavy oil spills.

VII. TOXICITY AND EFFECTIVENESS

a. Toxicity:

Material Tested	Species	LC50 (ppm)
MARINE D-BLUE CLEAN™	Menidia beryllina	18.00 96-hr
	Mysidopsis bahia	56.00 48-hr
No. 2 Fuel Oil	Menidia beryllina	18.00 96-hr
	Mysidopsis bahia	18.00 48-hr
MARINE D-BLUE CLEAN™ &	Menidia beryllina	32.00 96-hr
No. 2 Fuel Oil (1:10)	Mysidopsis bahia	18.00 48-hr
Reference Toxicant (DSS)	Menidia beryllina	1.06 96-hr
	Mysidopsis bahia	0.97 48-hr

b. Effectiveness:

SWIRLING FLASK DISPERSANT EFFECTIVENESS TEST WITH SOUTH LOUISIANA (S/L) AND PRUDHOE BAY (P/B) CRUDE OIL

Oil	Effectiveness (%)
Prudhoe Bay Crude	45.00
South Louisiana Crude	55.59
Average of Prudhoe Bay and South Louisiana Crudes	50.30

VIII. MICROBIOLOGICAL ANALYSIS

NA

IX. PHYSICAL PROPERTIES

1. Flash Point: >200°F

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2. Pour Point: 30°F
3. Viscosity: 17.29 cSt @ 100°C
4. Specific Gravity: 1.035 @70°F
5. pH: 11.89
6. Surface Active Agents: CONFIDENTIAL
7. Solvents: CONFIDENTIAL
8. Additives: None
9. Solubility: Completely soluble

X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

Compound	Concentration (ppm)
Arsenic	<0.25
Cadmium	<0.005
Chromium	<0.08
Copper	<0.30
Lead	<0.015
Mercury	<0.0025
Nickel	<0.350
Zinc	<2.015
Cyanide	<0.050
Chlorinated Hydrocarbons	ND

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TECHNICAL PRODUCT BULLETIN #D-19
USEPA, OEM REGULATIONS IMPLEMENTATION DIVISION
ORIGINAL LISTING DATE: AUGUST 1, 2013
"COREXIT® EC9500B"

I. NAME, BRAND, OR TRADEMARK
COREXIT® EC9500B
Type of Product: Dispersant

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT
Nalco Environmental Solutions LLC
7705 Highway 90-A
Sugar Land, TX 77478
Product Management:
Office: (281) 263-7709
Mobile: (832) 851-5164
E-mail: debby.theriot@nalco.com
(Ms. Debby Theriot)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS
Nalco Environmental Solutions LLC
7705 Highway 90-A
Sugar Land, TX 77478
Product Management:
Office: (281) 263-7709
Mobile: (832) 851-5164
E-mail: debby.theriot@nalco.com
(Ms. Debby Theriot)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION
1. Flammability: DOT HazMat Classification – This product meets the criteria for classification as a Class 3 combustible liquid (49 CFR §173.120(b)(1)). However, it does not contain combustion, and, therefore, is not subject to the requirements for the Hazardous Materials Regulations (49 CFR §173.120(b)(3)).
2. Ventilation: Use with adequate ventilation equal to unobstructed outdoors in moderate breeze.
3. Skin and eye contact; protective clothing; treatment in case of contact: Do not get in eyes, on skin, or on clothing. In case of eye contact, rinse immediately with plenty of water and seek medical advice promptly. In case of skin contact, wash immediately with plenty of soap and water. If irritation persists or symptoms develop, seek medical attention. If clothing is contaminated, remove clothing and thoroughly wash the affected area. Do not take internally. In the event of oral ingestion, do not induce vomiting (can cause chemical pneumonia if aspirated into lungs). If conscious, wash out mouth and give water to drink. Get medical attention. If inhaled, remove to fresh air, treat symptomatically. Get medical attention.

For open systems where contact is likely, wear Tyvek, chemical resistant gloves (e.g., nitrile), and chemical splash goggles. Where concentrations in air may be high (e.g., confined area), the use of a half face filter mask or air supplied breathing apparatus is recommended.
4.a. Maximum storage temperature: 170°F
4.b. Minimum storage temperature: 40°F
4.c. Optimum storage temperature range: 40°F to 100°F
4.d. Temperatures of phase separations and chemical changes: No phase changes or chemical reactions are anticipated in the minimum to maximum storage range. Below 40°F, surfactant may slowly precipitate out of the solution, but it will return back into solution when warmed.

V. SHELF LIFE
The shelf life of unopened drums of COREXIT® EC9500B is potentially unlimited when containers remain capped and sealed to prevent contamination and evaporation of solvents. Testing of COREXIT® EC9500B is recommended every five years to ensure it remains fit for its intended purpose.

VI. RECOMMENDED APPLICATION PROCEDURE
1. Application Method: For aerial spraying, apply COREXIT® EC9500B undiluted. Various fixed-wing aircraft or helicopters can be used for spraying over a large area, from an altitude of 30 to 50 feet or even higher, depending on the application equipment and aircraft. Typical application altitudes of 30 to 50 feet have been used, although higher altitudes may be effective under certain conditions. Actual altitudes will depend on the application equipment, weather and aircraft. Careful selection of spray nozzles is critical to achieve desired dose levels, since droplet size must be controlled. Many nozzles used for agricultural spraying are of low capacity and produce too fine a spray. Avoid nozzles that produce a mist or fog. No nozzle may be necessary if the aircraft travels at 120 mph (104 knots) or more, since the air shear at these speeds will be sufficient to break the chemical stream into appropriately-sized droplets.

For boat spraying (spray boom), COREXIT® EC9500B may also be applied by workboats equipped with spray booms mounted ahead of the bow wake or as far forward as possible. The most effective method of application from a workboat could be the use of a low-volume, low-pressure pump. Spray equipment designed to provide a diluted dispersant solution to the spray booms can also be used. Dispersant concentrations in the 5 to 10 percent range are recommended; lower concentrations may result in significant fall-off in effectiveness. COREXIT® EC9500B should be applied as droplets, not fogged or atomized. Natural wave or boat wake action usually provides adequate mixing energy to disperse the oil. Water from a fire hose can also be used for agitation of the treated slick.

For boat spraying (fire monitor), a slightly modified fire monitor may be useful for applying dispersant concentrates such as COREXIT® EC9500B from a boat. A screen cap is used on the nozzle of the monitor to obtain a uniform spray pattern with the proper sized droplet. Due to the volume output and the greater reach of the fire monitor, significantly more area can be covered in a shorter period of time than using conventional spray booms.

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System Calibration – To facilitate successful application and dosage control, calibrate spray systems at the temperatures anticipated. Application at sub-freezing temperatures may require larger nozzle, supply lines and orifices due to higher product viscosity.
2. Concentration/Application Rate: A treatment rate of about 2 to 10 U.S. gallons per acre, or a dispersant to oil ratio of 1:50 to 1:10 is recommended; lower concentrations may also be used. This rate varies depending on the type of oil, degree of weathering, temperature, and thickness of the slick.
3. Conditions for Use: COREXIT® EC9500B can be used on oil spills in salt waters and at any water temperature. The product can be used on most oils, weathered spills, and "chocolate mousse" (water-oil emulsions). Viscous oil may require higher dosage rates.

VII. TOXICITY AND EFFECTIVENESS

a. Toxicity

Material Tested	Species	LC50 (ppm)	
COREXIT® EC9500B	Menidia beryllina	29.13	96-hr
	Mysidopsis bahia	10.00	48-hr
No. 2 Fuel Oil	Menidia beryllina	7.54	96-hr
	Mysidopsis bahia	2.51	48-hr
COREXIT® EC9500B & No. 2 Fuel Oil (1:10)	Menidia beryllina	4.46	96-hr
	Mysidopsis bahia	2.13	48-hr
Reference Toxicant (SLS)	Menidia beryllina	12.19	96-hr
	Mysidopsis bahia	10.53	48-hr

b. Effectiveness:

SWIRLING FLASK DISPERSANT EFFECTIVENESS TEST WITH SOUTH LOUISIANA (S/L) AND PRUDHOE BAY (P/B) CRUDE OILS

Oil	Effectiveness (%)
Prudhoe Bay Crude	57.0
South Louisiana Crude	50.9
Average of Prudhoe Bay and South Louisiana Crudes	53.9

VIII. MICROBIOLOGICAL PROPERTIES

NA

IX. PHYSICAL PROPERTIES

1. Flash Point: 164°F
2. Pour Point: -44.0°F
3. Viscosity: 21.78 cSt at 40°C
4. Specific Gravity: 0.9626 at 15°C
5. pH: 6.29
6. Chemical Name and Percentage by Weight of the Total Formulation: CONFIDENTIAL
7. Surface Active Agents: CONFIDENTIAL
8. Solvents: CONFIDENTIAL
9. Additives: None
10. Solubility: Miscible

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X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

Compound	Concentration (ppm)
Arsenic	0.0108
Cadmium	<0.0020
Chromium	<0.0060
Copper	<0.0060
Lead	<0.0040
Mercury	<1.0000 (ug/L)
Nickel	<0.0100
Zinc	<0.0060
Cyanide	<0.0100
Chlorinated hydrocarbons	1.7600

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TECHNICAL PRODUCT BULLETIN #SW-2 (formerly #D-20)
USEPA, OEM REGULATIONS IMPLEMENTATION DIVISION
ORIGINAL LISTING DATE: JANUARY 7, 1985
REVISED LISTING DATE: AUGUST 21, 1995
"TOPSALL #30"
(aka, SUPERALL #38)

I. NAME, BRAND, OR TRADEMARK
TOPSALL #30 (aka, SUPERALL #38)
Type of Product: Surface Washing Agent (Oil and Petroleum Cleaning Agent)

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT

TOPSALL #30	SUPERALL #38
Stutton North Corporation	Superall Products LLP
P.O. Box 724	22215 Tuwa Rd.
Mandeville, LA 70470	Tomball, TX 77375
Phone: (985) 626-3900	Phone: (281) 351-4800
Fax: (985) 674-0476	Fax: (281) 351-4855
(Mr. David Anton)	(Mr. Sammy Roberts)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS

TOPSALL #30	SUPERALL #38
Stutton North Corporation	Superall Environmental LLC
P.O. Box 724	22215 Tuwa Rd.
Mandeville, LA 70470	Tomball, TX 77375
Phone: (985) 626-3900	Phone: (281) 351-4800
Fax: (985) 674-0476	Fax: (281) 351-4855
(Mr. David Anton)	(Mr. Sammy Roberts)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION
1. Flammability: TOPSALL #30 (aka, SUPERALL #38) is non-flammable.
2. Ventilation: Normal type household ventilation is adequate for handling and storage.
3. Skin and eye contact; protective clothing; treatment in case of contact:
In case of contact with eyes, wash thoroughly with large amounts of water. If irritation persists, seek medical attention. Use protective gloves for manual cleaning.
4.a. Maximum storage temperature: 120°F
4.b. Minimum storage temperature: 20°F
4.c. Optimum storage temperature range: 40°F to 100°F
4.d. Temperatures of phase separations and chemical changes: TOPSALL #30 (aka, SUPERALL #38) has a pour point of 20°F and a boiling point of 212°F.

V. SHELF LIFE
TOPSALL #30 (aka, SUPERALL #38) has a shelf life of not less than two years.

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VI. RECOMMENDED APPLICATION PROCEDURE

1. Application Method: For general use, apply by spray, mop, etc. Agitate severe spots and rinse thoroughly for a residue-free surface.

2. Concentration/Application Rate: Normal cleaning (rigs and platforms, bilges, decks, waterline scum, shop machinery and equipment) use 1 part TOPSALL #30 (aka, SUPERALL #38) to up to 20 parts water.

Heavy cleaning (degassing tanks and barges, engine rooms and soot, oil stained concrete, petroleum based drilling muds) use 1 part TOPSALL #30 (aka, SUPERALL #38) to up to 15 parts water.

Severe cleaning (Black magic, Bunker C, crude oil, holding tanks, grease traps) use 1 part TOPSALL #30 (aka, SUPERALL #38) to up to 5 parts water.

Steam cleaning use 1 part TOPSALL #30 (aka, SUPERALL #38) to up to 50 parts of water.
Pressure wash use 1 part TOPSALL #30 (aka, SUPERALL #38) to up to 30 parts water.
DO NOT USE UNDILUTED ON COMPOSITION FLOORS, WATER BASED PAINTED SURFACES, OR ALUMINUM.

3. Conditions for Use: Recommended for cleaning petroleum fractions from decks, platforms, bilges, rigs, and other seagoing equipment, as noted above.

VII. TOXICITY AND EFFECTIVENESS

a. Toxicity:

Material Tested	Species	LC50 (ppm)
TOPSALL #30	Menidia beryllina	156.60 96-hr
(aka, SUPERALL #38)	Mysidopsis bahia	115.80 48-hr
No. 2 Fuel Oil	Menidia beryllina	6.40 96-hr
	Mysidopsis bahia	1.30 48-hr
TOPSALL #30	Menidia beryllina	4.60 96-hr
(aka, SUPERALL #38) &	Mysidopsis bahia	5.00 48-hr
No. 2 Fuel Oil (1:10)		
Reference Toxicant (DSS)	Menidia beryllina	1.60 96-hr
	Mysidopsis bahia	10.00 48-hr

NOTE: This toxicity data was derived using the concentrated product. See Section VI of this bulletin for information regarding the manufacturer's recommendations for concentrations and application rates for field use.

b. Effectiveness:

NA

VIII. MICROBIOLOGICAL ANALYSIS

NA

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IX. PHYSICAL PROPERTIES

1. Flash Point: >212°F
2. Pour Point: 20°F
3. Viscosity: 30.53 SUS at 100°F
4. Specific Gravity: 1.06 at 70°F
5. pH: 12.6
6. Surface Active Agents: CONFIDENTIAL
7. Solvents: None
8. Additives: CONFIDENTIAL
9. Solubility: Miscible with water

X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

Compound	Concentration (ppm)
Arsenic	0.05
Cadmium	<0.002
Chromium	0.031
Copper	0.25
Lead	0.02
Mercury	<0.01
Nickel	<0.01
Zinc	0.25
Cyanide	<0.1
Chlorinated Hydrocarbons	<0.1

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EPA HAS NOT RECEIVED UPDATED CONTACT INFORMATION FOR THIS PRODUCT: 11/19/14

TECHNICAL PRODUCT BULLETIN #SW-9
USEPA, OEM REGULATIONS IMPLEMENTATION DIVISION
ORIGINAL LISTING DATE: MAY 25, 1989
REVISED LISTING DATE: APRIL 16, 1996
"CN-110"

I. NAME, BRAND, OR TRADEMARK
CN-110
Type of Product: Surface Washing Agent

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER
Chemex, Inc.
107-B Balboa Drive
Broussard, LA 70518
E-mail: chemex@msn.com
(Mr. Gale Campbell)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS
Chemex, Inc.
107-B Balboa Drive
Broussard, LA 70518
E-mail: chemex@msn.com
(Mr. Gale Campbell)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION
1. Flammability: Non-flammable.
2. Ventilation: None needed.
3. Skin and eye contact; protective clothing; treatment in case of contact: As in handling any industrial chemical, the standard precautions of wearing chemical-resistant gloves and eye protection are recommended.
4.a. Maximum storage temperature: 120°F
4.b. Minimum storage temperature: -40°F
4.c. Optimum storage temperature range: 70°F-80°F
4.d. Temperatures of phase separations and chemical changes: Product does not lose effectiveness between temperatures of -40°F through 120°F, although it will become hazy if the temperature is sustained at less than 30°F over a 24-hour period.

V. SHELF LIFE:
CN-110 has a shelf life of 2 years.

VI. RECOMMENDED APPLICATION PROCEDURE

1. Application Method: There are no application restrictions. The preferred application method is by spraying and/or applying the product over the pollutant (primarily oil of any viscosity) on the stained area. Immediately, the product begins to work on breaking the physical bond between the oil and the object desired to be cleaned. The full effect of CN-110 on hard, porous and most non-porous materials usually takes a minimum of 30 minutes with a maximum retention time of 60 minutes. Then the freed oil is sprayed off with available water. The oil is then safely and effectively skimmed without dispersed oil remaining in the affected waters.
If "herding" or "corralling" a slick is desired, CN-110 can also be applied without the increased toxicities by dispersing minute particles of oil into the affected water stream.
2. Concentration/Application Rate: Application concentration for cleaning shorelines is approximately 1 gallon per 75-100 square feet of affected area. Depending on depths of shorelines, this amount will give a residual of much less than 1 ppm of CN-110 in the affected waters. This residual should be lower than the toxicity of the spilled oil.
If "herding" is desired, the application concentration should be in its original state while either spraying CN-110 around the slick or dropping small amounts from a plane. The resulting residual concentration in this case should be the same as shoreline cleaning or less.
If it is desired that CN-110 be added to a high-pressure cleaning system or steam, the dilution rate should be no lower than 10%. This will lower the CN-110 residual in the affected waters to the parts per billion range.
3. Conditions for Use: Preferably fresh water, at temperature of 32°F.

VII. TOXICITY AND EFFECTIVENESS
a. Toxicity:

Material Tested	Species	LC50 (ppm)	
CN-110	Menidia beryllina	52,233.00	96-hr
	Mysidopsis bahia	12,262.00	48-hr
No. 2 Fuel Oil	Menidia beryllina	1.90	96-hr
	Mysidopsis bahia	0.90	48-hr
CN-110	Menidia beryllina	7.40	96-hr
No. 2 Fuel Oil (1:10)	Mysidopsis bahia	1.19	48-hr
Reference Toxicant (DSS)	Menidia beryllina	1.80	96-hr
	Mysidopsis bahia	5.90	48-hr

NOTE: This toxicity data was derived using the concentrated product. See Section VI of this bulletin for information regarding the manufacturer's recommendations for concentrations and application rates for field use.
b. Effectiveness:
NA

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VIII. MICROBIOLOGICAL ANALYSIS
NA

IX. PHYSICAL PROPERTIES
1. Flash Point: None
2. Pour Point: 30°F
3. Viscosity: 45.7 cSt at 78°F
4. Specific Gravity: 1.025
5. pH: 11.4
6. Surface Active Agents: Trace amounts of a sulfonated compound
7. Solvents: None
8. Additives: Complex silicate solution
9. Solubility: NA

X. ANALYSIS FOR HEAVY METALS, CYANIDES, AND CHLORINATED HYDROCARBONS

Compound	Concentration (ppm)
Arsenic	<0.22
Cadmium	<0.088
Chromium	0.109/0.131*
Copper	0.238/0.234*
Lead	<0.275
Mercury	<0.0001
Nickel	<0.11
Zinc	<0.374/<0.369*
Cyanide	0.25
Chlorinated Hydrocarbons	ND

* Duplicate Analyses

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TECHNICAL PRODUCT BULLETIN #SW-10 (formerly D-38)
USEPA, OEM REGULATIONS IMPLEMENTATION DIVISION
ORIGINAL LISTING DATE: JULY 21, 1989
REVISED LISTING DATE: SEPTEMBER 27, 1995
"COREXIT® EC9580A"
(formerly COREXIT 9580 SHORELINE CLEANER)

I. NAME, BRAND, OR TRADEMARK
COREXIT® EC9580A
Type of Product: Surface Washing Agent (hydrocarbon based)

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT
Nalco Environmental Solutions LLC
7705 Highway 90-A
Sugar Land, TX 77478
Product Management:
Office: (281) 263-7709
Mobile: (832) 851-5164
E-mail: debby.theriot@nalco.com
(Ms. Debby Theriot)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS
Nalco Environmental Solutions LLC
7705 Highway 90-A
Sugar Land, TX 77478
Product Management:
Office: (281) 263-7709
Mobile: (832) 851-5164
E-mail: debby.theriot@nalco.com
(Ms. Debby Theriot)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION
1. Flammability: IMO nonflammable; DOT combustible
2. Ventilation: Use with ventilation equal to unobstructed outdoors in moderate breeze.
3. Skin and eye contact; protective clothing; treatment in case of contact: Avoid contact with eyes, skin and clothing. Wash skin with soap and water. Flush eyes with plenty of water until irritation subsides. Remove to fresh air.
4.a. Maximum storage temperature: 170°F
4.b. Minimum storage temperature: -30°F
4.c. Optimum storage temperature range: 40°F-100°F
4.d. Temperatures of phase separations and chemical changes: None

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V. SHELF LIFE
The shelf life of unopened drums of COREXIT® EC9580A is unlimited.

VI. RECOMMENDED APPLICATION PROCEDURE
1. Application Method: COREXIT® EC9580A contains a balanced formula of specifically selected biodegradable surfactants in a de-aromatized hydrocarbon solvent system. COREXIT® EC9580A has a very low degree of toxicity to marine and shoreline organisms.

Shorelines, Mangroves, and Seagrasses - COREXIT® EC9580A is sprayed directly on the oiled rocky shorelines, mangroves or seagrasses full strength as supplied. After a soak time of zero to thirty minutes, rinse the cleaner and the oil released from the shoreline surface into the water where it can be readily recovered by conventional means such as skimmers or absorbents. The soak time may vary with temperature, oil density and degree of weathering.
2. Concentration/Application Rate: The recommended dosage is approximately 1 gallon per 100 square feet but this can vary depending on the amount of weathering and oiling. The product should be applied full strength as supplied. Since it is hydrocarbon-based, the product should not be diluted with water during application as this will greatly reduce effectiveness.
3. Conditions for Use: COREXIT® EC9580A is useful on shorelines in fresh or salt water. It is effective on all types of oil including heavily weathered and emulsified oil ("chocolate mousse") containing up to 50 percent water.

VII. TOXICITY AND EFFECTIVENESS
a. Toxicity:

Material Tested	Species	LC50 (ppm)
COREXIT® EC9580A	Menidia beryllina	86.88 96-hr
	Mysidopsis bahia	31.96 48-hr
No. 2 Fuel Oil	Menidia beryllina	10.72 96-hr
	Mysidopsis bahia	16.12 48-hr
COREXIT® EC9580A &	Menidia beryllina	13.20 96-hr
No.2 Fuel Oil (1:10)	Mysidopsis bahia	9.06 48-hr
Reference Toxicant (DSS)	Menidia beryllina	7.02 96-hr
	Mysidopsis bahia	9.82 48-hr

NOTE: This toxicity data was derived using the concentrated product. See Section VI of this bulletin for information regarding the manufacturer's recommendations for concentrations and application rates for field use.

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VIII. MICROBIOLOGICAL ANALYSISNA

IX. PHYSICAL PROPERTIES
1. Flash Point: 174°F
2. Pour Point: -65°F
3. Viscosity: 8 cSt at 104°F, 28 cSt at 32°F
4. Specific Gravity: 0.810 at 60°F
5. pH: Not Applicable
6. Surface Active Agents: CONFIDENTIAL
7. Solvents: De-aromatized Hydrocarbon
8. Additives: None
9. Solubility: Not Applicable

X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

Compound	Concentration (ppm)
Arsenic	<0.06
Cadmium	<0.002
Chromium	0.003
Copper	<0.001
Lead	<0.009
Mercury	<0.0002
Nickel	0.01
Zinc	0.041
Cyanide	<0.05
Chlorinated Hydrocarbons	ND

ED_001324_00005599-00083

TECHNICAL PRODUCT BULLETIN #SW-11 (formerly D-40)USEPA, OEM
REGULATIONS IMPLEMENTATION DIVISION
ORIGINAL LISTING DATE: JUNE 26, 1989
REMOVAL DATE: SEPTEMBER 15, 1994
RELISTING DATE: JULY 07, 2010
"DE-SOLV-IT INDUSTRIAL FORMULA"

I. NAME, BRAND, OR TRADEMARK
DE-SOLV-IT INDUSTRIAL FORMULA
Type of Product: Surface Washing Agent

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT
Orange-Sol Blending and Packaging
1400 N Fiesta Boulevard
Gilbert, AZ 85233
Phone: (800) 877-7771
Fax: (480) 497-0444
E-mail: amf@orange-sol.com
Website: www.orange-sol.com
(Mr. Albert Farnsworth or
Mr. Jack Farnsworth at (480) 319-0141)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS
Bell Tech
Master Distributor
P.O. Box 2198
Valdez, AK 99686
Phone: (907) 602-0111
Fax: (907) 835-4535
E-mail: bellenterprise@cvinternet.net
(Mr. Randy Bell)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION
1. Flammability: Non-flammable (DOT: Not regulated unless shipped by land in a package having a capacity of 3,500 gallons or more). Combustible Class IIIA per OSHA, 29 CFR 1910.106
2. Ventilation: No special requirements
3. Skin and eye contact; protective clothing; treatment in case of contact: No special equipment of clothing required; however, goggles are recommended where splash is potential. If eye or skin irritation occurs, flush with ample fresh water.
4.a. Maximum storage temperature: 120°F continuous, 140°F up to 5 days
4.b. Minimum storage temperature: -20°F
4.c. Optimum storage temperature range: 0°F to 120°F
4.d. Temperatures of phase separations and chemical changes: Stable

V. SHELF LIFE
Two (2) years in sealed polydrums or totes (as delivered).

VI. RECOMMENDED APPLICATION PROCEDURES
1. Application Method: DE-SOLV-IT (DSI) is to be used in neat form. DSI works just as well with fresh or salt water. This product works well with all types of oils. Product can be used on oil-contaminated beaches.
2. Concentration/Application Rate: Use DSI directly on the contaminated area, or up to approximately a 1:10 dilution ratio (product:water). Lighter oils will require a 1:10 to 1:30 product to water dilution ratio. Warmer waters (greater than 78°F) and/or good agitation during application will require less product. Response personnel can determine best method to collect clean up residue. Clean up residue should be collected and disposed of in accordance to local, state, and federal regulations.
3. Conditions for Use: Effective in salt or fresh water, with no limitations as to usage within optimum temperature parameters (application may be made at or above 35°F, with optimum above 48°F).

VII. TOXICITY AND EFFECTIVENESS
a. Toxicity:

Material Tested	Species	LC50 (ppm)
DE-SOLV-IT	Menidia beryllina	37.71 96-hr
	Mysidopsis bahia	4.57 48-hr
No. 2 Fuel Oil	Menidia beryllina	3.76 96-hr
	Mysidopsis bahia	2.04 48-hr
DE-SOLV-IT &	Menidia beryllina	9.40 96-hr
No. 2 Fuel Oil (1:10)	Mysidopsis bahia	1.68 48-hr
Reference Toxicant (SLS)	Menidia beryllina	12.25 96-hr
	Mysidopsis bahia	11.71 48-hr

b. Effectiveness: NA

VIII. MICROBIOLOGICAL ANALYSIS
NA

IX. PHYSICAL PROPERTIES
1. Flash Point: 145°F
2. Pour Point: -84°F
3. Viscosity: 1.8 cSt @ 40°C
4. Specific Gravity: 1.8345 @60°F
5. pH: 6.6
6. Surface Active Agents: Nonionic PROPRIETARY Surfactants
7. Solvents: PROPRIETARY
8. Additives: None
9. Solubility: Miscible in oil and solvents

ED_001324_00005599-00085

X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

Compound	Concentration (ppm)
Arsenic	<0.010
Cadmium	<0.005
Chromium	<0.015
Copper	<0.015
Lead	<0.010
Mercury	<1 µg/L
Nickel	<0.025
Zinc	0.0.15
Cyanide	<0.010
Chlorinated Hydrocarbons	<6.00

ED_001324_00005599-00086

TECHNICAL PRODUCT BULLETIN #SW-12 (formerly D-41)
USEPA, OEM REGULATIONS IMPLEMENTATION DIVISION
ORIGINAL LISTING DATE: AUGUST 11, 1989
REVISED LISTING DATE: NOVEMBER 2, 1995
"PREMIER 99"

I. NAME, BRAND, OR TRADEMARK
PREMIER 99
Type of Product: Surface Washing Agent (Water Based)

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT
Gold Coast Chemical Products
2357 Stirling Road
Dania Beach, FL 33312
Phone: (954) 893-0044
Fax: (954) 893-8884
E-mail: noslime@goldcoastchemical.com
(Mr. Eli Finkelberg or Ms. Sue Freid)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS
Gold Coast Chemical Products
2357 Stirling Road
Dania Beach, FL 33312
Phone: (954) 893-0044
Fax: (954) 893-8884
E-mail: noslime@goldcoastchemical.com
(Mr. Eli Finkelberg or Ms. Sue Freid)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION
1. Flammability: None
2. Ventilation: Adequate ventilation is needed if in closed environment.
3. Skin and eye contact; protective clothing; treatment in case of contact: Skin and eye contact: Detergents will defat skin and eyes. May cause irritation. Protective clothing: Use protective gloves for manual cleaning and splash goggles. Treatment in case of contact: If splashed on skin, wash with copious amounts of water. If ingested, drink diluted vinegar or lemon juice. Get medical attention.
4.a. Maximum storage temperature: 125°F
4.b. Minimum storage temperature: 0°F
4.c. Optimum storage temperature range: 0°F - 75°F
Avoid freezing the product. If material freezes and separation is experienced, it should be warmed and mixed together.
4.d. Temperatures of phase separations and chemical changes: No separation expected down to 20°F.

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V. SHELF LIFE
Unopened material – at least 5 years is expected.
Opened material – at least 2 years is expected.

VI. RECOMMENDED APPLICATION PROCEDURE
1. Application Method: Apply by spray, mop, or pressure washer, etc. Agitate severe spots. Rinse thoroughly for residue free surface.
2. Concentration/Application Rate:
Normal Cleaning – 1 part PREMIER 99 to up to 20 parts water.
Heavy Cleaning – 1 part PREMIER 99 to up to 15 parts water.
Severe Cleaning – 1 part PREMIER 99 to up to 5 parts water.
Steam Cleaning – 1 part PREMIER 99 to up to 50 parts water.
Pressure Wash – 1 part PREMIER 99 to up to 30 parts water.
3. Conditions for Use: Water salinity, water temperature, types and ages of pollutants are not determined.

VII. TOXICITY AND EFFECTIVENESS
a. Toxicity:

Material Tested	Species	LC50 (ppm)
PREMIER 99	Menidia beryllina	565.70 96-hr
	Mysidopsis bahia	94.70 48-hr
No. 2 Fuel Oil	Menidia beryllina	10.20 96-hr
	Mysidopsis bahia	2.10 48-hr
PREMIER 99 &	Menidia beryllina	8.20 96-hr
No. 2 Fuel Oil (1:10)	Mysidopsis bahia	2.50 48-hr
Reference Toxicant (DSS)	Menidia beryllina	1.55 96-hr
	Mysidopsis bahia	7.96 48-hr

NOTE: This toxicity data was derived using the concentrated product. See Section VI of this bulletin for information regarding the manufacturer's recommendations for concentrations and application rates for field use.
b. Effectiveness:
NA

VIII. MICROBIOLOGICAL ANALYSIS
NA

IX. PHYSICAL PROPERTIES
1. Flash Point: 160°F
2. Pour Point: NA
3. Viscosity: 15 cps
4. Specific Gravity: 1.01
5. pH: 10 - 11.5
6. Surface Active Agents: Active 8000* - Purity Chemical <10%

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7. Solvents: <5%
8. Additives: <5%
9. Solubility: Complete in Water
*NOTE: Particular chemical composition of Active 8000 is considered by Purity Chemical as a trade secret. More detailed information can be given by Purity Chemical – Mr. Jim Palmer, 1800 NW 70th Avenue, Miami, FL 33126, 1-800-654-0235, FAX (305) 592-2601.

X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

Compound	Concentration (ppm)
Arsenic	< 0.01
Cadmium	< 0.0005
Chromium	< 0.1
Copper	< 0.1
Lead	< 0.005
Mercury	< 0.001
Nickel	< 0.5
Zinc	< 0.1
Cyanide	< 0.005
Chlorinated Hydrocarbons	ND

ED_001324_00005599-00089

TECHNICAL PRODUCT BULLETIN #SW-15 (formerly D-46)
USEPA, OEM REGULATIONS IMPLEMENTATION DIVISION
ORIGINAL LISTING DATE: APRIL 23, 1990
REVISED LISTING DATE: AUGUST 30, 1995
"SIMPLE GREEN®"

I. NAME, BRAND, OR TRADEMARK
SIMPLE GREEN®
Type of Product: Surface Washing Agent (Water Based)

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT
Sunshine Makers, Inc.
15922 Pacific Coast Highway
Huntington Beach, CA 92649
Phone: (800) 228-0709
Phone: (562) 795-6000
Fax: (562) 592-3830
Email: CChapin@simplegreen.com
(Ms. Carol Chapin)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS
Sunshine Makers, Inc.
15922 Pacific Coast Highway
Huntington Beach, CA 92649
Phone: (800) 228-0709
Phone: (562) 795-6000
Fax: (562) 592-3830
Email: CChapin@simplegreen.com
(Ms. Carol Chapin)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION
1. Flammability: Non-flammable.
2. Ventilation: Not required.
3. Skin and eye contact; protective clothing; treatment in case of contact: SIMPLE GREEN® is safe for use on skin and will not cause irritation in the majority of users. Avoid contact with eyes, irritation may result. Wear splash goggles or full face-shield and have eye washing equipment available in areas where potential is high for eye contact. No special precautions or additional protective equipment are required during handling or use. SIMPLE GREEN® is provided with a Material Safety Data Sheet (No. 1002).
4.a. Maximum storage temperature: 140°F
4.b. Minimum storage temperature: 34°F
4.c. Optimum storage temperature range: >32°F and <140°F
4.d. Temperatures of phase separations and chemical changes: SIMPLE GREEN® is stable and phase separation will not occur at temperatures within the above storage range.

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V. SHELF LIFE
SIMPLE GREEN® has an unlimited shelf life.

VI. RECOMMENDED APPLICATION PROCEDURE
1. Application Method: Spray on oily surface.
2. Concentration/Application Rate: For open water, spray concentrated product directly on surface of oil at a ratio of 4 parts of oil to 1 part of SIMPLE GREEN®. Site conditions may warrant alternative procedures to maintain effectiveness.
3. Conditions for Use: Equally effective in fresh water, estuarine, and marine environments at all temperatures. SIMPLE GREEN® contains no known EPA Priority Pollutants.

VII. TOXICITY AND EFFECTIVENESS
a. Toxicity:

Material Tested	Species	LC50 (ppm)
SIMPLE GREEN®	Menidia beryllina	27.90 96-hr
	Mysidopsis bahia	77.60 48-hr
No. 2 Fuel Oil	Menidia beryllina	6.50 96-hr
	Mysidopsis bahia	3.70 48-hr
SIMPLE GREEN® &	Menidia beryllina	8.30 96-hr
No. 2 Fuel Oil (1:10)	Mysidopsis bahia	4.40 48-hr
Reference Toxicant (DSS)	Menidia beryllina	7.80 96-hr
	Mysidopsis bahia	21.20 48-hr

NOTE: This toxicity data was derived using the concentrated product. See Section VI of this bulletin for information regarding the manufacturer's recommendations for concentrations and application rates for field use.

VIII. MICROBIOLOGICAL ANALYSIS
SIMPLE GREEN® contains no microorganisms, enzymes, or biological material.

IX. PHYSICAL PROPERTIES
1. Flash Point: >200°F
2. Pour Point: None
3. Viscosity: 2.0 Centistokes at 78°F
4. Specific Gravity: 1.0257 g/ml at 72°F
5. pH: 9.5
6. Surface Active Agents: CONFIDENTIAL
7. Solvents: CONFIDENTIAL
8. Additives: CONFIDENTIAL
9. Solubility: Infinitely miscible.
(Increasing salt concentrations in marine ecosystems will lead to complexes with SIMPLE GREEN® that may become visible at ratios above one part SIMPLE GREEN® to 99 parts seawater.)

ED_001324_00005599-00091

X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

Compound	Concentration (ppm)
Arsenic	<5.0000
Cadmium	<0.0233
Chromium	0.1150
Copper	<0.7500
Lead	0.0776
Mercury	<0.0125
Nickel	<2.3000
Zinc	<4.4000
Cyanide	<1.0000
Chlorinated Hydrocarbons	<1.0

ED_001324_00005599-00092

TECHNICAL PRODUCT BULLETIN #SW-16 (formerly D-52)
USEPA, OEM REGULATIONS IMPLEMENTATION DIVISION
ORIGINAL LISTING DATE: JULY 8, 1991
REVISED LISTING DATE: JUNE 14, 1995
"AQUACLEAN"

I. NAME, BRAND, OR TRADEMARK
AQUACLEAN
Type of Product: Surface Washing Agent

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT
Madison Chemical Company, Inc.
3141 Clifty Drive
Madison, IN 47250
Phone: (812) 273-6000
Fax: (812) 273-6002
E-mail: cara.cyrus@madchem.com
(Ms. Cara Cyrus)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS
Madison Chemical Company, Inc.
3141 Clifty Drive
Madison, IN 47250
Phone: (812) 273-6000
Fax: (812) 273-6002
E-mail: cara.cyrus@madchem.com
(Ms. Cara Cyrus)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION
1. Flammability: Non-flammable.
2. Ventilation: Handle in a well-ventilated space. Local exhaust is recommended if TLV's are exceeded.
3. Skin and eye contact; protective clothing; treatment in case of contact: Avoid eye and skin contact. In case of such contact, immediately flush with large amount of cool water for at least 15 minutes, and call a physician. Wear protective eye goggles, impermeable protective gloves, and protective clothing when handling the product. Wash contaminated protective equipment (including clothing, shoes, eye goggles, gloves, etc.) thoroughly in soap and water, rinse repeatedly in clean water and dry before reuse. Avoid ingestion, breathing dusts, mists, or fumes. In case of ingestion, induce vomiting, give water and call a physician. In case of inhalation, move the affected person to fresh air, and call a physician.
4.a. Maximum storage temperature: 140°F
4.b. Minimum storage temperature: 50°F
4.c. Optimum storage temperature range: >50°F to <104°F

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4.d. Temperatures of phase separations and chemical changes: <50°F, >104°F

V. SHELF LIFE
18 months if stored between 50°F and 104°F, and away from acids.

VI. RECOMMENDED APPLICATION PROCEDURES
1. Application Method: AQUACLEAN may be introduced with a pressure spray to cover the affected area, after the appropriate dilution or concentration is prepared. After application, agitate spill area with water using a solid stream flow.
For manual cleaning with AQUACLEAN, follow instructions in the product data sheet provided by the manufacturer.
2. Concentration/Application Rate: For small spills, dilute 3 to 1 with water and apply as above. For large spills, prepare a 33% solution of AQUACLEAN and apply through a foam eductor at 6% setting with approximately 90 gallons per minute flow at the nozzle.
For spills on shorelines and beaches, dilute AQUACLEAN 50% with fresh water and apply using a pressure spray to cover the entire contaminated area. Then rinse with fresh water.
3. Conditions for Use: Water temperature should be above 41°F.

VII. TOXICITY AND EFFECTIVENESS
a. Toxicity:

Material tested	Species	LC50 (ppm)
AQUACLEAN	Menidia beryllina	70.7 96-hr
	Mysidopsis bahia	32.7 48-hr
No. 2 Fuel Oil	Menidia beryllina	4.4 96-hr
	Mysidopsis bahia	1.8 48-hr
AQUACLEAN and	Menidia beryllina	6.5 96-hr
No. 2 Fuel (1:10)	Mysidopsis bahia	2.1 48-hr
Reference Toxicant (DSS)	Menidia beryllina	1.4 96-hr
	Mysidopsis bahia	4.9 48-hr

NOTE: This toxicity data was derived using the concentrated product. See Section VI of this bulletin for information regarding the manufacturer's recommendations for concentrations and application rates for field use.
b. Effectiveness:
NA

VIII. MICROBIOLOGICAL ANALYSIS
NA

IX. PHYSICAL PROPERTIES
1. Flash Point: None detected
2. Pour Point: -20°F
3. Viscosity: 16.5 cP at 25°C (77°F)
4. Specific Gravity: 1.06 at 25°C (77°F)
5. pH: 11.8 (at full strength)
6. Chemical Name and Percentage by Weight of the Total Formulation: CONFIDENTIAL

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7. Surface Active Agents: Anionic and nonionic synthetic surfactants.
8. Solvents: CONFIDENTIAL
9. Additives: CONFIDENTIAL
10. Solubility: Completely soluble

X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

Compound	Concentration (ppm)
Arsenic	1.10
Cadmium	0.16
Chromium	0.20
Copper	0.66
Lead	1.83
Mercury	<0.01
Nickel	0.80
Zinc	0.29
Cyanide	0.06
Chlorinated hydrocarbons	4.20

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TECHNICAL PRODUCT BULLETIN #SW-17 (formerly D-14)
USEPA, OEM REGULATIONS IMPLEMENTATION DIVISION
ORIGINAL LISTING DATE: SEPTEMBER 30, 1984
REVISED LISTING DATE: JULY 25, 1996
"PETRO-GREEN ADP-7"

I. NAME, BRAND, OR TRADEMARK
PETRO-GREEN ADP-7
Type of Product: Surface Washing Agent (Water Based Concentrate)

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER
Petro-Green, Inc.
P.O. Box 814665
Dallas, TX 75381
Phone/Fax: (972) 484-7336
E-mail: adp7@petro-green.com
(Mrs. Janis Paddock)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS
Petro-Green, Inc.
P.O. Box 814665
Dallas, TX 75381
Phone/Fax: (972) 484-7336
E-mail: adp7@petro-green.com
(Mrs. Janis Paddock)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION
1. Flammability: Non-flammable.
2. Ventilation: Use normal household type ventilation when storing and handling.
3. Skin and eye contact; protective clothing; treatment in case of contact: Avoid contact with skin and eyes. In the event of contact, flush with clean water. Prolonged contact with skin can cause drying. Treat skin with common hand lotion. The use of gloves and goggles is recommended.
4.a. Maximum storage temperature: 140°F
4.b. Minimum storage temperature: 26°F
4.c. Optimum storage temperature: 40°F to 110°F
4.d. Temperatures of phase separations and chemical changes: No phase separations or chemical changes within storage temperature range.

V. SHELF LIFE
PETRO-GREEN ADP-7 has an indefinite shelf life.

ED_001324_00005599-00096

VI. RECOMMENDED APPLICATION PROCEDURE

1. Application Method: For spills on soils, sandy or rocky areas: The ADP-7 can be pre-mixed into water, or educted into a water flow, to be sprayed directly onto the oil spill.

2. Concentration/Application Rate: For spills on land: Typical dilution is one gallon of ADP-7 diluted in one barrel (42 gallons) of water (about 2.4%), which is enough to wash one barrel of oil on the surface. After loose oil is vacuumed off soil surfaces, the application rate is 100 barrels of solution per acre.

3. Conditions for Use: The conditions for each spill dictate proper choice of surface washing agent. PETRO-GREEN ADP-7 has been tested in both tropical and arctic environments, as well as with fresh water and a variety of produced water salinities. It has been found to be effective over these ranges. PETRO-GREEN ADP-7 has also been tested on a wide variety of fresh crude oil and product spills. There are no specific limitations to use, however, and an aged spill is likely to be non-responsive as it would be to any environmentally sound surface washing agent. For aged or asphaltic spills, the solution may be heated to 150EF in a hot water washing rig, or a common oil field "hot oiler" truck to increase effectiveness.

VII. TOXICITY AND EFFECTIVENESS

a. Toxicity:

Material Tested	Species	LC50 (ppm)
PETRO-GREEN ADP-7	Menidia beryllina	11.61 96-hr
	Mysidopsis bahia	10.56 48-hr
No. 2 Fuel Oil	Menidia beryllina	19.00 96-hr
	Mysidopsis bahia	1.51 48-hr
PETRO-GREEN ADP-7	Menidia beryllina	10.95 96-hr
No. 2 Fuel Oil (1:10)	Mysidopsis bahia	1.12 48-hr
Reference Toxicant (DSS)	Menidia beryllina	1.50 96-hr
	Mysidopsis bahia	7.60 48-hr

NOTE: This toxicity data was derived using the concentrated product. See Section VI of this bulletin for information regarding the manufacturer's recommendations for concentrations and application rates for field use.

b. Effectiveness:

NA

VIII. MICROBIOLOGICAL ANALYSIS

NA

IX. PHYSICAL PROPERTIES

1. Flash Point: >212°F
2. Pour Point: 22°F
3. Viscosity: 103.1 at 60°F
4. Specific Gravity: 1.035 at 60°F
5. pH: 10.5
6. Surface Active Agents: CONFIDENTIAL
7. Solvents: CONFIDENTIAL

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8. Additives: CONFIDENTIAL
9. Solubility: NA

X. ANALYSIS FOR HEAVY METALS AND CHLORINATED HYDROCARBONS

Compound	Concentration (ppm)
Arsenic	ND
Cadmium	0.12
Chromium	ND
Copper	0.4
Lead	0.6
Mercury	0.004
Nickel	0.75
Zinc	1.32
Cyanide	0.074
Chlorinated Hydrocarbons	<1.0*

*NOTE: Surfactant activity interfered with the extraction and chemical analyses; this was the practical limit of detection.

ED_001324_00005599-00098

TECHNICAL PRODUCT BULLETIN #SW-18
USEPA, OEM REGULATIONS IMPLEMENTATION DIVISION
LISTING DATE: OCTOBER 23, 1996
"NATURE'S WAY HS"
(aka, MARINECLEAN, MICRO CLEAN, NATURE'S WAY PC, POWERCLEAN)

I. NAME, BRAND, OR TRADEMARK
NATURE'S WAY HS
(aka, MARINECLEAN, MICRO CLEAN, NATURE'S WAY PC, POWERCLEAN)
Type of Product: Surface Washing Agent

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER
Integra Environmental, Ltd.
5825 Centralcrest
Houston, TX 77092
Phone: (713) 680-1234
Fax: (713) 680-1608
E-mail: info@integraenvironmental.com
(Ms. Cathy Kaiser)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS
Integra Environmental, Ltd.
5825 Centralcrest
Houston, TX 77092
Phone: (713) 680-1234
Fax: (713) 680-1608
E-mail: info@integraenvironmental.com
(Ms. Cathy Kaiser)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION
1. Flammability: Non-flammable.
2. Ventilation: No special precautions are required, but in case of inhalation, move person to fresh air.
3. Skin and eye contact; protective clothing; treatment in case of contact: Flush contaminated skin with plenty of water for at least 15 minutes. Consult a physician if irritation develops. Protective gloves are recommended for extended or prolonged contact, (e.g., immersing hands). Tight fitting safety goggles are recommended for handling product in concentrated form, especially if contacts are worn.
4.a. Maximum storage temperature: 130°F
4.b. Minimum storage temperature: 32°F
4.c. Optimum storage temperature: 90°F
4.d. Temperatures of phase separations and chemical changes: NA

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V. SHELF LIFENATURE'S WAY HS has a five year shelf life.

VI. RECOMMENDED APPLICATION PROCEDURE

1. Application Method: NATURE'S WAY HS may be applied by spraying, pouring, dispensing equipment, or by manual or automatic scrubber machines. Do not mix the product with any other cleaner nor allow any other cleaners to contact surfaces where HS is being used. Hot water should never be used.

2. Concentration/Application Rate: Apply NATURE'S WAY HS full strength (undiluted) to surface area with sprayer, concentrating on areas with heaviest contamination first. To speed clean-up of shorelines and beaches, pressure spray into cracks and crevices prior to scrubbing. Agitate and scrub well using power brushes, hand brushes, brooms or mops. If possible, allow the scrubbed solution to remain on the surface for at least 15 minutes. If allowed to soak overnight, the next morning the treated surface must be re-wet with water, reagitated, and rinsed. Additional product will not be necessary at that time.

3. Conditions for Use: For heavily contaminated surfaces, NATURE'S WAY HS should always be used full strength. For moderate accumulations HS may be diluted to as little as 2 oz. per gallon of cool water for cleaning light contamination. For average contamination, a dilution of 12 oz. per gallon is recommended (1 part NATURE'S WAY HS to 10 parts water). For light use, 4 to 6 oz. of product per gallon water will be sufficient.

VII. TOXICITY AND EFFECTIVENESS

a. Toxicity

Material Tested	Species	LC50 (ppm)
NATURE'S WAY HS	Menidia beryllina	152.14 96-hr
	Mysidopsis bahia	193.00 48-hr
No. 2 Fuel Oil	Menidia beryllina	3.15 96-hr
	Mysidopsis bahia	0.96 48-hr
NATURE'S WAY HS	Menidia beryllina	3.91 96-hr
No. 2 Fuel Oil (1:10)	Mysidopsis bahia	1.07 48-hr
Reference Toxicant (DSS)	Menidia beryllina	- 96-hr
	Mysidopsis bahia	5.71 48-hr

NOTE: This toxicity data was derived using the concentrated product. See Section VI of this bulletin for information regarding the manufacturer's recommendations for concentrations and application rates for field use.

a. Effectiveness:

NA

VIII. MICROBIOLOGICAL ANALYSIS

NA

IX. PHYSICAL PROPERTIES

1. Flash Point: NA
2. Pour Point: Flowable at all temperatures above freezing
3. Viscosity: <100 CPS
4. Specific Gravity: 1.01

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5. pH: 8 - 9.5
6. Surface Active Agents: CONFIDENTIAL
7. Solvents: CONFIDENTIAL
8. Additives: CONFIDENTIAL
9. Solubility: NA

X. ANALYSIS FOR HEAVY METALS AND CHLORINATED HYDROCARBONS

Compound	Concentration (ppm)
Arsenic	<0.003
Cadmium	<0.005
Chromium	<0.010
Copper	0.020
Lead	<0.002
Mercury	<0.0002
Nickel	<0.030
Zinc	0.260
Cyanide	<0.020
Chlorinated Hydrocarbons	ND

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TECHNICAL PRODUCT BULLETIN #SW-19
USEPA, OEM REGULATIONS IMPLEMENTATION DIVISION
LISTING DATE: JANUARY 30, 1997
"CYTOSOL"

I. NAME, BRAND, OR TRADEMARK
CYTOSOL
Type of Product: Surface Washing Agent

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER
CytoCulture International, Inc.
249 Tewksbury Avenue
Point Richmond, CA 94801-3829
Phone: (510) 233-0102
Fax: (510) 233-3777
Emergency Mobile: (561) 762-5440
E-mail First Response: rvwedel@gmail.com
E-mail: rvw@cytoculture.com
Website: www.cytosolbiosolvent.com
Website: www.cytoculture.com
(Dr. Randall von Wedel)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS
CytoCulture International, Inc.
249 Tewksbury Avenue
Point Richmond, CA 94801-3829
Phone: (510) 233-0102
Fax: (510) 233-3777
Emergency Mobile: (561) 762-5440
E-mail First Response: rvwedel@gmail.com
E-mail: rvw@cytoculture.com
Website: www.cytosolbiosolvent.com
Website: www.cytoculture.com
(Dr. Randall von Wedel)

Foss Environmental, Inc.
7440 West Marginal
Seattle, WA 98108-4141
Phone: (206) 768-1450
Fax: (206) 767-3460
(Mr. Larry Pintler)

Advanced Cleanup Technologies, Inc.
20928 Lamberton Avenue
Carson, CA 90810
Phone: (800) 334-2284
Fax: (310) 763-9076
(Mr. Walt Dorn)

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IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION

1. Flammability: Non-flammable. However, keep the product away from heat and avoid contact with strong oxidizing agents. Ensure proper disposal of product-saturated absorbents, rags, and combustible materials to avoid the possibility of spontaneous combustion.

2. Ventilation: Product is not volatile. However, in the event of aerosol inhalation, immediately move victim to fresh air. If victim has stopped breathing, give artificial respiration, preferably by mouth to mouth. Get medical attention immediately.

3. Skin and eye contact; protective clothing; treatment in case of contact: The CYTOSOL contains no volatile hydrocarbons or petroleum constituents. However, as a precautionary measure, wear gloves and safety glasses meeting the specifications of ANSI Standard Z87.1. Avoid breathing aerosols. Avoid prolonged contact with skin.

4.a. Maximum storage temperature: 110°F

4.b. Minimum storage temperature: 39°F

4.c. Optimum storage temperature: 55°F

4.d. Temperatures of phase separations and chemical changes: Avoid freezing. At temperatures below the cloud point (43°F), the product may become cloudy, but will return to normal upon warming, with no effect on performance. Store product in airtight containers, if possible, without excessive exposure to moisture.

V. SHELF LIFE

Closed container: 10 years in a dry environment.

Open container: 1 year in a warm, humid environment.

The product does not deteriorate appreciably over time, but will grow bacteria if water condensation accumulates in the container.

VI. RECOMMENDED APPLICATION PROCEDURE

1. Application Method: The CYTOSOL is applied to oiled shorelines to extract and recover weathered petroleum by flotation with passive water deluges from header pipes or manual spraying. Remaining residual hydrocarbons are biodegraded, either passively by intrinsic bioremediation, or aggressively by enhancing the process with controlled amounts of nutrients and/or acclimated cultures of bacteria cultured from the site, when approved by local, state and federal agencies.

The CYTOSOL process is most suitable for the treatment of heavily oiled shorelines that do not respond well to conventional treatments, or that are considered too sensitive for mechanical/pressure wash strategies. Prior to the application of CYTOSOL, collection booms, oil skimmers, sorbent pads, or other appropriate containment and collection mechanisms must be deployed and operational.

2. Concentration/Application Rate: CYTOSOL may be applied with a variety of spraying or washing equipment, depending upon the scale and type of shoreline to be cleaned. The product is to be used only neat and undiluted, for direct application to spilled oil. For large beach areas, CYTOSOL can be sprayed from water trucks or work boats equipped with pumps, hoses, and nozzles to deliver the product as an aerial spray. In smaller applications, CYTOSOL may be

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applied with hand sprayers or portable pumps to spray the product directly onto oiled surfaces. Dose rates will vary with the type and amount of petroleum spilled, the extent of weathering, and other site specific conditions, including temperature, porosity of shoreline, and residence time available to let the product contact the oil. In general, the ratio of applied CYTOSOL to crude oil is between 0.5:1 and 1:1. The quantity of CYTOSOL applied should be approximately equivalent to the quantity of petroleum accumulated on the shoreline, or as required to dissolve and remove weathered oil. After application, the product should be allowed to penetrate and dissolve the weathered petroleum for at least one hour, preferably longer. Cold weather applications will require more contact time before initiating recovery. In tidal areas, it is advisable to apply the CYTOSOL as the tide is ebbing (receding) to maximize contact time. Trapped oil may continue to be released for several days, requiring that containment devices be left in place.

3. Conditions for Use: The following shoreline types are appropriate for the use of CYTOSOL: Coarse sand beaches where petroleum has penetrated into sand; marsh areas and vegetated wetlands where oil has coated plants and become trapped; concrete bulkheads, rip rap and piers that may have trapped oil; oiled pilings; gravel or cobble shorelines and rocky shores, where oil has become trapped in pockets; and, public beaches, fisheries, hatcheries, river banks, and other sensitive or high impact sites. The CYTOSOL has been fielded tested successfully for removing oil from mussel beds and intertidal zones, pilings and concrete rip rap. The CYTOSOL also proved effective in facilitating the removal of oil from the banks and vegetation along an oiled creek.

VII. TOXICITY AND EFFECTIVENESS

a. Toxicity

Material Tested	Species	LC50 (ppm)
CYTOSOL	Menidia beryllina	738.0 96-hr
	Mysidopsis bahia	124.0 48-hr
No. 2 Fuel Oil	Menidia beryllina	38.9 96-hr
	Mysidopsis bahia	5.9 48-hr
CYTOSOL &	Menidia beryllina	24.3 96-hr
No. 2 Fuel Oil (1:10)	Mysidopsis bahia	7.0 48-hr
Reference Toxicant (DSS)	Menidia beryllina	13.8 96-hr
	Mysidopsis bahia	22.2 48-hr

NOTE: This toxicity data was derived with the EPA protocols for dispersants using a blender to emulsify the product into the water for testing organisms. The CYTOSOL emulsion created microdroplets of product which may have had direct physical effects on the test larvae. Since the solubility of the product in water is so low (14 ppm or less), it is probable that the observed effects on the test organisms was caused by larvae having direct contact with droplets of product rather than by a true chemical toxicity from the trace amount of dissolved product. In practice, the CYTOSOL would not be emulsified to any great extent during application. See Section VI of this bulletin for information regarding the manufacturer's recommendations for concentrations and application rates for field use.

b. Effectiveness:

NA

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VIII. MICROBIOLOGICAL ANALYSIS
NA

IX. PHYSICAL PROPERTIES
1. Flash Point: 360°F
2. Pour Point: 10°F
3. Viscosity: 4.15 CST @ 104°F
4. Specific Gravity: 0.8877 @ 60°F
5. pH: Neutral
6. Surface Active Agents: None
7. Solvents: No Petroleum Distillates
8. Additives: CONFIDENTIAL
9. Solubility: 14 ppm in fresh water, 7 ppm in sea water

X. ANALYSIS FOR HEAVY METALS AND CHLORINATED HYDROCARBONS

Compound	Concentration
Arsenic	ND
Cadmium	ND
Chromium	ND
Copper	ND
Lead	ND
Mercury	ND
Nickel	ND
Zinc	ND
Cyanide	ND
Chlorinated Hydrocarbons	ND

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TECHNICAL PRODUCT BULLETIN #SW-20USEPA, OEM REGULATIONS IMPLEMENTATION DIVISION
ORIGINAL LISTING DATE: MARCH 21, 1997
"BIOSOLVE® HYDROCARBON MITIGATION™ AGENT"

I. NAME, BRAND, OR TRADEMARK
BIOSOLVE® HYDROCARBON MITIGATION™ AGENT
Type of Product: Surface Washing Agent

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER
The BioSolve® Company
329 Massachusetts Avenue
Lexington, MA 02420
Phone: (781) 482-7900 or (800) 225-3909
Fax: (781) 482-7909
Website: www.biosolve.com
E-mail: info@biosolve.com
(Mr. Karl Loos or Mr. James Edgerly)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS
The BioSolve® Company
329 Massachusetts Avenue
Lexington, MA 02420
Phone: (781) 482-7900 or (800) 225-3909
Fax: (781) 482-7909
Website: www.biosolve.com
E-mail: info@biosolve.com
(Mr. Karl Loos or Mr. James Edgerly)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION
1. Flammability: Non-flammable
2. Ventilation: Normal
3.Skin and eye contact; protective clothing; treatment in case of contact: Flush contaminated eyes thoroughly with water for 15 minutes, and get medical attention. Remove contaminated clothing, wash exposed area with soap and water, wash clothing before reuse. Get medical attention if irritation develops. Get medical attention for ingestion. No medical attention is necessary with inhalation. There are no special storage requirements or special handling precautions; use good normal hygiene.
4.a. Maximum storage temperature: 120°F (50°C)
4.b. Minimum storage temperature: 35°F (1.5°C)
4.c. Optimum storage temperature: 60°F (15°C)
4.d. Temperatures of phase separations and chemical changes: NA

V. SHELF LIFE

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BIOSOLVE® has a 10+ year shelf life if unopened.

VI. RECOMMENDED APPLICATION PROCEDURE

1. Application Method: Dilute or use eductors to specified rate and apply through fire hose, power washers, steam powered units, or chemical boom sprayers with nozzles that produce a shearing action. Special nozzles to apply the solution as droplets are not necessary. For shoreline cleanup involving heavy or weathered crude, presoak to a 6% solution may be necessary.

2. Concentration/Application Rate: BIOSOLVE® is a highly concentrated product and must be diluted with water before use. Dilution ratios vary depending on site specific conditions. Dilution ratio's normally run at 6%, 3%, or 1%. For heavy, mousse, or weathered oil, a 3% to 6% solution should be applied. For light or refined products, apply at 2% to 3%. For sheens, apply at .5 to 1%. Since testing shows that BIOSOLVE® quickly emulsifies weathered crude, it is not critical to apply immediately after a spill occurs; impact considerations can be fully considered prior to action taken.

Surface Washing Applications: BIOSOLVE® applied through power washers in light dilution is very effective in attaining the removal of oils from rock, cobblestone, shorelines, and sea walls. In marsh or wetland applications, BIOSOLVE® prevents the oil from clinging to grasses and mangroves.

Rigs and Platforms: BIOSOLVE® is used to inert undersea pipelines before plugging and abandonment, degas tanks and platforms during work over operations, and to wash drill cuttings to remove oils and prevent sheens on surface waters.

3. Conditions for Use: May be used with salt or fresh water. Temperature is not relevant.

VII. TOXICITY AND EFFECTIVENESS

a. Toxicity:

Material Tested	Species	LC50 (ppm)	
BIOSOLVE®	Menidia beryllina	6.4	96-hr
	Mysidopsis bahia	3.6	48-hr
No. 2 Fuel Oil	Menidia beryllina	5.6	96-hr
	Mysidopsis bahia	2.7	48-hr
BIOSOLVE® &	Menidia beryllina	7.4	96-hr
No. 2 Fuel Oil (1:10)	Mysidopsis bahia	1.3	48-hr
Reference Toxicant (SDS)	Menidia beryllina	7.2	96-hr
	Mysidopsis bahia	13.4	48-hr

NOTE: This toxicity data was derived using the concentrated product. See Section VI of this bulletin for information regarding the manufacturer's recommendations for concentrations and application rates for field use.

b. Effectiveness:

NA

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VIII. MICROBIOLOGICAL ANALYSIS NA

IX. PHYSICAL PROPERTIES
(Liquid concentrate)
1. Flash Point: NA, Water based >200°F (93.3°C)
2. Pour Point: 32.9°F (0.5°C)
3. Viscosity: 77.5 Centistrokes (concentrate), 490 centipoise (concentrate), 15 centipoise at 6%, at 60.08°F or 15.6°C
4. Specific Gravity: 1.025 at 60°F or 15.5°C
5. pH: 9.37 +/- 0.5
6. Chemical Name and Percentage by Weight of the Total Formulation: CONFIDENTIAL
7. Surface Active Agents: CONFIDENTIAL
8. Solvents: CONFIDENTIAL
9. Additives: CONFIDENTIAL
10. Solubility: Complete-true solution formed with water

X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

Compound	Concentration (ppm)
Arsenic	<0.2
Cadmium	<0.18
Chromium	<0.5
Copper	<0.6
Lead	<0.2
Mercury	<0.07
Nickel	<0.6
Silver	<0.4
Zinc	0.51
Cyanide	<0.01
Chlorinated Hydrocarbons	<0.5

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TECHNICAL PRODUCT BULLETIN #SW-21
USEPA, OEM REGULATIONS IMPLEMENTATION DIVISION
LISTING DATE: MARCH 2, 1998
"PETROTECH 25"

I. NAME, BRAND, OR TRADEMARK
PETROTECH 25
Type of Product: Surface Washing Agent

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT
Petrotech America Corporation
130 William Street, Suite 802
New York, NY 10038
Phone: (212)933-9071, ext. 7001
Fax: (877) 226-4028
Email: Info@helpenvironmental.com
(Mr. Lawrence Gallo)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS

Petrotech America Corporation
130 William Street, Suite 802
New York, NY 10038
Phone: (212)933-9071, ext. 7001
Fax: (877) 226-4028
Email: Info@helpenvironmental.com
(Mr. Lawrence Gallo)

Manufacturing Plant:
Clariant Corp.
Charlotte, NC

H.E.L.P. Environmental
926 3rd Avenue
Brooklyn, NY 11232

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION
1. Flammability: Non-flammable.
2. Ventilation: Normal.
3. Skin and eye contact; protective clothing; treatment in case of contact: No special handling is required beyond that prescribed under the general OSHA rules for non-hazardous, non-flammable and noncorrosive liquids. This is not to suggest that contact with eyes and skin is totally without risk for allergy. Contact with eyes and skin is to be avoided, as suggested under OSHA procedures.
4.a. Maximum storage temperature: +45°C
4.b. Minimum storage temperature: -5°C (can be stored below its freezing point without detectable loss of performance provided that it is warmed to within liquid range prior to application.)

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4.c. Optimum storage temperature: >-5°C and <+45°C
4.d. Temperatures of phase separations and chemical changes: NA

V. SHELF LIFE
PETROTECH 25 has an unlimited shelf-life when maintained in the factory sealed containers and stored within the prescribed temperature limits. Climatic factors such as humidity have no effect on closed container storage although the product is hygroscopic and will absorb water if left for long periods in open containers.

VI. RECOMMENDED APPLICATION PROCEDURE
1. Application Method: It is recommended that the surface washing agent PETROTECH 25 be applied to contaminated surfaces in one of three ways: (a) a mixture of ten parts PETROTECH 25 to ninety parts water, either fresh or saltwater, should be discharged over the surface by commercial pressure washer, hot or cold; (b) the same mixture discharged on the surface using standard firefighting apparatus preferably at a nozzle pressure of 100 PSI plus; or (3) PETROTECH 25 in concentrated form can be applied to the surface and manually or mechanically brushed and then water applied.
2. Concentration/Application Rate: Generally, PETROTECH 25 is applied neat in its factory supplied concentrate form. However, for lighter oils where educting or proportioning equipment is available, an aqueous solution of PETROTECH 25 between 3 and 10 percent may be used. Broadly speaking, PETROTECH 25 has no solvent action. For any given oil spill of a specific nature, the application rate is unaffected by neat or diluted application as long as the concentrate to oil ratio remains the same. Applications of diluted PETROTECH 25 in the 6 - 10 percent range via firefighting equipment can be used on automobile and aviation gasoline's together with the lighter oils such as diesel and all jet fuels.

The dosage of PETROTECH 25 to be used depends upon two factors:1) The nature of the oil, and 2) The energy used in its application to the contaminated substrate.
3. Conditions for Use: May be used with salt or fresh water. Temperature is not relevant.

VII. TOXICITY AND EFFECTIVENESS
a. Toxicity:

Material Tested	Species	LC50 (ppm)
PETROTECH 25	Menidia beryllina	601.0 96-hr
	Mysidopsis bahia	350.0 48-hr
No. 2 Fuel Oil	Menidia beryllina	2.8 96-hr
	Mysidopsis bahia	1.8 48-hr
PETROTECH 25 & No. 2 Fuel Oil	Menidia beryllina	3.4 96-hr
(1:10)	Mysidopsis bahia	1.0 48-hr
Reference Toxicant (DSS)	Menidia beryllina	7.9 96-hr
	Mysidopsis bahia	19.8 48-hr

b. Effectiveness:
NA

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VIII. MICROBIOLOGICAL ANALYSIS
NA

IX. PHYSICAL PROPERTIES
(Liquid concentrate)
1. Flash Point: None
2. Pour Point: 0°C
3. Viscosity: 700 CP
4. Specific Gravity: 1.03
5. pH: 7.5
6. Chemical Name and Percentage by Weight of Total Formulation: CONFIDENTIAL
7. Surface Active Agents: CONFIDENTIAL
8. Solvents: CONFIDENTIAL
9. Additives: CONFIDENTIAL
10. Solubility: 100%

X. ANALYSIS FOR HEAVY METALS AND CHLORINATED HYDROCARBONS

Compound	Concentration (ppm)
Arsenic	<0.10
Cadmium	<0.08
Chromium	<0.10
Copper	<0.26
Lead	0.047
Mercury	<0.0005
Nickel	<0.40
Zinc	0.256
Cyanide	0.70
Chlorinated Hydrocarbons	ND

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TECHNICAL PRODUCT BULLETIN #SW-22
USEPA, OEM REGULATIONS IMPLEMENTATION DIVISION
LISTING DATE: NOVEMBER 12, 1998
"SPLIT DECISION SC (formerly Split Decision)"
(aka, CLEAN SPLIT, DUO-SPLIT)

I. NAME, BRAND, OR TRADEMARK
SPLIT DECISION SC
(aka, CLEAN SPLIT, DUO-SPLIT)
Type of Product: Surface Washing Agent (Water Based)

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT
Mantek
Division of NCH Corporation
P.O. Box 660196
Dallas, TX 75266-0196
Phone: (800) 527-9919, ext. 0661
E-mail: gzimmerm@nch.com
(Mr. George Zimmerman)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS

SPLIT DECISION SC
Mantek
Division of NCH Corporation
P.O. Box 660196
Dallas, TX 75266-0196
Phone: (800) 527-9919, ext. 0661
E-mail: gzimmerm@nch.com
(Mr. George Zimmerman)

DUO-SPLIT
Chemsearch
Division of NCH Corporation
Irving, TX 75015
Phone: (800) 527-9919, ext. 0661
E-mail: gzimmerm@nch.com
(Mr. George Zimmerman)

CLEAN SPLIT
Certified Laboratories
Division of NCH Corporation
P.O. Box 2493
Ft. Worth, TX 76113-2493
Phone: (800) 527-9919, ext. 0661
E-mail: gzimmerm@nch.com
(Mr. George Zimmerman)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION
1. Flammability: Not flammable
2. Ventilation: Not required
3. Skin and eye contact; protective clothing; treatment in case of contact: SPLIT DECISION SC is not aggressive to skin and will not cause irritation in the majority of users. Avoid contact with

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eyes, irritation may result. Wear safety glasses with side shields if the method of use presents the likelihood of eye contact. No special precautions or additional protective equipment are required during handling or use.
4.a. Maximum storage temperature: 140°F
4.b. Minimum storage temperature: 27°F
4.c. Optimum storage temperature range: 32-140°F
4.d. Temperatures of phase separations and chemical changes: SPLIT DECISION SC is stable and phase separation will not occur at temperatures within the above storage range. Repetitive freeze/thaw cycles may cause stratification. This stratification is readily dispersed by minimal mixing.

V. SHELF LIFE
The recommended shelf life is one year.

VI. RECOMMENDED APPLICATION PROCEDURE
1. Application Method: Spray on oily surface. SPLIT DECISION SC forms a loose emulsion with oil that separates within seconds. Oil displaced from surface can be skimmed from the rinse water or absorbed with an oil absorbent.
2. Concentration/Application Rate: For heavy oil apply at a concentration of 1 part SPLIT DECISION SC to 3 parts water. For lighter oil on non-porous substrates use at up to 1 part SPLIT DECISION SC to 30 parts water. For application by hot water pressure washers or steam cleaner, SPLIT DECISION SC may be diluted with as much as 50 parts water.
3. Conditions for Use: Effective in fresh water, estuarine, and marine environments at normal climatic temperatures. SPLIT DECISION SC contains no known EPA Priority Pollutants.

VII. TOXICITY AND EFFECTIVENESS
a. Toxicity

Material Tested	Species	LC50 (ppm)
SPLIT DECISION	Menidia beryllina	8.27 96-hr
	Mysidopsis bahia	8.20 48-hr
No. 2 Fuel Oil	Menidia beryllina	12.26 96-hr
	Mysidopsis bahia	4.30 48-hr
SPLIT DECISION SC &	Menidia beryllina	0.25 96-hr
No. 2 Fuel Oil (1:10)	Mysidopsis bahia	2.06 48-hr
Reference Toxicant (DSS)	Menidia beryllina	13.80 96-hr
	Mysidopsis bahia	22.20 48-hr

b. Effectiveness
NA

VIII. MICROBIOLOGICAL ANALYSIS
NA

IX. PHYSICAL PROPERTIES
1. Flash Point: None

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2. Pour Point: NA
3. Viscosity: 20 cps - Brookfield #1 spindle @ 20 rpm at 73°F
4. Specific Gravity: 1.075 at 73°F
5. pH: 7.0
6. Surface Active Agents: Confidential
7. Solvents: Water
8. Additives: CONFIDENTIAL
9. Solubility in Water: Complete

X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

Compound	Concentration (ppm)
Arsenic	<0.05
Cadmium	<0.03
Chromium	<0.03
Copper	0.20
Lead	<0.05
Mercury	<0.03
Nickel	<0.03
Zinc	0.08
Cyanide	<0.1
Chlorinated Hydrocarbons	<0.1

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TECHNICAL PRODUCT BULLETIN #SW-23
USEPA, OEM REGULATIONS IMPLEMENTATION DIVISION
LISTING DATE: MARCH 1, 1999
"PETRO-CLEAN"

I. NAME, BRAND, OR TRADEMARK
PETRO-CLEAN
Type of Product: Surface Washing Agent

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT
B.R.A.T. Microbial Products Inc.
P.O. Box 7089
Pasadena, TX 77508
Phone: (713) 724-9226
E-mail: alabastercorp@gmail.com
(Mr. John Sheffield)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS
B.R.A.T. Microbial Products Inc.
P.O. Box 7089
Pasadena, TX 77508
Phone: (713) 724-9226
E-mail: alabastercorp@gmail.com
(Mr. John Sheffield)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION
1. Flammability: Non-flammable
2. Ventilation: Normal
3. Skin and eye contact: Protective clothing; treatment in case of contact. Eyes-flush with water using eye cup of fountain for 15 minutes. Seek medical attention if irritation persists. Wash contaminated clothing and footwear before reuse. Ingestion – seek medical attention. Inhalation – no medical attention is required.
4.a. Maximum storage temperature: 120°F
4.b. Minimum storage temperature: 35°F
4.c. Optimum storage temperature range:
4.d. Temperatures of phase separations and chemical changes: None

V. SHELF LIFE
Indefinite when stored properly.

VI. RECOMMENDED APPLICATION PROCEDURE
1. Application Method: PETRO-CLEAN is applied through power washers or even garden type sprayers in light dilution is very effective in removing petrochemical hydrocarbons from rocks,

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shorelines, sea walls, bridges, and highways. In wetland applications, PETRO-CLEAN prevents hydrocarbons from attaching to grasses, trees, rocks, etc.
2. Concentration/Application Rate: Dilute or use eductors to specified rate and apply through fire hose, power washers, or sprayers to contaminated area. PETRO-CLEAN is a highly concentrated product and must be diluted before use. Dilution ratios vary depending on the specific conditions of the contaminated site. Normal recommended dilutions are from 0.5% to 6%. On heavy or weathered crude, pre-soaking with 6% may be necessary. For light or refined products, apply as 3% to 6% solution. For sheens on water apply a 0.5% to 1.0% solution.
3. Conditions for Use: May be used with salt or fresh water

VII. TOXICITY AND EFFECTIVENESS
a. Toxicity

Material Tested	Species	LC50 (ppm)	
PETRO-CLEAN	Menidia beryllina	100	96-hr
	Mysidopsis bahia	110	48-hr
No. 2 Fuel Oil	Menidia beryllina	110	96-hr
	Mysidopsis bahia	110	48-hr
PETRO-CLEAN &	Menidia beryllina	115	96-hr
No. 2 Fuel Oil (1:10)	Mysidopsis bahia	105	48-hr
Reference Toxicant (DSS)	Menidia beryllina	1.14	96-hr
	Mysidopsis bahia	0.98	48-hr

b. Effectiveness:
NA

VIII. MICROBIOLOGICAL ANALYSIS
NA

IX. PHYSICAL PROPERTIES
1. Flash Point: > 200°F
2. Pour Point: -17°F
3. Viscosity: 1.26 @ 75°F
4. Specific Gravity: 0.99 @ 75°F
5. pH: 8.05 (10% solution, s.u.)
6. Surface Active Agents: CONFIDENTIAL
7. Solvents: None
8. Additives: CONFIDENTIAL
9. Solubility in Water: 100 percent

X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

Compound	Concentration (ppm)
Arsenic	<0.10
Cadmium	<0.10
Chromium	<0.01
Copper	<0.01

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Lead	<0.002
Mercury	<0.01
Nickel	<0.01
Zinc	<0.01
Cyanide	<2.0
Chlorinated Hydrocarbons	<1.0

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TECHNICAL PRODUCT BULLETIN #SW-24
USEPA, OEM REGULATIONS IMPLEMENTATION DIVISION
LISTING DATE: JULY 14, 2000
"DO-ALL #18"

I. NAME, BRAND, OR TRADEMARK
DO-ALL #18
Type of Product: Surface Washing Agent

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT
Radcob Solutions, Inc.
4800 North State Road 7, Suite #105
Lauderdale Lakes, FL 33319
Phone: (954) 249-2178
Fax: (954) 640-7080
E-mail: adam@doall18.com
Website: www.doall18.com
(Mr. Adam Goldberg)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS
Radcob Solutions, Inc.
4800 North State Road 7, Suite #105
Lauderdale Lakes, FL 33319
Phone: (954) 249-2178
Fax: (954) 640-7080
E-mail: adam@doall18.com
Website: www.doall18.com
(Mr. Adam Goldberg)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION
1. Flammability: DO-ALL #18 is water based, contains no solvents and is non-flammable.
2. Ventilation: Normal room ventilation.
3. Skin and eye contact; protective clothing; treatment in case of contact: Avoid contact with skin, eyes, and clothing. Wear safety glasses or goggles and protective gloves when handling. In case of eye contact, flush immediately with water for at least 15 minutes. If persistent irritation occurs, call a physician. For skin contact, wash thoroughly with soap and water.
4.a. Maximum storage temperature:100°F
4.b. Minimum storage temperature: 35°F
4.c. Optimum storage temperature range: 40°F to 100°F
4.d. Temperatures of phase separations and chemical changes: DO-ALL #18 has a pour point of 32°F and phase separation occurs at 105°F.

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V. SHELF LIFE
DO-ALL #18 has a shelf life of at least two (2) years.

VI. RECOMMENDED APPLICATION PROCEDURE
1. Application Method: May be diluted with fresh or salt water. For general use, apply by spray, mop, etc. Agitate severe spots, rinse thoroughly for residue-free surface.
2. Concentration/Application Rate: To clean oil from beaches, rocks, and piers as a shore-line cleaner, first use a pre-treatment or soaking, using one (1) part DO-ALL #18 diluted with three (3) parts of water. Allow 30 to 45 minutes to soften viscous oil deposits (soak time may vary with temperature, oil density, and degree of weathering). After the soaking period, dilute one (1) part of DO-ALL #18 with 15 parts of water and apply with a high pressure water hose (50 - 100 PSI). Oil released can then be removed by vacuuming, skimmers, or absorbents.
For normal cleaning of shop machinery, bilges, decks, waterline scum, rigs, and platforms, dilute one (1) part DO-ALL #18 with up to 20 parts of water.

For heavy cleaning and degreasing of tanks, barges, engine rooms and soot, oil stained concrete, and petroleum based drilling muds, dilute one (1) part DO-ALL #18 with up to 15 parts of water.
For severe cleaning of holding tanks, grease traps, black magic, crude oil, and Bunker C, dilute one (1) part DO-ALL #18 with up to five (5) parts of water.

For steam cleaning, dilute one (1) part of DO-ALL #18 with up to 50 parts of water.

For pressure washing, dilute one (1) part DO-ALL #18 with up to 30 parts of water.
DO NOT USE UNDILUTED ON COMPOSITION FLOORS, WATER-BASED PAINTED SURFACES, OR ALUMINUM,
3. Conditions for Use: Recommended for cleaning petroleum fractions from beaches, rocks, piers, bilges, decks, waterline scum, rigs, platforms, tanks, barges, engine rooms, machinery, holding tanks, and grease traps.

VII. TOXICITY AND EFFECTIVENESS
a. Toxicity

Material Tested	Species	LC50 (ppm)
DO-ALL #18	Menidia beryllina	66.10 96-hr
	Mysidopsis bahia	288.00 48-hr
No. 2 Fuel Oil	Menidia beryllina	9.10 96-hr
	Mysidopsis bahia	0.65 48-hr
DO-ALL #18 & No. 2 Fuel Oil	Menidia beryllina	9.38 96-hr
(1:10)	Mysidopsis bahia	0.57 48-hr
Reference Toxicant (SDS)	Menidia beryllina	6.36 96-hr
	Mysidopsis bahia	16.53 48-hr

b. Effectiveness:
NA

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VIII. MICROBIOLOGICAL ANALYSIS
NA

IX. PHYSICAL PROPERTIES
1. Flash Point: >200°F
2. Pour Point: 32°F
3. Viscosity: 1.8 @ 68°F
4. Specific Gravity: 1.07 @ 68°F
5. pH:13.1
6. Surface Active Agents: CONFIDENTIAL
7. Solvents: None
8. Additives: CONFIDENTIAL
9. Solubility in Water: Soluble with water.

X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

Compound	Concentration (ppm)
Arsenic	ND (<0.02)
Cadmium	ND (<0.02)
Chromium	ND (<0.02)
Copper	0.33
Lead	ND (<0.02)
Mercury	ND (<0.00)
Nickel	ND (<0.10)
Zinc	0.28
Cyanide	0.26
Chlorinated Hydrocarbons	ND (<0.30)

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TECHNICAL PRODUCT BULLETIN #SW-25
USEPA, OEM REGULATIONS IMPLEMENTATION DIVISION
LISTING DATE: JULY 9, 2001
"SC-1000™"

I. NAME, BRAND, OR TRADEMARK
SC-1000™
Type of Product: Surface Washing Agent

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT
GEMTEK® Products
3808 North 28th Avenue
Phoenix, AZ 85017
Emergency Number: (602) 265-8586
Phone: (800) 331-7022
Fax: (602) 265-7241
E-mail: techsupport@infogemtek.com
(Mr. Kim Kristoff)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS
GEMTEK® Products
3808 North 28th Avenue
Phoenix, AZ 85017
Emergency Number: (602) 265-8586
Phone: (800) 331-7022
Fax: (602) 265-7241
E-mail: techsupport@infogemtek.com
(Mr. Kim Kristoff)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION
1. Flammability: Non-flammable.
2. Ventilation: General room ventilation is satisfactory.
3.Skin and eye contact; protective clothing; treatment in case of contact: Non-irritating, no first aid needed. May be an eye irritant. Do not spray into eyes; safety glasses are recommended. If irritation does occur, rinse thoroughly with water.
4.a. Maximum storage temperature: None.
4.b. Minimum storage temperature: Room temperature.
4.c. Optimum storage temperature range: 70°F to 90°F
4.d. Temperatures of phase separations and chemical changes: Low temperature can cause handling problems; viscosity of material will increase. The product is an organic compound and it will not typically stratify. The cloud point is 54°F. At 212°F it will boil and at somewhat less (around 130°F) water vapor will form. Repeat freeze/thaw/boiling cycles over a 30-day period has not demonstrated noticeable break down of the product.

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V. SHELF LIFE
Minimum of 5 years.

VI. RECOMMENDED APPLICATION PROCEDURE
1. Application Method: SC-1000™ is a highly concentrated cleaning compound capable of a multitude of cleaning applications with dilutions ranging from full strength to far in excess of 1:350. Depending on the specific factors in the cleaning environment, the desired cleaning speed with the least amount of SC-1000™ can be determined. When diluting, it is recommended that SC-1000™ be added to premeasured water to minimize foaming in the solution.
2. Concentration/Application Rate:
Beach Waterfront, Rocky Soils, Break Water Structures, and Pier Facilities: For beach sands or light rocky soils, burning or creating a temporary shallow wash tank is most successful. Fill one-half of the tank with contaminated beach sand, then add a solution of SC-1000™ and clean water (ocean or fresh) to cover the sand. Gentle agitation will release the oil to the surface of the tank where it can be collected. For rocky surfaces spray with a 20 percent solution of SC-1000™ using a horizontal eductor sprayer, spraying side-to-side, allowing the soil to dwell for several minutes before spraying top-to-bottom with clean ocean or fresh water to rinse oil into perimeter oil booms, blankets or impermeable sheeting.

Washing Marine Vegetation - Use a non-pressure/impact spraying equipment to dispense a 0.01 percent SC-1000™ solution and allow to stand for 5-10 minutes before a final rinsing with fresh or ocean water.

Washing Marine Equipment - For wet oils and bunker crude, use SC-1000™ at 20 percent solution (preferably warmer than 80EF) and spray or wipe. Apply directly to equipment, allow to dwell for 1-2 minutes and then spray rinse with fresh or ocean water. For hardened oils, fuels, and viscous lubricants, apply SC-1000™ blended with SC-Supersolve™ (a non-toxic, low aromatic, water miscible solvent) at the ratio of 80/20 then dilute with water to a 50 percent solution, spray or wipe onto surface, let stand for 1-2 minutes before rinsing.

Heavy Cleaning Examples - Dilution full strength 1:5; diesel engines, auto parts, baked on oil or lube grease, dried oil/enamel, latex paints, thick food syrups, insect smears, dried animal or vegetable fats, hard resins, thick dust-laden oily dirt, asphalt and grass or plant stains.

Average Cleaning Examples - Dilution 1:5 up to 1:20; automotive work counters and tools, food and beverage processing equipment, oily or food-laden floors, manufacturing work areas, vehicle maintenance, shipping containers, utility equipment, and parts washers.

General Maintenance Examples - 1:20 up to 1:100; vehicle washing, general janitorial for offices/schools/hospitals/recreation and related equipment, pressure sprayers, food preparation and storage, painted/plastic laminate surfaces, sports equipment, general cleaning, immersion tanks, and ultrasonics.
3. Conditions for Use: SC-1000™ may be used on any surface that is compatible with water. The product may tarnish some soft aluminum surfaces if not adequately diluted and rinsed with

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water.

VII. TOXICITY AND EFFECTIVENESS

a. Toxicity

Material Tested	Species	LC50 (ppm)
SC-1000™	Menidia beryllina	26.40 96-hr
	Mysidopsis bahia	15.20 48-hr
No. 2 Fuel Oil	Menidia beryllina	8.85 96-hr
	Mysidopsis bahia	1.57 48-hr
SC-1000™ & No. 2 Fuel Oil	Menidia beryllina	4.72 96-hr
	Mysidopsis bahia	2.13 48-hr
Reference Toxicant (SDS)	Menidia beryllina	2.22 96-hr
	Mysidopsis bahia	10.5 48-hr

b. Effectiveness:

NA

VIII. MICROBIOLOGICAL ANALYSIS

NA

IX. PHYSICAL PROPERTIES

1. Flash Point: >212°F
2. Pour Point: 25°F
3. Viscosity: <10 cps @ 25°C
4. Specific Gravity: 1.009
5. pH: 10.2 - 10.5
6. Surface Active Agents: CONFIDENTIAL.
7. Solvents: None.
8. Additives: CONFIDENTIAL.
9. Solubility in Water: Soluble in water.

X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

Compound	Concentration (ppm)
Arsenic	1.33
Cadmium	ND
Chromium	ND
Copper	0.100
Lead	ND
Mercury	ND
Nickel	ND
Zinc	0.20
Cyanide	ND
Chlorinated Hydrocarbons	ND

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TECHNICAL PRODUCT BULLETIN #SW-26
USEPA, OEM REGULATIONS IMPLEMENTATION DIVISION
LISTING DATE: AUGUST 06, 2001
"GOLD CREW SW"

I. NAME, BRAND, OR TRADEMARK
GOLD CREW SW
Type of Product: Surface Washing Agent

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT

Gold Crew Products & Services, LLC
P.O. Box 12032
Orange, CA 92869
Phone: (714) 288-8781
Fax: (714) 288-8730
E-mail: jfigueira@goldcrew.net
Website: www.goldcrew.net
(Mr. Jim Figueira)

ECS
9014 Peacock Hill Avenue, Suite 200
Gig Harbor, WA 98332
(Mr. Ed Grubbs)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS

Gold Crew Products & Services, LLC
P.O. Box 12032
Orange, CA 92869
Phone: (714) 288-8781
Fax: (714) 288-8730
E-mail: jfigueira@goldcrew.net
Website: www.goldcrew.net
(Mr. Jim Figueira)

ECS
9014 Peacock Hill Avenue, Suite 200
Gig Harbor, WA 98332
(Mr. Ed Grubbs)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION

1. Flammability: Non-flammable.
2. Ventilation: Normal.
3. Skin and eye contact; protective clothing; treatment in case of contact: Extensive testing indicates that GOLD CREW SW is non-hazardous and non-toxic to humans; however, good hygiene practices should always be followed as outlined below:
Eyes- flush with water; get medical attention if required; Skin - remove contaminated clothing, wash exposed area, and wash clothing before use. If irritation develops get medical attention; Ingestion - get medical attention if required; Inhalation - none considered necessary.
4.a. Maximum storage temperature: When above 120°F, keep container closed and stored in a cool dark place. Evaporation may change product's characteristics.
4.b. Minimum storage temperature: Product will freeze below 25°F. No phase separation will occur. If frozen, thaw, and stir well.
4.c. Optimum storage temperature range: 25°F to 120°F
4.d. Temperatures of phase separations and chemical changes: No separation at any temperature

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between 32-120°F. No tendency to "layer out" or separate, standing for 30 days. No separation of layering after freezing.

V. SHELF LIFE
20 years (unopened).

VI. RECOMMENDED APPLICATION PROCEDURE
1. Application Method: Apply through hand pump sprayer and allow to soak.
2. Concentration/Application Rate: As a presoak dilute 20 parts water to 1 part SW. For crude oil, allow about 1 hour. For medium distillates, allow 30 minutes. For light distillates, allow 15 minutes. Time may vary depending on weather conditions. After allowing the solution to presoak, wash the area in the following manner: Apply through a power washer or through a steam powered unit at 1 percent, 3 percent, or 5 percent depending on oil viscosity and temperature.
3. Conditions for Use: Equally effective with salt or fresh water.

VII. TOXICITY AND EFFECTIVENESS
a. Toxicity:

Material Tested	Species	LC50 (ppm)
GOLD CREW SW	Menidia beryllina	13.80 96-hr
	Mysidopsis bahia	20.40 48-hr
No. 2 Fuel Oil	Menidia beryllina	6.75 96-hr
	Mysidopsis bahia	2.82 48-hr
GOLD CREW SW &	Menidia beryllina	6.34 96-hr
No. 2 Fuel Oil (1:10)	Mysidopsis bahia	2.70 48-hr
Reference Toxicant (SDS)	Menidia beryllina	2.22 96-hr
	Mysidopsis bahia	9.52 48-hr

b. Effectiveness:
NA

VIII. MICROBIOLOGICAL ANALYSIS
NA

IX. PHYSICAL PROPERTIES
1. Flash Point: >200
2. Pour Point: 25°F
3. Viscosity: 33.87 CST
4. Specific Gravity: 1.035
5. pH: 9.76 +/- 0.01
6. Surface Active Agents: CONFIDENTIAL.
7. Solvents: None.
8. Additives: CONFIDENTIAL.
9. Solubility in Water: Complete.

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X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

Compound	Concentration (ppm)
Arsenic	<1.0
Cadmium	<0.10
Chromium	<1.0
Copper	<1.0
Lead	<0.5
Mercury	<0.02
Nickel	<1.0
Zinc	0.44
Cyanide	ND
Chlorinated Hydrocarbons	ND

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TECHNICAL PRODUCT BULLETIN #SW-28USEPA, OEM REGULATIONS IMPLEMENTATION DIVISION
LISTING DATE: NOVEMBER 05, 2001
"NALE-IT"

I. NAME, BRAND, OR TRADEMARK
NALE-IT
Type of Product: Surface Washing Agent

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT
SPL Control LLC
P.O. Box 627
Elemore City, OK 73433
Phone: (580) 788-2187
E-mail: splcontrol@aol.com
(Mr. Tom Lester)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS
SPL Control LLC
P.O. Box 627
Elemore City, OK 73433
Phone: (580) 788-2187
E-mail: splcontrol@aol.com
(Mr. Tom Lester)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION
1. Flammability: Non-flammable
2. Ventilation: Workers should be in well ventilated areas; if in a confined area, use a respirator.
3. Skin and eye contact; protective clothing; treatment in case of contact: Workers should wear protective goggles or safety glasses. Prolonged contact with skin may result in dryness.
4.a. Maximum storage temperature: NA
4.b. Minimum storage temperature: >32°F
4.c. Optimum storage temperature range: 40°F to 200°F
4.d. Temperatures of phase separations and chemical changes: No phase separation or hazardous polymerization will occur.

V. SHELF LIFE
Indefinite.

VI. RECOMMENDED APPLICATION PROCEDURE
1. Application Method: NALE-IT may be applied using a pressure sprayer.
2. Concentration/Application Rate: For pit closures, surface hydrocarbon spills, compressor stations, pipeline and flow line leaks, well head and tank farm leaks, and highway spills.

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(petroleum products) mix 1 part NALE-IT with 20 parts water.
3. Conditions for Use: Equally effective with fresh or salt water.

VII. TOXICITY AND EFFECTIVENESS

a. Toxicity:

Material Tested	Species	LC50 (ppm)	
NALE-IT	Menidia beryllina	273.30	96-hr
	Mysidopsis bahia	69.00	48-hr
No. 2 Fuel Oil	Menidia beryllina	6.93	96-hr
	Mysidopsis bahia	2.29	48-hr
NALE-IT & No. 2 Fuel Oil	Menidia beryllina	3.82	96-hr
(1:10)	Mysidopsis bahia	1.84	48-hr
Reference Toxicant (SDS)	Menidia beryllina	2.60	96-hr
	Mysidopsis bahia	8.56	48-hr

b. Effectiveness:
NA

VIII. MICROBIOLOGICAL ANALYSIS
NA

IX. PHYSICAL PROPERTIES
1. Flash Point: >212°F
2. Pour Point: 30°F
3. Viscosity: 1.18
4. Specific Gravity: 1.02
5. pH: 6.8 - 7.2
6. Surface Active Agents: CONFIDENTIAL
7. Solvents: None
8. Additives: CONFIDENTIAL
9. Solubility in Water: Soluble in fresh and sat water.

X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

Compound	Concentration (ppm)
Arsenic	0.82
Cadmium	ND
Chromium	ND
Copper	0.173
Lead	ND
Mercury	ND
Nickel	ND
Zinc	0.18
Cyanide	ND
Chlorinated Hydrocarbons	ND

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TECHNICAL PRODUCT BULLETIN #SW-30
USEPA, OEM REGULATIONS IMPLEMENTATION DIVISION
LISTING DATE: JULY 24, 2002
"F-500"

I. NAME, BRAND, OR TRADEMARK
F-500
Type of Product: Surface Washing Agent

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT
Hazard Control Technologies, Inc.
150 Walter Way
Fayetteville, GA 30214
Phone: (770) 719-5112
Fax: (770) 719-5117
(Mr. Christopher L. Champion)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS
Hazard Control Technologies, Inc.
150 Walter Way
Fayetteville, GA 30214
Phone: (770) 719-5112
Fax: (770) 719-5117
(Mr. Christopher L. Champion)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION
1. Flammability: Non-flammable.
2. Ventilation: Local exhaust – no special requirements.
3. Skin and eye contact; protective clothing; treatment in case of contact: Eye contact – may cause eye irritation, flush with water. Wear splash proof protection goggles or full-face shield. If irritation persists contact a physician. Skin contact – may cause mild irritation, flush with water. Wear rubber and vinyl gloves and apron. Product has been tested and found to be non-skin sensitizing per OECD 406. Ingestion – may cause gastrointestinal irritation. Drink plenty of water to dilute. Do not induce vomiting. If irritation persists contact a physician. Inhalation – elevated temperature vapors may cause irritation to respiratory tract. Remove to fresh air.
4.a. Maximum storage temperature: 130°F
4.b. Minimum storage temperature: 17°F
4.c. Optimum storage temperature range: 35°F - 130°F
4.d. Temperatures of phase separations and chemical changes: NA

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V. SHELF LIFEThe shelf life is 15 years when stored between 35°F - 130°F in unopened containers.

VI. RECOMMENDED APPLICATION PROCEDURE
1. Application Method: Standard fire apparatus spray nozzle with agitation onto and into spill.
2. Concentration/Application Rate: 1 part F-500:8 parts hydrocarbon:32 parts water (fresh or salt).
3. Conditions for Use: Water temperature: 33°F - 211°F. Effective on both polar and non-polar hydrocarbons

VII. TOXICITY AND EFFECTIVENESS
a. Toxicity:

Material Tested	Species	LC50 (ppm)	
F-500	Menidia beryllina	<10.00	96-hr
	Mysidopsis bahia	32.00	48-hr
No. 2 Fuel Oil	Menidia beryllina	56.00	96-hr
	Mysidopsis bahia	100.00	48-hr
F-500 & No. 2 Fuel Oil	Menidia beryllina	<10.00	96-hr
(1:10)	Mysidopsis bahia	32.00	48-hr
Reference Toxicant (DSS)	Menidia beryllina	1.14	96-hr
	Mysidopsis bahia	0.98	48-hr

b. Effectiveness:
NA

VIII. MICROBIOLOGICAL ANALYSIS
NA

IX. PHYSICAL PROPERTIES
1. Flash Point: >200°F
2. Pour Point: -17°F
3. Viscosity: 54-56 centistokes @ 72°F
4. Specific Gravity: 0.99 g/cc @ 72°F
5. pH: 7.00
6. Surface Active Agents: PROPRIETARY/CONFIDENTIAL
7. Solvents: None
8. Additives: None
9. Solubility in Water: Complete

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X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

Compound	Concentration (ppm)
Arsenic	<0.03
Cadmium	<0.01
Chromium	<0.01
Copper	<0.05
Lead	<0.025
Mercury	<0.005
Nickel	<0.02
Zinc	<0.07
Cyanide	<0.02
Chlorinated Hydrocarbons	<0.10

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TECHNICAL PRODUCT BULLETIN #SW-31
USEPA, OEM REGULATIONS IMPLEMENTATION DIVISION
LISTING DATE: OCTOBER 27, 2003
"ENVIROCLEAN"
(formerly ENVIRO CLEAN 165)

I. NAME, BRAND, OR TRADEMARK
ENVIROCLEAN
(formerly ENVIRO CLEAN 165)
Type of Product: Surface Washing Agent

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT
Enviro Clean Services, LLC
P.O. Box 721090
Oklahoma City, OK 73172-1090
Phone: (405) 373-4545
Fax: (405) 373-4549
E-mail: info@envirocleanps.com
E-mail: jbehymer@envirocleanps.com
Website: www.envirocleanps.com
(Mr. Jonathan Behymer)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS
Enviro Clean Services, LLC
P.O. Box 721090
Oklahoma City, OK 73172-1090
Phone: (405) 373-4545
Fax: (405) 373-4549
E-mail: info@envirocleanps.com
E-mail: jbehymer@envirocleanps.com
Website: www.envirocleanps.com
(Mr. Jonathan Behymer)

Enviro Clean Products & Services
110 Airport Drive, Suite A
Wappingers Falls, NY 12590
Phone: (800) 477-2461
Fax: (845) 463-4573
E-mail: jjordan@envirocleanps.com
Website: www.envirocleanps.com
(Mr. Joe Jordan)

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IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION

1. Flammability: Non-flammable.
2. Ventilation: Normal.
3. Skin and eye contact; protective clothing; treatment in case of contact: Use good normal hygiene and avoid contact with skin and eyes. Gloves and goggles are recommended for field application and product handling. If contact with eyes flush with water for 15 minutes and seek medical attention. For contact with skin, wash area with soap and water. May cause redness, edema, and drying of skin. Seek medical attention if irritation develops. In case of ingestion, seek medical attention. Not considered an inhalation risk.

4.a. Maximum storage temperature: 120°F
4.b. Minimum storage temperature: 28°F
4.c. Optimum storage temperature range: 30°F - 120°F
4.d. Temperatures of phase separations and chemical changes: Temperature fluctuations will not cause separation or deterioration of product. Product blend is stable and will not undergo phase separation of ingredients or stratification of contents over time.

V. SHELF LIFE

Unlimited if unopened.

VI. RECOMMENDED APPLICATION PROCEDURE

1. Application Method: Dilute product with water prior to use. Apply product via manual pressure applicator (i.e., hand pump), or other delivery equipment, to impacted surfaces. Allow product to soak prior to rinse/recovery if heavily saturated with oil. On hard surfaces, product may be applied and agitated with a brush or other physical means prior to recovery of effluent. Product may also be pre-mixed and used in a batch tank or through an eduction/metering system for flushing and recovery operations.
2. Concentration/Application Rate: ENVIROCLEAN is a concentrated product and must be diluted prior to use. Concentrations vary based upon type of oil and degree of surface saturation. For light ends (i.e., gas condensate/gasoline) a 1% - 2% solution may be used to flush area to containment. (A higher concentration solution of 6% should be used if flammable vapor presents an explosion hazard.) For lighter oils (i.e., No. 2 Fuel Oil) a 3% solution may be used to flush impacted areas to containment. For heavy ends (i.e., crude oil/No. 6 Fuel Oil) a 6% solution of ENVIROCLEAN should be applied and allowed to soak into containment/substrate for up to an hour to allow for release of oil. The surface should then be flushed to containment with a 1% - 3% solution of ENVIROCLEAN. Product may be used as noted above through any pressure or steam equipment. The use of a "hot" unit is recommended when oils are at low temperature or have been weathered.
3. Conditions for Use: ENVIROCLEAN may be diluted with hard, soft, brackish, salt, or most waters of sufficient quality for operations.

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VII. TOXICITY AND EFFECTIVENESSa. Toxicity:

Material Tested	Species	LC50 (ppm)
ENVIROCLEAN	Menidia beryllina	27.80 96-hr
	Mysidopsis bahia	22.60 48 hr
No. 2 Fuel Oil	Menidia beryllina	8.77 96-hr
	Mysidopsis bahia	1.53 48-hr
ENVIROCLEAN&		
No. 2 Fuel Oil (1:10)	Menidia beryllina	8.13 96-hr
	Mysidopsis bahia	1.76 48 hr
Reference Toxicant (DSS)	Menidia beryllina	1.83 96-hr
	Mysidopsis bahia	3.37 48 hr

b. Effectiveness:
NA

VIII. MICROBIOLOGICAL ANALYSIS
NA

IX. PHYSICAL PROPERTIES
1. Flash Point: >200°F
2. Pour Point: 28.8°F
3. Viscosity: 9 Centipose
4. Specific Gravity: 1.028
5. pH: 8.63
6. Surface Active Agents: CONFIDENTIAL
7. Solvents: None
8. Additives: CONFIDENTIAL
9. Solubility in Water: Complete

X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

Compound	Concentration (ppm)
Arsenic	<0.002
Cadmium	<0.001
Chromium	<0.005
Copper	<0.002
Lead	<0.005
Mercury	<0.0002
Nickel	<0.005
Zinc	<0.002
Cyanide	<0.1
Chlorinated Hydrocarbons	<0.05

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TECHNICAL PRODUCT BULLETIN #SW-32
USEPA, OEM REGULATIONS IMPLEMENTATION DIVISION
ORIGINAL LISTING DATE: JULY 21, 2006
"BG-CLEAN™ 401"

I. NAME, BRAND, OR TRADEMARK
BG-CLEAN™ 401
Type of Product: Surface Washing Agent

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT
Amiran BioChemicals, LLC
610 W. Rawson Avenue
Oak Creek, WI 53154
Phone: (414) 571-6230
Fax: (414) 571-6231
(Dr. Mohsen Amiran)
Phone: (414) 939-8405
Fax: (414) 571-6231
E-mail: aamiran@amiran-technologies.com or jwilde@amiran-technologies.com
(Ms. Allana Amiran or Mr. Jason Wilde at (703) 216-0194)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS
Amiran BioChemicals, LLC
610 W. Rawson Avenue
Oak Creek, WI 53154
Phone: (414) 571-6230
Fax: (414) 571-6231
(Dr. Mohsen Amiran)

BioCenter, Inc.
610 W Rawson Avenue
Oak Creek, WI 53154
Phone: (414) 768-7100
Fax: (414) 768-7106
E-mail: skelling@aol.com
(Mr. Scott Kelling)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION
1. Flammability: BG-CLEAN™ 401 is not classified as flammable by either USDOT or IMO regulations.
2. Ventilation: Avoid prolonged breathing of vapors.
3. Skin and eye contact; protective clothing; treatment in case of contact:
BG-CLEAN™ 401 is an organic compound with a slightly alkaline pH. No extraordinary

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precautions are required during handling. Avoid unnecessary contact with skin or eyes. No special protective clothing is required. Body areas exposed to BG-CLEAN™ 401 may be flushed with water to clean off the chemical.
4.a. Maximum storage temperature: 180°F
4.b. Minimum storage temperature: -25°F
4.c. Optimum storage temperature range: 68°F
4.d. Temperatures of phase separations and chemical changes: BG-CLEAN™ 401 is not adversely affected by changes in storage temperature unless evaporation is allowed to occur. Phase separation does not occur when the product is stored in below freezing conditions. BG-CLEAN™ 401 is ready for use as soon as it is rewarmed to approximately 34-40°F. Product will expand when frozen.

V. SHELF LIFE
The shelf life of unopened containers of BG-CLEAN™ 401 is unlimited. Containers should always be capped when not in use to prevent contamination and evaporation.

VI. RECOMMENDED APPLICATION PROCEDURE
1. Application Method: BG-CLEAN™ 401 is applied by one of two methods. 1) For situations where cleanup starts shortly after contamination and the oil has not yet weathered, use a high pressure spray. BG-CLEAN™ 401 is proportioned into a stream of water and sprayed directly on the surface to be cleaned at a rate of 60-70 gpm. 2) For difficult cleaning situations such as weathered crude oil on a rocky beach, a three step procedure should be used. First presoak the contaminated area by proportioning BG-CLEAN™ 401 into a low pressure stream of water at a rate of about 20 gpm. Allow the spray to soak for 15-30 minutes. Then proportion BG-CLEAN ™ 401 into a high pressure water stream and apply at a rate of 60-70 gpm. Selection of the best procedure depends on site conditions.

BG-CLEAN™ 401 effectiveness is increased when applied with water heated to between 100EF and 180EF. As ambient temperature decreases, the benefits of applying heated spray increase. The efficiency of BG-CLEAN™ 401 depends directly on mixing of the BG-CLEAN™ 401 molecules with the hydrocarbon molecules. Given good mixing, BG-CLEAN™ 401 can be used on all hydrocarbons except asphalt.
2. Concentration/Application Rate: Dilute BG-CLEAN™ 401 water. The amount of spray required varies with the amount of oil. Concentrations ranging from 5:1 to 100:1 have been found useful depending on hydrocarbon concentrations and viscosity. During application, adjust the concentration of BG-CLEAN™ 401 to suit the cleaning effect desired.
3. Conditions for Use: BG-CLEAN™ 401 is recommended as a cleaner for piers, seawalls, pilings, ship's hulls, and rocky beaches. It can be used on metal, wood, and plastics. BG-CLEAN™ 401 is also highly useful for cleaning contaminated solids such as soil. This includes a range from normal soil aggregate to 100% sand. Two conditions are required for maximum cleaning; thorough mixing of BG-CLEAN™ 401 with the oil and an adequate concentration of BG-CLEAN™ 401.

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VII. TOXICITY AND EFFECTIVENESSa. Toxicity:

Material Tested	Species	LC50 (ppm)
BG-CLEAN™ 401	Menidia beryllina	787.00 96-hr
	Mysidopsis bahia	477.00 48-hr
No. 2 Fuel Oil	Menidia beryllina	16.90 96-hr
	Mysidopsis bahia	2.92 48-hr
BG-CLEAN™ 401	Menidia beryllina	13.10 96-hr
No. 2 Fuel Oil (1:10)	Mysidopsis bahia	2.86 48-hr
Reference Toxicant (SDS)	Menidia beryllina	3.93 96-hr
	Mysidopsis bahia	8.80 48-hr

b. Effectiveness:
NA

VIII. MICROBIOLOGICAL ANALYSIS
NA

IX. PHYSICAL PROPERTIES
1. Flash Point, ASTM D-93: >76.6°C (>170°F)
2. Pour Point, ASTM D-97: -4°C
3. Viscosity, ASTM D-88: 24 SUS@ 100°F
4. Specific Gravity, ASTM D-1298: 1.00604 @ 60°F
5. pH: 8.227
6. Surface Active Agents: Proprietary
7. Solvents: Proprietary
8. Additives: Proprietary
9. Solubility: Miscible in water.

X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

Compound	Concentration (ppm)
Arsenic	<0.118
Cadmium	<0.020
Chromium	<0.125
Copper	0.049
Lead	0.166
Mercury	<0.02
Nickel	<0.125
Zinc	0.280
Cyanide	0.002
Chlorinated Hydrocarbons	ND

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TECHNICAL PRODUCT BULLETIN #SW-33
USEPA, OEM REGULATIONS IMPLEMENTATION DIVISION
ORIGINAL LISTING DATE: NOVEMBER 27, 2006
"E-SAFE©"

I. NAME, BRAND, OR TRADEMARK
E-SAFE©
Type of Product: Surface Washing Agent

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT
PLUTUS Environmental Technologies, Inc.
3138 Hatcher Mountain Road
Sevierville, TN 37862
Phone: (865) 292-8501
E-mail: plutusCEO@yahoo.com
(Mr. James Hatcher)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS
PLUTUS Environmental Technologies, Inc.
3138 Hatcher Mountain Road
Sevierville, TN 37862
Phone: (865) 292-8501
E-mail: plutusCEO@yahoo.com
(Mr. James Hatcher)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION
1. Flammability: Non-flammable until >170ºF
2. Ventilation: Handle in a well-ventilated space. Local exhaust is recommended if TLV's are exceeded.
3. Skin and eye contact; protective clothing; treatment in case of contact: Avoid eye and (sensitive) skin contact. In case of contact, immediately flush with large amount of cool water of at least 5 minutes. Wear protective eye goggles when using any chemicals. Impermeable protective gloves are recommended for sensitive skin types. Protective clothing is not required. Rinse contaminated clothing, shoes, goggles, and gloves in simple tap water to remove any chemical residue. Avoid ingestion, breathing dusts, mists, or fumes. In case of ingestion drink several glasses of water. Do not induce vomiting. In case of inhalation, move affected person to fresh air.
4.a. Maximum storage temperature: 160°F
4.b. Minimum storage temperature: -15°F
4.c. Optimum storage temperature range: 40°F – 110ºF
4.d. Temperatures of phase separations and chemical changes: No phase separations will occur. Continued exposure to direct sunlight may cause a change in color, but performance is not affected.

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V. SHELF LIFE
Unlimited if left in unopened containers stored at 40ºF - 110ºF and away from direct sunlight.

VI. RECOMMENDED APPLICATION PROCEDURE
1. Application Method: E-SAFE© may be introduced with a pressure spray to cover the affected area. The contaminated area should be thoroughly moistened. Following the spray application the treated area should be soaked with water to facilitate penetration. Heavy soil such as clay will be cleaned by E-SAFE©, but tilling or aerating the soil will rapidly shorten penetration time. Sand or loam ay require heavy dosage with E-SAFE© because hydrocarbon migration is so rapid in these soil types. Treatment of fouled beach areas should have E-SAFE© sprayed on all contaminated surfaces. Any remaining hydrocarbons may then be effectively vacuumed or wiped away from the treated surfaces. Incidental wave action or rainfall will enhance coverage and penetration by E-SAFE©.
2. Concentration/Application Rate: E-SAFE© should be applied full strength. Beginning treatment for hydrocarbon contaminated surface is one gallon of E-SAFE© per 100 square foot of surface area. This dosage is recommended when the ambient temperature is 72ºF and humidity is moderate. Higher temperature or lower humidity will increase the need for repeated applications or a higher volume of E-SAFE© per application.
3. Conditions for Use: E-SAFE© works on all soil types and weather conditions that allow hydrocarbon penetration. E-SAFE© follows the same path, channel, or gradient as the contaminant. When visible detection reveals that E-SAFE© has been absorbed by, or has penetrated the soil, water should be applied to the site. E-SAFE© is soluble in water and also breaks the surface tension of the transporting water molecules.

VII. TOXICITY AND EFFECTIVENESS
a. Toxicity:

Material Tested	Species	LC50 (ppm)	
E-SAFE©	Menidia beryllina	329.00	96-hr
	Mysidopsis bahia	257.00	48-hr
No. 2 Fuel Oil	Menidia beryllina	5.45	96-hr
	Mysidopsis bahia	10.20	48-hr
E-SAFE©	Menidia beryllina	8.77	96-hr
No. 2 Fuel Oil (1:10)	Mysidopsis bahia	14.20	48-hr
Reference Toxicant (SDS)	Menidia beryllina	8.07	96-hr
	Mysidopsis bahia	16.00	48-hr

b. Effectiveness:
NA

VIII. MICROBIOLOGICAL ANALYSIS
NA

IX. PHYSICAL PROPERTIES
1. Flash Point, ASTM D-93: >170°F
2. Pour Point, ASTM D-97: -27ºC

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3. Viscosity, ASTM D-88: 11SFS@ 100°F
4. Specific Gravity, ASTM D-1298: 1.0118 @ 60°F
5. pH: 8.04
6. Surface Active Agents: Confidential
7. Solvents: Confidential
8. Additives: Confidential
9. Solubility: Soluble

X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

Compound	Concentration (ppm)
Arsenic	<0.005
Cadmium	<0.0008
Chromium	<0.025
Copper	0.061
Lead	0.082
Mercury	<0.007
Nickel	<0.003
Zinc	0.214
Cyanide	0.200
Chlorinated Hydrocarbons	ND

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TECHNICAL PRODUCT BULLETIN #SW-34
USEPA, OEM REGULATIONS IMPLEMENTATION DIVISION
ORIGINAL LISTING DATE: NOVEMBER 27, 2006
"SHEEN-MAGIC©"

I. NAME, BRAND, OR TRADEMARK
SHEEN-MAGIC©
Type of Product: Surface Washing Agent

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT
PLUTUS Environmental Technologies, Inc.
3138 Hatcher Mountain Road
Sevierville, TN 37862
Phone: (865) 292-8501
E-mail: plutusCEO@yahoo.com
(Mr. James Hatcher)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS
PLUTUS Environmental Technologies, Inc.
3138 Hatcher Mountain Road
Sevierville, TN 37862
Phone: (865) 292-8501
E-mail: plutusCEO@yahoo.com
(Mr. James Hatcher)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION
1. Flammability: Non-flammable until >170ºF
2. Ventilation: Handle in a well-ventilated space. Local exhaust is recommended if TLV's are exceeded.
3. Skin and eye contact; protective clothing; treatment in case of contact: Avoid eye and (sensitive) skin contact. In case of contact, immediately flush with large amount of cool water of at least 5 minutes. Wear protective eye goggles when using any chemicals. Impermeable protective gloves are recommended for sensitive skin types. Protective clothing is not required. Rinse contaminated clothing, shoes, goggles, and gloves in simple tap water to remove any chemical residue. Avoid ingestion, breathing dusts, mists, or fumes. In case of ingestion drink several glasses of water. Do not induce vomiting. In case of inhalation, move affected person to fresh air.
4.a. Maximum storage temperature: 160°F
4.b. Minimum storage temperature: -8°F
4.c. Optimum storage temperature range: 40°F – 110ºF
4.d. Temperatures of phase separations and chemical changes: No phase separations will occur.

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V. SHELF LIFE
Unlimited if left in unopened containers stored at 40°F - 110°F and away from direct sunlight.

VI. RECOMMENDED APPLICATION PROCEDURE
1. Application Method: SHEEN-MAGIC© recommended treatment is light misting of contaminated surface. Heavier hydrocarbons such as crude oil should be boomed or vacuumed away as much as possible before application of the SHEENMAGIC©. Treatment of fouled beach areas should have SHEEN-MAGIC© sprayed on all contaminated surfaces. Incidental wave action or rainfall will enhance coverage and penetration by SHEEN-MAGIC©. Any remaining hydrocarbons may then be effectively vacuumed or wiped away from the treated surfaces. Aerial application should be delivered at height and air speed that will create air shear necessary to deliver droplets as per nozzle manufacturer's recommendations. Mist spray from surface vehicles may be delivered from power fogger units. Hand sprayers are generally used for small treatment areas.
2. Concentration/Application Rate: One ounce per 50 square yards of surface is the normal treatment for diesel spills. Heavier hydrocarbon sheens may require additional treatment to remove the contaminant.
3. Conditions for Use: SHEEN-MAGIC© works in all weather conditions that allow hydrocarbon penetration. SHEEN-MAGIC© should be used as soon as the temperature and weather conditions allow delivery to the spill area. Heavier concentrations may be required when the temperature/humidity will cause rapid evaporation of the spray.

VII. TOXICITY AND EFFECTIVENESS
a. Toxicity:

Material Tested	Species	LC50 (ppm)
SHEEN-MAGIC©	Menidia beryllina	183.00 96-hr
	Mysidopsis bahia	161.00 48-hr
No. 2 Fuel Oil	Menidia beryllina	4.57 96-hr
	Mysidopsis bahia	3.04 48-hr
SHEEN-MAGIC©	Menidia beryllina	7.82 96-hr
No. 2 Fuel Oil (1:10)	Mysidopsis bahia	5.75 48-hr
Reference Toxicant (SDS)	Menidia beryllina	11.70 96-hr
	Mysidopsis bahia	5.36 48-hr

b. Effectiveness:
NA

VIII. MICROBIOLOGICAL ANALYSIS
NA

IX. PHYSICAL PROPERTIES
1. Flash Point, ASTM D-93: >170°F
2. Pour Point, ASTM D-97: -22°C
3. Viscosity, ASTM D-88: 11SFS@ 100°F
4. Specific Gravity, ASTM D-1298: 1.0127 @ 60°F
5. pH: 8.10

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6. Surface Active Agents: Confidential
7. Solvents: Confidential
8. Additives: Confidential
9. Solubility: Soluble

X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

Compound	Concentration (ppm)
Arsenic	<0.005
Cadmium	<0.0008
Chromium	0.026
Copper	0.023
Lead	0.085
Mercury	<0.007
Nickel	<0.003
Zinc	0.231
Cyanide	0.200
Chlorinated Hydrocarbons	ND

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TECHNICAL PRODUCT BULLETIN #SW-35USEPA, OEM REGULATIONS IMPLEMENTATION DIVISION
LISTING DATE: JUNE 16, 2008
"PROCLEANS"

I. NAME, BRAND, OR TRADEMARK
PROCLEANS
Type of Product: Surface Washing Agent

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT
Eximco International, Inc.
5252 Gulfton, #2-B
Houston, TX 77081
Phone: (713) 432-7899
E-mail: procleans@procleans.com
(Mr. Nat Brown)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS
Eximco International, Inc.
5252 Gulfton, #2-B
Houston, TX 77081
Phone: (713) 432-7899
E-mail: procleans@procleans.com
(Mr. Nat Brown)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION
1. Flammability: Non-flammable.
2. Ventilation: Normal.
3. Skin and eye contact; protective clothing; treatment in case of contact: Flush contaminated eyes thoroughly with water for 15 minutes, and get medical attention. Remove contaminated clothing, wash exposed area with soap and water, and wash clothing before use. Get medical attention if irritation develops. Get medical attention if ingested. No medical attention is necessary if inhaled.
4.a. Maximum storage temperature: 130°F
4.b. Minimum storage temperature: 35°F
4.c. Optimum storage temperature range: 50°F to 100°F
4.d. Temperatures of phase separations and chemical changes: NA

V. SHELF LIFE
Approximately 2 years at recommended temperatures if unopened.

VI. RECOMMENDED APPLICATION PROCEDURE
1. Application Method: Apply specified dilute solution using fire hoses or heated pressure washers onto the contaminated solid surface of the spill.

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2. Concentration/Application Rate: Use ten parts water to one part product. Dilution rates may be adjusted to suit different job conditions. Apply 10 to 15 gallons of diluted PROCLEANS to one cubic yard of contamination.
3. Conditions for Use: May be used with fresh or salt water. Warmer temperatures may improve results. Most effective if used on solid surfaces such as shoreline beaches and rocks contaminated with light and medium weight crude oils and refined petroleum products.

VII. TOXICITY AND EFFECTIVENESS

a. Toxicity:

Material Tested	Species	LC50 (ppm)
PROCLEANS	Menidia beryllina	83.73 96-hr
	Mysidopsis bahia	83.98 48-hr
No. 2 Fuel Oil	Menidia beryllina	7.41 96-hr
	Mysidopsis bahia	11.68 48-hr
PROCLEANS &	Menidia beryllina	4.78 96-hr
No. 2 Fuel Oil (1:10)	Mysidopsis bahia	11.68 48-hr
Reference Toxicant ($CuSO_4$)	Menidia beryllina	0.73 96-hr
	Mysidopsis bahia	0.77 48-hr

b. Effectiveness:
NA

VIII. MICROBIOLOGICAL ANALYSIS
NA

IX. PHYSICAL PROPERTIES
1. Flash Point: >186°F
2. Pour Point: 34.6°F
3. Viscosity: 2.41 cST @ 104°F
4. Specific Gravity: 1.01 @ 25°C
5. pH: 6.8
6. Surface Active Agents: Anionic and nonionic
7. Solvents: None.
8. Additives: None
9. Solubility in Water: NA

X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

Compound	Concentration (ppm)
Arsenic	0.690
Cadmium	ND
Chromium	ND
Copper	ND
Lead	ND
Mercury	ND

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Nickel	ND
Zinc	0.738
Cyanide	ND
Chlorinated Hydrocarbons	ND

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TECHNICAL PRODUCT BULLETIN #SW-36USEPA, OEM REGULATIONS IMPLEMENTATION DIVISION
ORIGINAL LISTING DATE: MARCH 30, 2009
"SPILLCLEAN"
SPILLCLEAN ["Concentrate"]
(aka, FIREMAN'S BRAND SPILLCLEAN)

I. NAME, BRAND, OR TRADEMARK
SPILLCLEAN
SPILLCLEAN ["Concentrate"] = 30% Active Ingredients and 70% Water
(aka, FIREMAN'S BRAND SPILLCLEAN)
Type of Product: Surface Washing Agent

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT
Super Sat Ventures, Inc.
611 Riverview Drive
Thiensville, WI 53092
Phone: (414) 840-9223
(Mr. Daniel W. Klein)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS
Super Sat Ventures, Inc.
611 Riverview Drive
Thiensville, WI 53092
Phone: (414) 840-9223
(Mr. Daniel W. Klein)

Aramsco
1201 Gateway Drive
Elgin, IL 60124
Phone: (800) 767-6933
(Mr. Rick Swift)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION
1. Flammability: >210°F
2. Ventilation: General room ventilation is expected to be satisfactory.
3. Skin and eye contact; protective clothing; treatment in case of contact: Product may cause mild skin irritation. Wear impervious gloves, safety goggles, and full cover clothes. Eye wash and safety shower should be accessible. If eye contact, flush immediately with water for at least 15 minutes. If skin contact, wash with soap and water. If swallowed, give two glasses of water (do not induce vomiting). Seek medical attention for eye and skin contact and ingestion.
4.a. Maximum storage temperature: <210°F
4.b. Minimum storage temperature: >32°F

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4.c. Optimum storage temperature range: 50°F – 70°F
4.d. Temperatures of phase separations and chemical changes: <32°F and >210°F

V. SHELF LIFE
3 years. Avoid extreme heat and store in a dry, cool area.

VI. RECOMMENDED APPLICATION PROCEDURES
Please note:
SPILLCLEAN comes in two forms "Concentrate" and "Original Formula." SPILLCLEAN ["Concentrate"] is 30% Active Ingredients and 70% Water while SPILLCLEAN ["Original Formula"] is 10% Active Ingredients and 90% Water.

SPILLCLEAN ["Concentrate"] and SPILLCLEAN ["Original Formula"] are for on land and surface use only. They should not be used around or near bodies of water when there is a reasonable chance of mixing in with water. Once the contaminant/SPILLCLEAN ["Concentrate"] solution mixes with the body of water, "control" of the contaminant will be lost since SPILLCLEAN is water soluble.

SPILLCLEAN is a formula designed to solubilize and emulsify oil and oil-type products such as motor oil, gasoline, diesel fuel, and transmission fluid. When such products are accidentally spilled and need to be cleaned up from hard surfaces such as streets and driveways, SPILLCLEAN is an effective material to use. Being a surfactant-type material, SPILLCLEAN allows the spilled contaminant to be emulsified and then lifted and separated from the hard surface. The resulting spill/contaminant can then be picked up, vacuumed up, or flushed with water, all in accordance with federal, state, and local regulations.

1. Application Method: SPILLCLEAN ["Concentrate"] 30% Active Ingredients and 70% Water – squeeze product directly around outside perimeter of oil/gasoline/antifreeze spill using squeeze bottle container. This process is designed to "contain" the contaminant and keep if from migrating down a hard surface like a city street, parking lot, or garage floor. SPILLCLEAN ["Concentrate"] is more viscous than oil/gasoline, and will "hold" the contaminant in place. Once the contaminant is contained, the user can apply SPILLCLEAN ["Original Formula"] over the "body" of the contaminant if the spill is large (over 2 gallons). If the spill is small (less than 2 gallons), the user can apply either SPILLCLEAN ["Concentrate"] or SPILLCLEAN ["Original Formula"] to the "body" of the contaminant spill. Using a broom or broom-like applicator, sweep SPILLCLEAN in with the contaminant until thoroughly blended in place. The original bright red color of SPILLCLEAN ["Concentrate"] and SPILLCLEAN ["Original Formula"] will dissipate when it is thoroughly mixed with the contaminant.

SPILLCLEAN ["Original Formula"] 10% Active Ingredients and 90% Water – apply over the "body" of the contaminant if the spill is large (over 2 gallons). If the spill is small (less than 2 gallons), the user can apply SPILLCLEAN ["Concentrate"] or SPILLCLEAN ["Original Formula"] to the "body" of the contaminant spill. SPILLCLEAN ["Original Formula"] is designed to "attach" to a contaminant and remove it from a hard surface like a city street, parking lot, or garage floor. It is recommended to be used on any size contaminant spill, large or

small. This product is designed to penetrate into the surface pores and molecularly "attach" with the contaminant, thus making the contaminant "water soluble." The contaminant can be removed from the pores (of the asphalt, concrete, epoxy surface, etc.) with a 60psi water supply. The user can then dispose of the resulting mixture according to regulations. This product can be applied using a vast number of different applicators, especially with regard to firefighting equipment. Using a broom or broom-like applicator, sweep SPILLCLEAN in with the contaminant until thoroughly blended in place. The original bright red color of SPILLCLEAN ["Concentrate"] and SPILLCLEAN ["Original Formula"] will dissipate when it is thoroughly mixed with the contaminant.

When SPILLCLEAN'S bright red color has dissipated (upon mixing) with the contaminant, it can be wiped clean with a rag or wet-vacuumed, collected, and disposed of according to EPA, federal, state, and local regulations. Additionally, a dry sorbent may be applied to the resulting SPILLCLEAN/contaminant/water mixture, shoveled up and disposed of according to applicable regulations.

2. Concentration/Application Rate: For Surface and Land Application Only:
SPILLCLEAN ["Concentrate"] 30% Active Ingredients and 70% Water – for spills less than 2 gallons squeeze a one-half inch ribbon of straight product around the perimeter of the oil/gasoline spill, followed by an "X" pattern over the body of the spill. For spills greater than 2 gallons squeeze a one-half inch ribbon of straight product around the perimeter of the oil/gasoline spill. The general purpose of SPILLCLEAN ["Concentrate"] is to "contain" the contaminant from migrating, and therefore should not be diluted with water during application.

SPILLCLEAN ["Original Formula"] 10% Active Ingredients and 90% Water – concentration rate is based on equipment used and disposal method. Typical usage will be (0 to 100 parts water) plus 1 part SPILLCLEAN ["Original Formula"] all applied to 1 part contaminant (oil/gasoline spill).

The resulting mixture of SPILLCLEAN and oil must be disposed of in accordance with EPA, federal, state, and local agencies that regulate disposal of contaminant. The resulting SPILLCLEAN contaminant mixture should be wet-vacuumed up and placed in a proper container and disposed.

3. Conditions for Use:
Water Salinity: Water soluble, not applicable for use on water
Water Temperature: >32°F and <120°F
Types of Pollutants: Automobile motor oil, gasoline, diesel fuel, and transmission fluid
Ages of Pollutants: 0 to 20 years old

VII. TOXICITY AND EFFECTIVENESS
a. Toxicity:

Material Tested	Species	LC50 (ppm)
SPILLCLEAN ["Concentrate"]	Menidia beryllina	24.30 96-hr

	Mysidopsis bahia	10.00	48-hr
No. 2 Fuel Oil	Menidia beryllina	6.60	96-hr
	Mysidopsis bahia	2.20	48-hr
SPILLCLEAN ["Concentrate"] &	Menidia beryllina	3.30	96-hr
No. 2 Fuel Oil (1:10)	Mysidopsis bahia	1.30	48-hr
Reference Toxicant (SDS)	Menidia beryllina	8.90	96-hr
	Mysidopsis bahia	10.70	48-hr

VIII. MICROBIOLOGICAL ANALYSIS
NA

IX. PHYSICAL PROPERTIES
1. Flash Point: SPILLCLEAN ["Concentrate"] = >210°F
2. Pour Point: SPILLCLEAN ["Concentrate"] = 27.0°F
3. Viscosity: SPILLCLEAN ["Concentrate"] = 6400cPs@25°C
4. Specific Gravity: SPILLCLEAN ["Concentrate"] = 1.030
5. pH: SPILLCLEAN ["Concentrate"] = 7.20
6. Surface Active Agents: Confidential
7. Solvents: Confidential
8. Additives: Confidential
9. Solubility: Water soluble

X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

Compound	Concentration (ppm)
Arsenic	0.02
Cadmium	<0.007
Chromium	<0.01
Copper	<0.01
Lead	<0.02
Mercury	<0.00003
Nickel	<0.01
Zinc	<0.01
Cyanide	0.137
Chlorinated Hydrocarbons	<0.01

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TECHNICAL PRODUCT BULLETIN #SW-37
USEPA, OEM REGULATIONS IMPLEMENTATION DIVISION
ORIGINAL LISTING DATE: MARCH 15, 2010
"TXCHEM HE-1000™"

I. NAME, BRAND, OR TRADEMARK
"TXCHEM HE-1000™"
Type of Product: Surface Washing Agent

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT
Texas EnviroChem, Inc.
11410 Dumas Street
Houston, TX 77034
Phone: (713) 806-4099
(Mr. Pete Franks)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS
Texas EnviroChem, Inc.
11410 Dumas Street
Houston, TX 77034
Phone: (713) 806-4099
(Mr. Pete Franks)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION
1. Flammability: Not flammable
2. Ventilation: Recommended, respirator in confined area
3. Skin and eye contact; protective clothing; treatment in case of contact:
Wear rubber gloves and eye protection. If eye contact, wash eyes thoroughly for 15 minutes; including upper and lowers lids, and seek medical attention. For skin contact, irritation is possible, wash with soap and water for 15 minutes. If irritation persists, seek medical attention.
4.a. Maximum storage temperature: 95°F
4.b. Minimum storage temperature: 32°F
4.c. Optimum storage temperature range: 75°F
4.d. Temperatures of phase separations and chemical changes: No phase changes have been observed.

V. SHELF LIFE
One year in a sealed container.

VI. RECOMMENDED APPLICATION PROCEDURES
1. Application Method: TXCHEM HE-1000™ is applied by pressure sprayer, heated pressure washer, fire hoses or mixing on or into hydrocarbon contaminated media.

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2. Concentration/Application Rate: TXCHEM HE-1000™ should be diluted to a one (1) part concentrated chemical to ten (10) parts water solution. Apply ten to fifteen gallons of diluted solution to one cubic yard of contaminated media. Agitate to slurry. Dilution rate may change due to level of hydrocarbon contamination. Please see manufacturer's instructions for additional application dilutions. Excess washing solution should be disposed of according to local, state, and federal regulations.3. Conditions for Use: Pollutants should be of hydrocarbon in nature. Greater results occur at ambient temperatures greater than 50°F. Fresh or salt water can be used with no performance change.

VII. TOXICITY AND EFFECTIVENESS

a. Toxicity:

Material Tested	Species	LC50 (ppm)
TXCHEM HE-1000™	Menidia beryllina	91.33 96-hr
	Mysidopsis bahia	65.52 48-hr
No. 2 Fuel Oil	Menidia beryllina	5.84 96-hr
	Mysidopsis bahia	2.17 48-hr
TXCHEM HE-1000™ &	Menidia beryllina	7.07 96-hr
No. 2 Fuel Oil (1:10)	Mysidopsis bahia	2.11 48-hr
Reference Toxicant (SLS)	Menidia beryllina	15.27 96-hr
	Mysidopsis bahia	12.84 48-hr

b. Effectiveness: NA

VIII. MICROBIOLOGICAL ANALYSIS

NA

IX. PHYSICAL PROPERTIES

1. Flash Point: >210°F
2. Pour Point: 23.0°F
3. Viscosity: 1.99cSt
4. Specific Gravity: 0.999
5. pH: 7.20
6. Surface Active Agents: Confidential
7. Solvents: NA
8. Additives: Confidential
9. Solubility: NA

X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

Compound	Concentration (ppm)
Arsenic	ND
Cadmium	ND
Chromium	0.0366
Copper	0.0402
Lead	0.0189
Mercury	ND

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Nickel	0.0125
Zinc	0.29
Cyanide	<0.05
Chlorinated Hydrocarbons	ND

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TECHNICAL PRODUCT BULLETIN #SW-38USEPA, OEM REGULATIONS IMPLEMENTATION DIVISION
ORIGINAL LISTING DATE: MAY 11, 2010
"NOKOMIS 5-W"

I. NAME, BRAND, OR TRADEMARK
NOKOMIS 5-W
Type of Product: Surface Washing Agent

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT
Mar-Len Supply, Inc.
23159 Kidder Street
Hayward, CA 94545
Phone: (510) 782-3555
Fax: (510) 782-2032
(Mr. Frank Winter)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS
Mar-Len Supply, Inc.
23159 Kidder Street
Hayward, CA 94545
Phone: (510) 782-3555
Fax: (510) 782-2032
(Mr. Frank Winter)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION
1. Flammability: Non-flammable (water based)
2. Ventilation: No special requirements
3. Skin and eye contact; protective clothing; treatment in case of contact: In case of eye contact, flush with water; in case of skin contact, wash with water; and, if swallowed drink water to dilute and induce vomiting.
4.a. Maximum storage temperature: 212°F
4.b. Minimum storage temperature: 32°F
4.c. Optimum storage temperature range: 50°F
4.d. Temperatures of phase separations and chemical changes: NA

V. SHELF LIFE
15 years or more if stored correctly in plastic drums.

VI. RECOMMENDED APPLICATION PROCEDURES
1. Application Method: NOKOMIS 5-W is a concentrated liquid, non-hazardous cleaner. Can be used full strength or diluted with fresh or salt water. NOKOMIS 5-W is marketed in plastic containers.
2. Concentration/Application Rate: Dilution ratios are determined by the individual cleaning

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application. For washing equipment contaminated with soluble crude and/or bunker fuel oil use a 5:1 cleaning solution. Spray or brush onto surface, agitate with a stiff bristle brush, and rinse with fresh or salt water. For pressure washing, pre-spray surface with concentrate and allow to dwell on surface one to ten minutes (depending on age of oil). For shoreline areas and beaches with rocky, breakwaters contain the area of beach sand and gravel by creating a sand bather around a small contaminated area. Spray contaminated area with a 10:1 solution. Add salt or freshwater, agitate surface to help release oil from sand. Allow time for oil to surface and recover oil. To clean larger tidal rock surfaces, apply 5:1 or 20 percent mixture of NOKOMIS 5-W. Spray solution onto rocks with a garden type pump sprayer. Agitate with a stiff bristle brush. Allow to dwell on surface until surface looks soluble. Contain with a boom or use oil absorbent pads to recover oil.
3. Conditions for Use: Fresh or salt water can be used.

VII. TOXICITY AND EFFECTIVENESS
a. Toxicity:

Material Tested	Species	LC50 (ppm)
NOKOMIS 5-W	Menidia beryllina	10.46 96-hr
	Mysidopsis bahia	21.52 48-hr
No. 2 Fuel Oil	Menidia beryllina	4.25 96-hr
	Mysidopsis bahia	2.11 48-hr
NOKOMIS 5-W	Menidia beryllina	3.07 96-hr
No. 2 Fuel Oil (1:10)	Mysidopsis bahia	2.24 48-hr
Reference Toxicant (SLS)	Menidia beryllina	13.01 96-hr
	Mysidopsis bahia	9.05 48-hr

b. Effectiveness: NA

VIII. MICROBIOLOGICAL ANALYSIS
NA

IX. PHYSICAL PROPERTIES
1. Flash Point: None
2. Pour Point: 28°F
3. Viscosity: 31.00 cps
4. Specific Gravity: 1.0065 g/cc
5. pH: 10.4
6. Surface Active Agents: Confidential
7. Solvents: None
8. Additives: None
9. Solubility: Completely water soluble

X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

Compound	Concentration (ppm)
Arsenic	0.037

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Cadmium	<0.050
Chromium	<0.050
Copper	<0.050
Lead	<0.025
Mercury	<0.0064
Nickel	<0.050
Zinc	1.7
Cyanide	0.042
Chlorinated Hydrocarbons	<0.500

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TECHNICAL PRODUCT BULLETIN #SW-39
USEPA, OEM REGULATIONS IMPLEMENTATION DIVISION
ORIGINAL LISTING DATE: JULY 02, 2010
"G-CLEAN OSC-1809"

I. NAME, BRAND, OR TRADEMARK
G-CLEAN OSC-1809
(aka, OIL SPILL CLEANUP)
Type of Product: Surface Washing Agent

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT
Green Earth Technologies
1136 Celebration Boulevard
Celebration, FL 34347
Phone: (330) 540-4220
Fax: (815) 331-0931
E-mail: mlukco@getg.com
E-mail: jloch@getg.com
Website: www.getg.com
(Mr. Michael Lukco)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS
Green Earth Technologies
1136 Celebration Boulevard
Celebration, FL 34347
Phone: (330) 540-4220
Fax: (815) 331-0931
E-mail: mlukco@getg.com
E-mail: jloch@getg.com
Website: www.getg.com
(Mr. Michael Lukco)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION
1. Flammability: Non-flammable (DOT: Non-hazardous)
2. Ventilation: No special requirements
3. Skin and eye contact; protective clothing; treatment in case of contact: As defined by OSHA's Hazard Communication Standard, this product is non-hazardous with no evidence of adverse effects. No personal protection or exposure controls.
4.a. Maximum storage temperature: 140°F continuous up to 5 days
4.b. Minimum storage temperature: 35°F
4.c. Optimum storage temperature range: 50°F to 98°F
4.d. Temperatures of phase separations and chemical changes: May begin freezing at or below 25°F as product begins to thaw. Mix product with agitator until product becomes homogenous.

V. SHELF LIFE
Five to ten years in sealed polydrums or totes (as delivered).

VI. RECOMMENDED APPLICATION PROCEDURES
1. Application Method: Product may be applied to any surface for removal of oils. Select proper dilution depending on product types and material surface prior to application. For treatment of large areas, properly diluted product may be applied by spraying with a pressure washer, portable fire pump or any other suitable pump with seawater or freshwater suction that is equipped with a chemical inductor or feed pump. For smaller areas, properly diluted product may be applied with scrubber, mop, cloth or damp sponge. Apply liberally, adjusting dilution on site as necessary.
2. Concentration/Application Rate: For heavily weathered oil on rocks, a diluted solution of 3 parts water to 1 part product is recommended. For heavily weathered oil on beaches/sand, a diluted solution of 5 parts water to 1 part product is ideal. For tar balls, no dilution is necessary and it is suggested to apply directly at full strength. For removing oil from vegetation, a diluted solution of 10/20 parts water to 1 part product is preferred. Product may be diluted with either salt water or fresh water. Warmer waters (greater than 78°F) and/or good agitation during application will require less product.
3. Conditions for Use: Best results are obtained by allowing diluted solution to soak for at least 30 minutes to soften the oil deposits. Reapplication may be necessary in severely contaminated areas. A sorbent boom or vacuum suction equipment should be positioned to collect the washed off effluent. When proper containment equipment is in place and a soaking period of at least 30 minutes has been achieved, a diluted solution of 20 parts water and 1 part product should be applied at mid-pressure (approximately 100 PSI). Adjust the pressure and angle of the hose sprayer to achieve optimum results, adjusting dilution as necessary on site. Product and effluent should be vacuumed up or absorbed in absorbent boom and disposed of according to EPA guidelines.

VII. TOXICITY AND EFFECTIVENESS
a. Toxicity:

Material Tested	Species	LC50 (ppm)
G-CLEAN OSC-1809	Menidia beryllina	11.49 96-hr
	Mysidopsis bahia	7.32 48-hr
No. 2 Fuel Oil	Menidia beryllina	2.51 96-hr
	Mysidopsis bahia	2.24 48-hr
G-CLEAN OSC-1809 &	Menidia beryllina	6.05 96-hr
No. 2 Fuel Oil (1:10)	Mysidopsis bahia	2.51 48-hr
Reference Toxicant (SLS)	Menidia beryllina	12.25 96-hr
	Mysidopsis bahia	11.71 48-hr

b. Effectiveness: NA

VIII. MICROBIOLOGICAL ANALYSIS
NA

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IX. PHYSICAL PROPERTIES

1. Flash Point: >93°C
2. Pour Point: -16°F
3. Viscosity: 60.77 at 40°C
4. Specific Gravity: 1.029 @60°F
5. pH: 11.3
6. Surface Active Agents: Nonionic, Surfactants, PROPRIETARY
7. Solvents: Plant-based, PROPRIETARY
8. Additives: None
9. Solubility: Completely water soluble

X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

Compound	Concentration (ppm)
Arsenic	<0.004
Cadmium	<0.002
Chromium	2.004
Copper	0.068
Lead	<0.004
Mercury	<1 µg/L
Nickel	0.0132
Zinc	0.0136
Cyanide	<0.25
Chlorinated Hydrocarbons	<5.00

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TECHNICAL PRODUCT BULLETIN #SW-40
USEPA, OEM REGULATIONS IMPLEMENTATION DIVISION
ORIGINAL LISTING DATE: JULY 06, 2010
"GREEN BEAST™ OIL SPILL & ODOR REMEDIATOR"
(aka, GREEN BEAST WASHING AGENT; ALL PURPOSE CLEANER & REMEDIATOR)

I. NAME, BRAND, OR TRADEMARK
GREEN BEAST™ OIL SPILL & ODOR REMEDIATOR
(aka, GREEN BEAST WASHING AGENT; ALL PURPOSE CLEANER & REMEDIATOR)
Type of Product: Surface Washing Agent

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT
BioFusion Corporation
310 Godwin Avenue
Ridgewood, NJ 07450
Phone: (201) 447-6241
Fax: (201) 444-2307
E-mail: gubb@biofusion.co
Website: www.biofusion.co
(Mr. David Gubb)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS

Brightside Products, LLC
310 Godwin Avenue
Ridgewood, NJ 07450
Phone: (201) 447-6241
Fax: (201) 444-2307
E-mail: gubb@biofusion.co
(Mr. David Gubb)

MSC Industrial Supply Company, Inc.
75 Maxess Road
Melville, NY 11747
Phone: (800) 645-7270
Website: www.mscdirect.com

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION
1. Flammability: Non-flammable (DOT: Non-hazardous)
2. Ventilation: No special requirements
3. Skin and eye contact; protective clothing; treatment in case of contact: No special equipment or clothing required; however, goggles are recommended. If eye or skin irritation occurs, flush with plenty of water.
4.a. Maximum storage temperature: 120°F
4.b. Minimum storage temperature: 35°F
4.c. Optimum storage temperature range: 40°F to 113°F
4.d. Temperatures of phase separations and chemical changes: Stable

V. SHELF LIFE
Unlimited in sealed polydrums or totes (as delivered).

VI. RECOMMENDED APPLICATION PROCEDURES

1. Application Method: The diluted composition of the present formulation is preferably applied to a surface to be cleaned under pressure (i.e., power washing), but will work well poured directly onto the contaminated area. It is advantageous to apply the diluted final composition at high pressure, above 500 psi, but it is not required.
2. Concentration/Application Rate: For treating hydrocarbons on beaches, rocks, and hard surfaces the final composition is diluted 1:15 with fresh or sea water and is applied to the hydrocarbons at a rate of about 4 gallons for 1000 square feet of contaminated area. For spills which are of heavy consistency, the diluted mixture is preferably applied at a rate of about 1.3 gallons for 1000 square feet of contaminated area and the diluted final composition is preferably applied over a period of three consecutive days. Residue should be collected and disposed of in accordance with local, state, and federal practices and laws.
3. Conditions for Use: The composition of the present formulation is diluted into water, preferably at a temperature of about 38°F to about 60°F. While the composition is active below about 38°F, the activity is slightly reduced. The composition is also active at temperatures above about 60°F; however, at these elevated temperatures the composition is less stable and is denatured at a greater rate than at lower temperatures. Preferably, the diluted compositions of the present formulation are used immediately after the dilution into about 38°F to 60°F water.

VII. TOXICITY AND EFFECTIVENESS
a. Toxicity:

Material Tested	Species	LC50 (ppm)
Product	Menidia beryllina	29.18 96-hr
	Mysidopsis bahia	30.42 48-hr
No. 2 Fuel Oil	Menidia beryllina	2.51 96-hr
	Mysidopsis bahia	2.24 48-hr
Product &	Menidia beryllina	7.15 96-hr
No. 2 Fuel Oil (1:10)	Mysidopsis bahia	2.24 48-hr
Reference Toxicant (SLS)	Menidia beryllina	12.25 96-hr
	Mysidopsis bahia	11.71 48-hr

b. Effectiveness: NA

VIII. MICROBIOLOGICAL ANALYSIS
NA

IX. PHYSICAL PROPERTIES
1. Flash Point: >85°C
2. Pour Point: +26°F
3. Viscosity: 3.87 at 40°C
4. Specific Gravity: 0.9986 @60°F
5. pH: 4.5
6. Surface Active Agents: Anionic and Nonionic, PROPRIETARY SURFACTANTS
7. Solvents: None
8. Additives: Nutrient and Protein Package, PROPRIETARY
9. Solubility: Miscible in oil, water, and solvents

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X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

Compound	Concentration (ppm)
Arsenic	0.0088
Cadmium	<0.002
Chromium	0.1752
Copper	0.0360
Lead	<0.004
Mercury	<1 µg/L
Nickel	<0.010
Zinc	0.0840
Cyanide	<0.010
Chlorinated Hydrocarbons	<5.00

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TECHNICAL PRODUCT BULLETIN #SW-41
USEPA, OEM REGULATIONS IMPLEMENTATION DIVISION
ORIGINAL LISTING DATE: JULY 13, 2010
"TULXA"

I. NAME, BRAND, OR TRADEMARK
TULXA
Type of Product: Surface Washing Agent

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT
Grupo Arthuriana S.A. de C.V.
Cuernavaca No. 43
Colonia Condesa, Delegación Cuauhtémoc
Mexico, Distrito Federal C.P. 06140
Phone: 01 52 (55) 52 41 11 90
Fax: 01 52 (55) 53 61 13 54
E-mail: sgarcia@arthuriana.com.mx, sgarcia@onsite.com.mx or bescorcia@arthuriana.com.mx, bescorcia@onsite.com.mx
Website: www.lancelotmexico.com
(Ms. Susana Garcia Ballesteros)
(Ms. Bertha Escorcia Rodriguez)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS
Grupo Arthuriana S.A. de C.V.
Cuernavaca No. 43
Colonia Condesa, Delegación Cuauhtémoc
Mexico, Distrito Federal C.P. 06140
Phone: 01 52 (55) 52 41 11 90
Fax: 01 52 (55) 53 61 13 54
E-mail: sgarcia@arthuriana.com.mx, sgarcia@onsite.com.mx or bescorcia@arthuriana.com.mx, bescorcia@onsite.com.mx
(Ms. Susana Garcia Ballesteros)
(Ms. Bertha Escorcia Rodriguez)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION
1. Flammability: Non-flammable (DOT: Non-hazardous)
2. Ventilation: Wear protective mask.
3. Skin and eye contact; protective clothing; treatment in case of contact: Avoid contact with eyes, in case of contact rinse with fresh water. Do not ingest. If swallowed do not induce vomiting and contact a doctor immediately. Use normal protective equipment for handling powder, such as a mask or eye shield. If eye or skin irritation occurs, flush with plenty of fresh water.
4.a. Maximum storage temperature: 104°F or 40°C

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4.b. Minimum storage temperature: 52°F or 20°C
4.c. Optimum storage temperature range: 77°F or 25°C and 95°F or 35°C
4.d. Temperatures of phase separations and chemical changes: >104°F or 40°C

V. SHELF LIFE
Two years if stored in dry, fresh environment.

VI. RECOMMENDED APPLICATION PROCEDURES
1. Application Method: Tulxa can be applied using conventional spraying equipment using low to moderate pressure. Tulxa can be applied directly to any surfaces coated with oil (e.g., beaches, rocks, plants).
2. Concentration/Application Rate: Tulxa can be diluted with fresh water up to a ratio of 1:200. Higher concentration of Tulxa may be required for weathered oils. Optimum concentration should be determined on site based on the type and age of the oil being removed. The product is fully miscible with water with minimal mixing.
3. Conditions for Use: It is recommended to do a test to measure the amount of oils removed and check the time and dilution at which the fats are separated. The product should completely separate the oils in 25 minutes. Although, it may be necessary to let the mixture stay in contact with surface for a longer period of time depending on the type and age of the oil. Residue should be collected and disposed of in accordance with local, state, and federal practices and laws.

VII. TOXICITY AND EFFECTIVENESS
a. Toxicity:

Material Tested	Species	LC50 (ppm)
TULXA	Menidia beryllina	16.50 96-hr
	Mysidopsis bahia	11.33 48-hr
No. 2 Fuel Oil	Menidia beryllina	4.94 96-hr
	Mysidopsis bahia	1.31 48-hr
TULXA &	Menidia beryllina	6.08 96-hr
No. 2 Fuel Oil (1:10)	Mysidopsis bahia	2.24 48-hr
Reference Toxicant (SLS)	Menidia beryllina	12.19 96-hr
	Mysidopsis bahia	10.53 48-hr

b. Effectiveness: NA

VIII. MICROBIOLOGICAL ANALYSIS
NA

IX. PHYSICAL PROPERTIES
1. Flash Point: >185°F
2. Pour Point: 22°F
3. Viscosity: 30.77 cSt @ 40°C
4. Specific Gravity: 1.0263 @60°F
5. pH: 5.0
6. Surface Active Agents: NA
7. Solvents: NA

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8. Additives: None
9. Solubility: Miscible in oil, water, and solvents

X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

Compound	Concentration (ppm)
Arsenic	<0.002
Cadmium	<0.001
Chromium	0.4436
Copper	0.0034
Lead	<0.002
Mercury	<1 µg/L
Nickel	<0.005
Zinc	0.0278
Cyanide	<0.013
Chlorinated Hydrocarbons	<1.00

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TECHNICAL PRODUCT BULLETIN #SW-42USEPA, OEM REGULATIONS IMPLEMENTATION DIVISION
ORIGINAL LISTING DATE: JULY 28, 2010
"MARINE GREEN CLEAN™"

I. NAME, BRAND, OR TRADEMARK
MARINE GREEN CLEAN™
Type of Product: Surface Washing Agent

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT
AGS Solutions, Inc.
5647 Nunn Street
Houston, TX 77087
Phone: (713) 645-4933
Fax: (713) 645-4903
E-mail: agssolutionsinc@gmail.com
Website: www.agstx.com
(Mrs. Linda Whiteley)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS
AGS Solutions, Inc.
5647 Nunn Street
Houston, TX 77087
Phone: (713) 645-4933
Fax: (713) 645-4903
E-mail: agssolutionsinc@gmail.com
Website: www.agstx.com
(Mrs. Linda Whiteley)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION
1. Flammability: Non-flammable
2. Ventilation: Respiratory protection is not considered necessary for normal use. If exposure to vapors or mists is possible, such as is a fire emergency, NIOSH approved respiratory protection for organic vapors should be used. Mechanical ventilation is not normally required.
3. Skin and eye contact; protective clothing; treatment in case of contact: In case of contact with eyes, wash thoroughly with plenty of clean water. Seek medical attention if irritation develops. Rubber protective gloves should be used if prolonged use of product is anticipated.
4.a. Maximum storage temperature: 100°F
4.b. Minimum storage temperature: 0°F
4.c. Optimum storage temperature range: 33°F to 100°F
4.d. Temperatures of phase separations and chemical changes: >100°F

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V. SHELF LIFE

Shelf life is ≥ 2 years. The product may lose its effectiveness at temperatures >140°F. Make sure bulk containers are properly vented. Drums and similar containers should be kept closed. Store in steel or plastic containers.

VI. RECOMMENDED APPLICATION PROCEDURES

1. Application Method: For general use, apply product by spray, mop, or with standard steam and pressure wash cleaning equipment. It can also be applied using a foam generator, or any convenient sprayer. Product can be used as is or by using heat and pressure or mechanical scrubbing. Rinse thoroughly with fresh water for a residue-free surface. In direct applications, foaming will be most effective as it will allow more contact time for the product to work. In a typical foam cleaning application operation the surface to be cleaned will be thoroughly covered with foam and allowed to stand for several minutes. The foam is rinsed away with clean water using a hot pressure of low pressure washer. Product can be applied with a variety of spraying or washing equipment, depending upon the type and scale of the shoreline or beach to be cleaned. For large areas such as beaches, the product can be sprayed from water trucks or other vehicles equipped with pumps, hoses, and nozzles to aerially deliver cleaner. On smaller oily surfaces, the product can be applied with hand sprayers or portable pumps may be used to spray directly onto oily surfaces. Dose rates may vary depending on type and amount of petroleum spilled, and other site conditions such as water, temperatures, and porosity of shoreline. Cold weather applications will require more contact time before initiating recovery. The treated product can be removed by several means including but not limited to: sorbent pads, oil skimmers, collection booms, use of vacuum trucks, berm collecting, drumming, frac tanks, or other appropriate containment and collection mechanism.

2. Concentration/Application Rate: For spills on shorelines and beaches, the product can be used undiluted up to 14% dilution with fresh water. After application, the product should be allowed to penetrate and dissolve the oily surface for up to 30 minutes, longer is preferable – if possible, to maximize contact time. For light cleaning, use up to 1:50 parts product to water. For heavy cleaning, use up to 1:14 parts product to water.

3. Conditions for Use: Product can be used in fresh or salt water, sand beaches, gravel, cobble, coarse sand and rocky shores, public beaches, and other sensitive or high impact sites.

VII. TOXICITY AND EFFECTIVENESS

a. Toxicity:

Material Tested	Species	LC50 (ppm)
MARINE GREEN CLEAN™	Menidia beryllina	46.00 96-hr
	Mysidopsis bahia	89.00 48-hr
No. 2 Fuel Oil	Menidia beryllina	18.00 96-hr
	Mysidopsis bahia	22.00 48-hr
MARINE GREEN CLEAN™ &	Menidia beryllina	34.00 96-hr
No. 2 Fuel Oil (1:10)	Mysidopsis bahia	45.00 48-hr
Reference Toxicant (DSS)	Menidia beryllina	1.06 96-hr
	Mysidopsis bahia	0.97 48-hr

b. Effectiveness: NA

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VIII. MICROBIOLOGICAL ANALYSIS
NA

IX. PHYSICAL PROPERTIES
1. Flash Point: NA
2. Pour Point: 30°F
3. Viscosity: 77.2 cSt @ 25°C
4. Specific Gravity: 1.032 @70°F
5. pH: 11-12.5
6. Surface Active Agents: CONFIDENTIAL
7. Solvents: CONFIDENTIAL
8. Additives: None
9. Solubility: Completely soluble

X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

Compound	Concentration (ppm)
Arsenic	0.648
Cadmium	0.030
Chromium	0.143
Copper	0.154
Lead	<0.025
Mercury	<0.013
Nickel	0.357
Zinc	2.540
Cyanide	<0.02
Chlorinated Hydrocarbons	ND

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TECHNICAL PRODUCT BULLETIN #SW-43USEPA, OEM REGULATIONS IMPLEMENTATION DIVISION
ORIGINAL LISTING DATE: JULY 28, 2010
"MARINE GREEN CLEAN PLUS™"

I. NAME, BRAND, OR TRADEMARK
MARINE GREEN CLEAN PLUS™
Type of Product: Surface Washing Agent

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT
AGS Solutions, Inc.
5647 Nunn Street
Houston, TX 77087
Phone: (713) 645-4933
Fax: (713) 645-4903
E-mail: agssolutionsinc@gmail.com
Website: www.agstx.com
(Mrs. Linda Whiteley)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS
AGS Solutions, Inc.
5647 Nunn Street
Houston, TX 77087
Phone: (713) 645-4933
Fax: (713) 645-4903
E-mail: agssolutionsinc@gmail.com
Website: www.agstx.com
(Mrs. Linda Whiteley)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION
1. Flammability: Non-flammable
2. Ventilation: Respiratory protection is not considered necessary for normal use. If exposure to vapors or mists is possible, such as is a fire emergency, NIOSH approved respiratory protection for organic vapors should be used. Mechanical ventilation is not normally required.
3. Skin and eye contact; protective clothing; treatment in case of contact: In case of contact with eyes, wash thoroughly with plenty of clean water. Seek medical attention if irritation develops. Rubber protective gloves should be used if prolonged use of product is anticipated.
4.a. Maximum storage temperature: 100°F
4.b. Minimum storage temperature: 0°F
4.c. Optimum storage temperature range: 33°F to 100°F
4.d. Temperatures of phase separations and chemical changes: >100°F

V. SHELF LIFE

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Shelf life is ≥ 2 years. The product will not lose its effectiveness unless the temperatures is >140°F. Make sure bulk containers are properly vented. Drums and similar containers should be kept closed. Store in steel or plastic containers.

VI. RECOMMENDED APPLICATION PROCEDURES

1. Application Method: For general use, apply product by spray, mop, or with standard steam and pressure wash cleaning equipment. It can also be applied using a foam generator, or any convenient sprayer. Product can be used as is or by using heat and pressure or mechanical scrubbing. Rinse thoroughly with fresh water for a residue-free surface. In direct applications, foaming will be most effective as it will allow more contact time for the product to work. In a typical foam cleaning application operation the surface to be cleaned will be thoroughly covered with foam and allowed to stand for several minutes. The foam is rinsed away with clean water using a hot pressure of low pressure washer. Product can be applied with a variety of spraying or washing equipment, depending upon the type and scale of the shoreline or beach to be cleaned. For large areas such as beaches, the product can be sprayed from water trucks or other vehicles equipped with pumps, hoses, and nozzles to aerially deliver cleaner. On smaller oily surfaces, the product can be applied with hand sprayers or portable pumps may be used to spray directly onto oily surfaces. Dose rates may vary depending on type and amount of petroleum spilled, and other site conditions such as water, temperatures, and porosity of shoreline. Cold weather applications will require more contact time before initiating recovery. The treated product can be removed by several means including but not limited to: sorbent pads, oil skimmers, collection booms, use of vacuum trucks, berm collecting, drumming, frac tanks, or other appropriate containment and collection mechanism.

2. Concentration/Application Rate: For spills on shorelines and beaches, the product can be used undiluted up to 14% dilution with fresh water. After application, the product should be allowed to penetrate and dissolve the oily surface for up to 30 minutes, longer is preferable – if possible, to maximize contact time. For light cleaning, use up to 1:200 parts product to water. For heavy cleaning, use up to 1:14 parts product to water.

3. Conditions for Use: Product can be used in fresh or salt water, sand beaches, gravel, cobble, coarse sand and rocky shores, public beaches, and other sensitive or high impact sites.

VII. TOXICITY AND EFFECTIVENESS

a. Toxicity:

Material Tested	Species	LC50 (ppm)
MARINE GREEN CLEAN PLUS™	Menidia beryllina	28.00 96-hr
	Mysidopsis bahia	53.00 48-hr
No. 2 Fuel Oil	Menidia beryllina	18.00 96-hr
	Mysidopsis bahia	23.00 48-hr
MARINE GREEN CLEAN PLUS™	Menidia beryllina	30.00 96-hr
& No. 2 Fuel Oil (1:10)	Mysidopsis bahia	32.00 48-hr
Reference Toxicant (DSS)	Menidia beryllina	1.06 96-hr
	Mysidopsis bahia	0.97 48-hr

b. Effectiveness: NA

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VIII. MICROBIOLOGICAL ANALYSIS
NA

IX. PHYSICAL PROPERTIES
1. Flash Point: NA
2. Pour Point: 28°F
3. Viscosity: 80.2 cSt @ 25°C
4. Specific Gravity: 8.6 @70°F
5. pH: 11-12.5
6. Surface Active Agents: CONFIDENTIAL
7. Solvents: CONFIDENTIAL
8. Additives: CONFIDENTIAL
9. Solubility: Completely soluble

X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

Compound	Concentration (ppm)
Arsenic	0.827
Cadmium	0.025
Chromium	0.078
Copper	0.062
Lead	<0.025
Mercury	<0.013
Nickel	0.220
Zinc	1.990
Cyanide	<0.02
Chlorinated Hydrocarbons	ND

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TECHNICAL PRODUCT BULLETIN #SW-44USEPA, OEM REGULATIONS IMPLEMENTATION DIVISION
ORIGINAL LISTING DATE: AUGUST 5, 2010
"CLEAN GREEN"
(aka, CLEANGREEN® PLANET WASH)

I. NAME, BRAND, OR TRADEMARK
CLEAN GREEN
(aka, CLEANGREEN® PLANET WASH)
Type of Product: Surface Washing Agent

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT
U.S. AG, LLC
P.O. Box 368
Luthersville, GA 30251
Phone: (770) 927-3206
Fax: (770) 927-3968
E-mail: unitedstatesag@yahoo.com
Website: www.unitedstatesag.org
(Mr. Carl Schneider)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS
U.S. AG, LLC
56 N Main
Luthersville, GA 30251
Phone: (770) 927-3206
Fax: (770) 927-3968
E-mail: unitedstatesag@yahoo.com
Website: www.unitedstatesag.org
(Mr. Carl Schneider)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION
1. Flammability: Non-flammable (DOT: Non-hazardous)
2. Ventilation: No special requirements.
3. Skin and eye contact; protective clothing; treatment in case of contact: No special equipment or clothing required, however, goggles are recommended. If eye or skin irritation occurs, flush with plenty of fresh water.
4.a. Maximum storage temperature: 120°F continuous, 140°F up to 5 days
4.b. Minimum storage temperature: 35°F
4.c. Optimum storage temperature range: 40°F to 120°F
4.d. Temperatures of phase separations and chemical changes: Stable

V. SHELF LIFE
5 years in sealed polydrums or totes (as delivered).

VI. RECOMMENDED APPLICATION PROCEDURES

1. Application Method: Product may be applied to any oil coated surface, such as beaches, equipment, rocks, etc. A variety of pumps or sprayers may be used for direct application to contaminates, back-pack, drum pumps, pick-up sprayers, etc.
2. Concentration/Application Rate: Where ever higher oil concentrations occur use approximately a 1:10 dilution ratio (product:water). Lightly soiled areas will require a 1:10 to 1:30 ratio.
3. Conditions for Use: Residue from surface washing should be collected and disposed of according to local, state, and federal regulations. The collection of residue can be determined on a site by site basis based on best practices of the area.

VII. TOXICITY AND EFFECTIVENESS

a. Toxicity:

Material Tested	Species	LC50 (ppm)
CLEAN GREEN	Menidia beryllina	136.10 96-hr
	Mysidopsis bahia	70.70 48-hr
No. 2 Fuel Oil	Menidia beryllina	3.35 96-hr
	Mysidopsis bahia	2.24 48-hr
CLEAN GREEN &	Menidia beryllina	4.73 96-hr
No. 2 Fuel Oil (1:10)	Mysidopsis bahia	2.24 48-hr
Reference Toxicant (SLS)	Menidia beryllina	12.25 96-hr
	Mysidopsis bahia	10.53 48-hr

b. Effectiveness: NA

VIII. MICROBIOLOGICAL ANALYSIS

NA

IX. PHYSICAL PROPERTIES

1. Flash Point: >93°C
2. Pour Point: +25°F
3. Viscosity: 3.72 @40°C
4. Specific Gravity: 1.0691 @70°F
5. pH: 9.9
6. Surface Active Agents: CONFIDENTIAL
7. Solvents: CONFIDENTIAL
8. Additives: CONFIDENTIAL
9. Solubility: Miscible in oil, water, and solvents

X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

Compound	Concentration (ppm)
Arsenic	0.0265
Cadmium	<0.005

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Chromium	0.0985
Copper	<0.0150
Lead	<0.0100
Mercury	0.0005
Nickel	<0.0250
Zinc	0.2455
Cyanide	<0.300
Chlorinated Hydrocarbons	<5.0

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EPA HAS NOT RECEIVED UPDATED CONTACT INFORMATION FOR THIS PRODUCT: 11/19/14

TECHNICAL PRODUCT BULLETIN #SW-45
USEPA, OEM REGULATIONS IMPLEMENTATION DIVISION
ORIGINAL LISTING DATE: AUGUST 5, 2010
"SOC-10"

I. NAME, BRAND, OR TRADEMARK
SOC 10 (SURFACE OIL CLEANER)
Type of Product: Surface Washing Agent

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT
Oil Treatment International AG
Seestrasse 5
CH-6300 Zug
Switzerland
Phone: 01141-41-727-2100
Fax: 01141-41-727-2109
(Mr. Paul Schuler, CEO)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS
Eco-Oil Treatment Technologies Corporation
18 Poppy Hills
Laguna Niguel, CA 92677
Phone: (949) 903-40336 (24-Hour)
E-mail: EcoOilTreatment@gmail.com
(Mr. William Azzalino)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION
1. Flammability: Non-flammable (water based)
2. Ventilation: No special requirements.
3. Skin and eye contact; protective clothing; treatment in case of contact: In case of eye contact, flush with water. In case of skin contact, wash with water. If swallowed, drink water to dilute and induce vomiting.
4.a. Maximum storage temperature: 60°C
4.b. Minimum storage temperature: 0°C
4.c. Optimum storage temperature range: 10°C to 30°C
4.d. Temperatures of phase separations and chemical changes: 85°C

V. SHELF LIFE
2 years or more if stored correctly in plastic drums and at recommended temperatures.

VI. RECOMMENDED APPLICATION PROCEDURES

1. Application Method: Product may be applied by manual or mechanical means including but not limited to: hand operated spraying flask, spraying equipment and jet spraying equipment. Application mixture, once applied, should be washed with water or any suitable type for desired end result after about 3 minutes. Application mixture can be applied without further action or may be scrubbed, rubbed, or abraded as desired until diluted hydrocarbons have been removed from soil, sand, or rocks.

2. Concentration/Application Rate: Product should be applied at a 1:12 product to water ratio: 1:12 (1 oz of SOC 10 concentrated:11 oz water or 1 ml SOC 10 concentrated to 11 ml water).

3. Conditions for Use: Product may be used in fresh, river, brackish, or salt water of any temperature above 35°F. Optimum temperature for normal contamination is 25°C for heavy or aged oil. Product is suitable for use on crude oils and petroleum products that retain the majority of their VOCs including oil slicks, oil sheens, oil emulsions, and oil spills. It is not suitable for use on tar balls or other tar masses, or tar sands. For in-situ washing of sands, soils, and vegetation, a lined recovery trench may be built down slope to recover any residue. As washing occurs, pump residue from trench and dispose according to federal, state, and local regulations.

VII. TOXICITY AND EFFECTIVENESS

a. Toxicity:

Material Tested	Species	LC50 (ppm)
SOC 10	Menidia beryllina	20,007 96-hr
	Mysidopsis bahia	9,639 48-hr
No. 2 Fuel Oil	Menidia beryllina	3.76 96-hr
	Mysidopsis bahia	2.04 48-hr
SOC 10 &	Menidia beryllina	6.31 96-hr
No. 2 Fuel Oil (1:10)	Mysidopsis bahia	2.24 48-hr
Reference Toxicant (SLS)	Menidia beryllina	12.19 96-hr
	Mysidopsis bahia	10.53 48-hr

b. Effectiveness: NA

VIII. MICROBIOLOGICAL ANALYSIS

NA

IX. PHYSICAL PROPERTIES

1. Flash Point: 122°F
2. Pour Point: 29°F
3. Viscosity: 1.261 cps @40°C
4. Specific Gravity: 0.9970 g/cc @60°F
5. pH: 7.3
6. Surface Active Agents: CONFIDENTIAL
7. Solvents: None
8. Additives: None
9. Solubility: Completely water soluble

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X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

Compound	Concentration (ppm)
Arsenic	<0.050
Cadmium	<0.035
Chromium	<0.025
Copper	<0.050
Lead	<0.060
Mercury	0.0005
Nickel	<0.050
Zinc	0.052
Cyanide	<0.150
Chlorinated Hydrocarbons	<1.0

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TECHNICAL PRODUCT BULLETIN #SW-46
USEPA, OEM REGULATIONS IMPLEMENTATION DIVISION
ORIGINAL LISTING DATE: AUGUST 17, 2010
"BIOGRASS® EXTRA"

I. NAME, BRAND, OR TRADEMARK
BIOGRASS® EXTRA
Type of Product: Surface Washing Agent

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT
bioGRASS EXTRA MEXICANA S.A. de C.V.
Transvina y Retes 6103-2
Col. Panamericana
Chihuahua City, Chihuahua, Mexico C.P. 31210
Phone: (614) 413-3011
E-mail: pedro.murillo@biograssextra.com
Website: www.biograssextra.com
(Sr. Pedro Murillo)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS
Sun Equipment and Construction Co.
8855 Viscount Boulevard
PMB 249, Suite D
El Paso, TX 79925
E-mail: pedro.murillo@biograssextra.com
(Sr. Pedro Murillo, Director)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION
1. Flammability: Non-flammable (DOT: Non-hazardous).
2. Ventilation: No special requirements.
3. Skin and eye contact; protective clothing; treatment in case of contact: No special equipment or clothing required, however goggles are recommended. In case of eye irritation, flush with plenty of fresh water.
4.a. Maximum storage temperature: 120°F continuous, 140°F up to 5 days
4.b. Minimum storage temperature: 35°F
4.c. Optimum storage temperature range: 40°F to 120°F
4.d. Temperatures of phase separations and chemical changes: Mix well before use if outside the 60-85°F range.

V. SHELF LIFE
Two years minimum.

VI. RECOMMENDED APPLICATION PROCEDURES
Recommended application procedures depending on concentration of contaminants, water

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salinity levels, water temperature, and the type and age of the contaminant.

There are two means of application: power spraying or direct application.
a. Application via power spraying: Use of a power washer to spray the contaminated surface. The action may be improved by warming the product during use.
b. Application via direct application: Remove contaminated soil, sand, etc. into a container. Irrigate the affected ground with the product and let it soak in. Agitate the mixture of water/product/ground and add additional water to float the contaminant off of the surface. A layer of product-contaminant will form which may be physically separated from the soil. The oil in this layer may be separated by dehydration or pumping to prepare the contaminant for disposal or reclamation. The clean soil or sand may be returned to its original environment.

The residue should be removed and disposed of as required by local, state, or federal regulations. The on-site coordinator can determine the best way to recover the residue based on the spill type, surface, and environment of the area.

Concentrations: The concentration of the BIOGRASS® EXTRA product to be used depends on the density of the contaminant. Normally the product is used in a one-to-one proportion with the contaminant.

VII. TOXICITY AND EFFECTIVENESS
a. Toxicity:

Material Tested	Species	LC50 (ppm)
BIOGRASS® EXTRA	Menidia beryllina	548.66 96-hr
	Mysidopsis bahia	703.43 48-hr
No. 2 Fuel Oil	Menidia beryllina	2.51 96-hr
	Mysidopsis bahia	2.24 48-hr
BIOGRASS® EXTRA &	Menidia beryllina	2.54 96-hr
No. 2 Fuel Oil (1:10)	Mysidopsis bahia	2.24 48-hr
Reference Toxicant (SLS)	Menidia beryllina	12.25 96-hr
	Mysidopsis bahia	11.71 48-hr

b. Effectiveness:
NA

VIII. MICROBIOLOGICAL ANALYSIS
NA

IX. PHYSICAL PROPERTIES
1. Flash Point: >93°C
2. Pour Point: 21.0°F
3. Viscosity: 1.37 cSt @40°C
4. Specific Gravity: 1.0253 @60°F
5. pH: 7.1
6. Surface Active Agents: Anionic and nonionic, proprietary, surfactants

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7. Solvents: Water
8. Additives: Sodium phosphate dibasic, sodium chloride
9. Solubility: Miscible in water and some solvents

X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

Compound	Concentration (ppm)
Arsenic	0.0702
Cadmium	0.0024
Chromium	0.0174
Copper	0.0158
Lead	0.0086
Mercury	<0.001
Nickel	0.0580
Zinc	0.3092
Cyanide	<0.010
Chlorinated Hydrocarbons	<1.0

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TECHNICAL PRODUCT BULLETIN #SW-47
USEPA, OEM REGULATIONS IMPLEMENTATION DIVISION
ORIGINAL LISTING DATE: AUGUST 25, 2010
"ENVIRONMENTAL 1 CRUDE OIL CLEANER"

I. NAME, BRAND, OR TRADEMARK
ENVIRONMENTAL 1 CRUDE OIL CLEANER
(aka, ENVIRONMENTAL 1 WASHING AGENT)
Type of Product: Surface Washing Agent

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT
Environmental 1, LLC
P.O. Box 9
Jackson, TN 38302
Phone: (615) 269-0506
Fax: (615) 269-0025
E-mail: info@environmental-one.com
E-mail: mfb@environmental-one.com
Website: www.environmental-one.com
(Ms. Mary Frances Blankenship, President)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS
Environmental 1, LLC
P.O. Box 9
Jackson, TN 38302
Phone: (615) 269-0506
Fax: (615) 269-0025
E-mail: info@environmental-one.com
E-mail: mfb@environmental-one.com
Website: www.environmental-one.com
(Ms. Mary Frances Blankenship, President)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION
1. Flammability: Non-flammable, no hazards or restrictions
2. Ventilation: No special requirements.
3. Skin and eye contact; protective clothing; treatment in case of contact: No special equipment or clothing required, however goggles are recommended if used with a pressure washer. If eye or skin irritation occurs, flush with plenty of fresh water.
4.a. Maximum storage temperature: 140°F
4.b. Minimum storage temperature: 35°F
4.c. Optimum storage temperature range: 40°F to 120°F
4.d. Temperatures of phase separations and chemical changes: Stable

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V. SHELF LIFE
Unlimited in sealed polydrums or totes (as delivered).

VI. RECOMMENDED APPLICATION PROCEDURES
ENVIRONMENTAL 1 CRUDE OIL CLEANER cleans oil from solid surfaces such as beaches, rocks, machines, buildings, tools, and other hard surfaces.

1. Spray ENVIRONMENTAL 1 CRUDE OIL CLEANER on oil surface to be cleaned with a drum pump sprayer or for smaller jobs use a hand pump sprayer.
2. On areas of heavy oil accumulation use product directly on the spill, or for areas of lighter accumulation use a 1:10 to 1:30 dilution ratio (product:water).
3. The oil and cleaner form a loose emulsion that can be rinsed away. Oil displaced from hard surfaces can be skimmed from the rinse water, absorbed with an oil absorbent, or removed via commercial waste removal.
4. May be used with fresh or salt water in normal climatic temperatures.

VII. TOXICITY AND EFFECTIVENESS
a. Toxicity:

Material Tested	Species	LC50 (ppm)
ENVIRONMENTAL 1 CRUDE	Menidia beryllina	22.68 96-hr
OIL CLEANER	Mysidopsis bahia	16.27 48-hr
No. 2 Fuel Oil	Menidia beryllina	2.24 96-hr
	Mysidopsis bahia	0.99 48-hr
ENVIRONMENTAL 1 CRUDE	Menidia beryllina	2.19 96-hr
OIL CLEANER & No. 2 Fuel Oil (1:10)	Mysidopsis bahia	0.43 48-hr
Reference Toxicant (SLS)	Menidia beryllina	12.25 96-hr
	Mysidopsis bahia	11.71 48-hr

b. Effectiveness:
NA

VIII. MICROBIOLOGICAL ANALYSIS
NA

IX. PHYSICAL PROPERTIES
1. Flash Point: >93°C
2. Pour Point: +26.0°F
3. Viscosity: 3.34 cSt @ 40°C
4. Specific Gravity: 1.01 @ 15°C
5. pH: 6.2
6. Surface Active Agents: Anionic, nonionic, zwitterionic surfactants
7. Solvents: None
8. Additives: Preservative
9. Solubility: Miscible in oil, water, and solvents

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X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

Compound	Concentration (ppm)
Arsenic	0.0021
Cadmium	<0.0010
Chromium	<0.0030
Copper	<0.0030
Lead	<0.0020
Mercury	<0.0005
Nickel	<0.0050
Zinc	<0.0030
Cyanide	<0.010
Chlorinated Hydrocarbons	<5.00

ED_001324_00005599-00183

TECHNICAL PRODUCT BULLETIN #SW-48
USEPA, OEM REGULATIONS IMPLEMENTATION DIVISION
ORIGINAL LISTING DATE: OCTOBER 4, 2010
"SANDKLENE 950"

I. NAME, BRAND, OR TRADEMARK
SANDKLENE 950
Type of Product: Surface Washing Agent

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT
MDEChem, Inc.
923 10th Street PMB 101
Floresville, TX 78114
Phone: (830) 393-5293
E-mail: corporateoffice@mdechem.com
Website: www.mdechem.com
(Mr. Paul Sack)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS

Imperial Petroleum, Inc.
101 NW 1st Street #213
Evansville, IN 47708
Phone: (812) 867-1433
Email: Jwilsonx1@aol.com
(Mr. Jeff Wilson)

Mailing Address:
Imperial Petroleum, Inc.
P.O. Box 1006
Evansville, IN 47706
(Mr. Jeff Wilson)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION
1. Flammability: Non-flammable (DOT: Non-hazardous)
2. Ventilation: Normal
3. Skin and eye contact; protective clothing; treatment in case of contact: Wear chemically impervious gloves. No other special equipment or clothing is required; however, goggles are recommended. If eye or skin irritation occurs, flush with plenty of water.
4.a. Maximum storage temperature: 120°F continuous, 140°F up to 5 days
4.b. Minimum storage temperature: 35°F
4.c. Optimum storage temperature range: 40°F to 120°F
4.d. Temperatures of phase separations and chemical changes: Stable

V. SHELF LIFE
Unlimited in sealed drums or totes (as delivered).

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VI. RECOMMENDED APPLICATION PROCEDURES1. Application Method: SANDKLENE 950 is most effective in enclosed systems using centrifuges, shearing devices, or similar high speed equipment to process material. Under these conditions, SANDKLENE 950 and water are recycled continuously. In smaller applications on solid surfaces, SANDKLENE 950 may be applied with sprayers using water diluted product directly onto solid oil coated surfaces.
2. Concentration/Application Rate: Oil contaminated sands are placed in an enclosed chamber with a solution of SANDKLENE 950 and water. The concentration of SANDKLENE 950 in water ranges from about 0.15% to about 1.0%. The total volume of solution is 350 gallons per 3 cubic yards of contaminated sand. The mixture is agitated at an elevated temperature in the range of 100°F to 150°F. The actual treatment rate will vary within the recommended range, depending upon the nature of sand, the nature of the oil, and the percentage of oil content.
3. Conditions for Use: The water and oil parts are separated from the sand. The water part is continuously recycled, the oil is recovered, and the sand can be disposed according to federal, state, and local regulations. Dose rates and SANDKLENE 950 concentrations will vary with the type and amount of petroleum present, the extent of weathering, and other site specific conditions, including temperature and time available to let the solution contact the oil.

VII. TOXICITY AND EFFECTIVENESS
a. Toxicity:

Material Tested	Species	LC50 (ppm)
SANDKLENE 950	Menidia beryllina	1768.73 96-hr
	Mysidopsis bahia	1263.78 48-hr
No. 2 Fuel Oil	Menidia beryllina	8.95 96-hr
	Mysidopsis bahia	2.41 48-hr
SANDKLENE 950&	Menidia beryllina	4.48 96-hr
No. 2 Fuel Oil (1:10)	Mysidopsis bahia	2.24 48-hr
Reference Toxicant (DLS)	Menidia beryllina	12.25 96-hr
	Mysidopsis bahia	11.71 48-hr

b. Effectiveness: NA

VIII. MICROBIOLOGICAL ANALYSIS
NA

IX. PHYSICAL PROPERTIES
1. Flash Point: >93°C
2. Pour Point: +10°F
3. Viscosity: 3.69 cSt @ 40°C
4. Specific Gravity: 1.2806 @60°F
5. pH: 9.4
6. Surface Active Agents: None
7. Solvents: None
8. Additives: None
9. Solubility: Completely soluble

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X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

Compound	Concentration (ppm)
Arsenic	<0.540
Cadmium	<0.209
Chromium	1.100
Copper	<0.205
Lead	<0.494
Mercury	0.0009
Nickel	<0.274
Zinc	<0.204
Cyanide	<1.150
Chlorinated Hydrocarbons	<0.100

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TECHNICAL PRODUCT BULLETIN #SW-49USEPA, OEM REGULATIONS IMPLEMENTATION DIVISION
ORIGINAL LISTING DATE: NOVEMBER 10, 2010
"DE-SOLV-IT CLEAN AWAY APC SUPER CONCENTRATE"

I. NAME, BRAND, OR TRADEMARK
DE-SOLV-IT CLEAN AWAY APC SUPER CONCENTRATE
Type of Product: Surface Washing Agent

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT
Orange-Sol Blending and Packaging
1400 N Fiesta Boulevard
Gilbert, AZ 85233
Phone: (800) 877-7771
Fax: (480) 497-0444
E-mail: amf@orange-sol.com
Website: www.orange-sol.com
(Mr. Albert Farnsworth or
Mr. Jack Farnsworth at (480) 319-0141)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS
Bell Tech
Master Distributor
P.O. Box 2198
Valdez, AK 99686
Phone: (907) 602-0111
Fax: (907) 835-4535
E-mail: bellenterprise@cvinternet.net
(Mr. Randy Bell)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION
1. Flammability: Non-combustible
2. Ventilation: No special requirements
3. Skin and eye contact; protective clothing; treatment in case of contact: No special equipment of clothing required; however, goggles are recommended where splash is potential. If eye or skin irritation occurs, flush with ample fresh water.
4.a. Maximum storage temperature: 210°F
4.b. Minimum storage temperature: 34°F
4.c. Optimum storage temperature range: 55°F to 90°F
4.d. Temperatures of phase separations and chemical changes: There are no known phase separations, chemical changes, or other altercations that will change the effectiveness of the product.

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V. SHELF LIFE
Two (2) years in sealed drums or totes (as delivered).

VI. RECOMMENDED APPLICATION PROCEDURES
1. Application Method: DE-SOLV-IT CLEAN AWAY APC SUPER CONCENTRATE can be used on all oil coated surfaces including sand and rocks through a detergency mechanism. Product should be used with handheld sprayers or for larger applications applied with truck mounted sprayers. Remove contamination with DE-SOLV-IT CLEAN AWAY APC SUPER CONCENTRATE, followed by a rinse.
2. Concentration/Application Rate: For oil spill removal and heavy duty cleaning, dilute product with water using a 1:1 ratio.
3. Conditions for Use: DE-SOLV-IT CLEAN AWAY APC SUPER CONCENTRATE can be used in salt or fresh water, with no limitations as to usage within the optimum temperature parameters (application may be made at or above 35°F, with optimum above 48°F). Cleaning of oil soaked areas should be done in a contained area and residue should be collected. For sand or vegetation cleaning, a berm may be constructed down slope that will collect the residue for disposal. All disposal residues should be done according to federal, state, and local regulations. In general, the technique used for collection of the oil/soap residue should be determined by the onsite contractor based on the environment of the area to be cleaned and the equipment and materials available for collection. Cleanup residue should be collected and disposed of in accordance with local, state, and federal regulations.

VII. TOXICITY AND EFFECTIVENESS
a. Toxicity:

Material Tested	Species	LC50 (ppm)
DE-SOLV-IT CLEAN AWAY	Menidia beryllina	20.95 96-hr
APC SUPER CONCENTRATE	Mysidopsis bahia	30.95 48-hr
No. 2 Fuel Oil	Menidia beryllina	4.07 96-hr
	Mysidopsis bahia	0.86 48-hr
DE-SOLV-IT CLEAN AWAY	Menidia beryllina	6.42 96-hr
APC SUPER CONCENTRATE &	Mysidopsis bahia	0.69 48-hr
No. 2 Fuel Oil (1:10)		
Reference Toxicant (SLS)	Menidia beryllina	12.04 96-hr
	Mysidopsis bahia	8.19 48-hr

b. Effectiveness: NA

VIII. MICROBIOLOGICAL ANALYSIS
NA

IX. PHYSICAL PROPERTIES
1. Flash Point: >93°C
2. Pour Point: +20°F
3. Viscosity: 3.1 cSt @ 40°C
4. Specific Gravity: 1.024 @60°F

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5. pH: 9.03
6. Surface Active Agents: PROPRIETARY
7. Solvents: PROPRIETARY
8. Additives: Yes
9. Solubility: 100 percent

X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

Compound	Concentration (ppm)
Arsenic	<1.0
Cadmium	<0.5
Chromium	<0.5
Copper	<2.0
Lead	<1.0
Mercury	<0.005
Nickel	<1.0
Zinc	<2.5
Cyanide	0.08
Chlorinated Hydrocarbons	<0.05

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TECHNICAL PRODUCT BULLETIN #SW-50
USEPA, OEM REGULATIONS IMPLEMENTATION DIVISION
ORIGINAL LISTING DATE: NOVEMBER 17, 2010
"EO ALL PURPOSE SOAP-LAVENDER"

I. NAME, BRAND, OR TRADEMARK
EO ALL PURPOSE SOAP-LAVENDER
Type of Product: Surface Washing Agent

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT
EO Products/Small World Trading Company
90 Windward Way
San Rafael, CA 94901
Phone: (415) 945-1900
Fax: (415) 945-7117
E-mail: patrick@eoproducts.com or michael@eoproducts.com
Website: www.eoproducts.com
(Mr. Patrick Butler or Mr. Michael Cronin)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS

UNFI East/Select Nutrition
P.O. Box 567
Keene, NH 03431
Phone: (603) 256-3000
(Ms. Missy Lamonreux)

UNFI West
1101 Sunset Boulevard
Rocklin, CA 95765
Phone: (916) 625-4100
(Ms. Kari Cluk)

Threshold
23 Janis Way
Scotts Valley, CA 95066
Phone: (800) 777-5677
(Ms. Linda Sims)

Lotus Light
P.O. Box 1008
Scotts Valley, CA 95066
(Ms. Kate Lill)

Sales Outlet:
Whole Foods Austin
601 N Lamar Boulevard, Suite 200
Austin, TX 78703
Phone: (512) 476-1206
(Mr. Jeremiah McElwee)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION
1. Flammability: Non-flammable (DOT: Non-hazardous)
2. Ventilation: Normal
3. Skin and eye contact; protective clothing; treatment in case of contact: Rinse thoroughly after use. Avoid eye contact. In case of such contact, immediately flush with large amounts of cool water for at least 15 minutes. Consult a physician if irritation develops. Protective gloves are recommended for extended or prolonged contact (e.g., immersing hands). Wear safety glasses if

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the method of use presents the likelihood of eye contact. Do not ingest. In case of ingestion, consult a physician.
4.a. Maximum storage temperature: 45°C
4.b. Minimum storage temperature: 4°C
4.c. Optimum storage temperature range: 22°C to 30°C
4.d. Temperatures of phase separations and chemical changes: Phase separation may occur at <15°C (but will restore to original condition at optimum temperature).

V. SHELF LIFE
Three (3) years (as delivered).

VI. RECOMMENDED APPLICATION PROCEDURES
1. Application Method: EO ALL PURPOSE SOAP may be applied by pouring, spraying (when diluted 1:4), dispensing equipment, or by scrubbing machines.
2. Concentration/Application Rate: Apply EO ALL PURPOSE SOAP full strength (undiluted) to surface area by pouring or with dispensing equipment concentrating on areas with heaviest contamination first. Apply diluted (1:4 dilution rate) EO ALL PURPOSE SOAP with sprayer. Agitate and scrub well. Rinse thoroughly. For heavily contaminated surfaces, EO ALL PURPOSE SOAP should always be used full strength (undiluted). For average to light contamination, EO ALL PURPOSE SOAP may be diluted from 2x-10x with water.
3. Conditions for Use: During cleaning, contain the oil soaked area and collect residue. For sand and vegetation cleaning, a berm may be constructed down slope that will collect the residue for disposal. All disposal of residue should be done according to federal, state, and local regulations. In general, the technique used for the collection of the oil/soap residue should be determined by the on-site contractor based on the environment of the area to be cleaned, and equipment and materials available for collection.

VII. TOXICITY AND EFFECTIVENESS
a. Toxicity:

Material Tested	Species	LC50 (ppm)
EO ALL PURPOSE SOAP	Menidia beryllina	21.33 96-hr
	Mysidopsis bahia	83.65 48-hr
No. 2 Fuel Oil	Menidia beryllina	8.95 96-hr
	Mysidopsis bahia	2.41 48-hr
EO ALL PURPOSE SOAP &	Menidia beryllina	3.14 96-hr
No. 2 Fuel Oil (1:10)	Mysidopsis bahia	2.37 48-hr
Reference Toxicant (SLS)	Menidia beryllina	12.04 96-hr
	Mysidopsis bahia	8.19 48-hr

b. Effectiveness: NA

VIII. MICROBIOLOGICAL ANALYSIS
NA

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IX. PHYSICAL PROPERTIES1. Flash Point: >93°C
2. Pour Point: +24°F
3. Viscosity: 349.5 cSt @ 40°C
4. Specific Gravity: 1.0208 @60°F
5. pH: 5.88
6. Surface Active Agents: PROPRIETARY
7. Solvents: PROPRIETARY
8. Additives: PROPRIETARY
9. Solubility: Miscible in oil, water, and solvents

X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

Compound	Concentration (ppm)
Arsenic	<0.540
Cadmium	<0.209
Chromium	0.202
Copper	<0.205
Lead	<0.494
Mercury	<0.000388
Nickel	5.99
Zinc	<0.204
Cyanide	<1.15
Chlorinated Hydrocarbons	<2.0

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TECHNICAL PRODUCT BULLETIN #SW-51
USEPA, OEM REGULATIONS IMPLEMENTATION DIVISION
ORIGINAL LISTING DATE: DECEMBER 7, 2010
"DYNAMIC GREEN™"

I. NAME, BRAND, OR TRADEMARK
DYNAMIC GREEN™
Type of Product: Surface Washing Agent (Water-based)

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT
Wechem, Inc.
5734 Susitna Drive
Harahan, LA 70123
Phone: (800) 426-0512
Phone: (504) 733-1152
Fax: (504) 733-2218
E-mail: mwisecarver@wechem.com or okropog@wechem.com
Website: www.wechem.com
(Mr. Mike Wisecarver)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS
Wechem, Inc.
5734 Susitna Drive
Harahan, LA 70123
Phone: (800) 426-0512
Phone: (504) 733-1152
Fax: (504) 733-2218
E-mail: mwisecarver@wechem.com or okropog@wechem.com
Website: www.wechem.com
(Mr. Mike Wisecarver)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION
1. Flammability: Non-flammable (DOT: Non-hazardous)
2. Ventilation: Not required.
3. Skin and eye contact; protective clothing; treatment in case of contact: Wear protective gloves that are chemical resistant, rubber. In case of skin contact, wash with soap and water. If irritation develops seek medical attention. Wear safety glasses/goggles for eye protection. In case of eye contact flush with water for 15 minutes. If irritation develops seek medical attention.
4.a. Maximum storage temperature: 140°F
4.b. Minimum storage temperature: 34°F
4.c. Optimum storage temperature range: >50°F and <100°F
4.d. Temperatures of phase separations and chemical changes: <35°F and >100°F.

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V. SHELF LIFEDYNAMIC GREEN™ has a shelf life of 6-10 years in sealed poly drums or totes (as delivered).

VI. RECOMMENDED APPLICATION PROCEDURES

1. Application Method: Product may be applied to any surface for removal of oils. The product can be applied through power washers, garden type sprayers, fire pump or any other portable pump with seawater or freshwater suction that is equipped with a chemical inductor or feed pump. For smaller areas properly diluted DYNAMIC GREEN™ may be applied with sponge, mop, scrub brush or cloth. Apply liberally, adjusting dilution on site if necessary.
2. Concentration/Application Rate: For heavily weathered oil on rocks, a diluted solution of 4 parts water to 1 part product is recommended. For heavily weathered oil on beaches/sand a diluted solution of 7 parts water to 1 part product is effective. For removing oil from vegetation, a diluted solution of 10/20 parts water to 1 part product is preferred. Product is effective in fresh or salt water.
3. Conditions for Use: Allow diluted product to soak for 20-30 minutes to soften and lift oil from surface. Reapplication may be necessary for severely contaminated areas. Vacuum suction equipment and sorbent boom or pads should be used to collect the washed effluent. When proper containment equipment is in place and a soak time of 20 minutes has been achieved, a diluted solution of 20 parts water to 1 part product should be applied through a pressure washer or flushing device to remove oils. Product and oil should be vacuumed up or absorbed with absorbent boom and disposed of according to EPA guidelines.

VII. TOXICITY AND EFFECTIVENESS

a. Toxicity:

Material Tested	Species	LC50 (ppm)
DYNAMIC GREEN™	Menidia beryllina	106.00 96-hr
	Mysidopsis bahia	66.60 48-hr
No. 2 Fuel Oil	Menidia beryllina	13.00 96-hr
	Mysidopsis bahia	3.16 48-hr
EO ALL PURPOSE SOAP &	Menidia beryllina	6.85 96-hr
No. 2 Fuel Oil (1:10)	Mysidopsis bahia	3.30 48-hr
Reference Toxicant (SDS)	Menidia beryllina	2.67 96-hr
	Mysidopsis bahia	9.14 48-hr

b. Effectiveness: NA

VIII. MICROBIOLOGICAL ANALYSIS

NA

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IX. PHYSICAL PROPERTIES1. Flash Point: >200°F
2. Pour Point: -16°F
3. Viscosity: <10 cSt @ 78°F
4. Specific Gravity: 1.01 @77°F
5. pH: 7.5
6. Surface Active Agents: CONFIDENTIAL
7. Solvents: CONFIDENTIAL
8. Additives: CONFIDENTIAL
9. Solubility: Infinitely miscible

X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

Compound	Concentration (ppm)
Arsenic	<0.25
Cadmium	<0.25
Chromium	<0.25
Copper	<0.25
Lead	<0.25
Mercury	<2.00
Nickel	<0.25
Zinc	<0.25
Cyanide	<0.50
Chlorinated Hydrocarbons	ND

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TECHNICAL PRODUCT BULLETIN #SW-52USEPA, OEM REGULATIONS IMPLEMENTATION DIVISION
ORIGINAL LISTING DATE: DECEMBER 9, 2010
"VERU-SOLVE™ MARINE 200 HP"

I. NAME, BRAND, OR TRADEMARK
VERU-SOLVE™ MARINE 200 HP
Type of Product: Surface Washing Agent

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT
VeruTEK® Technologies
65 West Dudley Town Road, Suite 100
Bloomfield, CT 06002
Phone: (860) 242-9800
Fax: (860) 242-9899
E-mail: bmcavoy@verutek.com
Website: www.verutek.com
(Ms. Bethany McAvoy)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS
VeruTEK® Technologies
65 West Dudley Town Road, Suite 100
Bloomfield, CT 06002
Phone: (860) 242-9800
Fax: (860) 242-9899
E-mail: bmcavoy@verutek.com
Website: www.verutek.com
(Ms. Bethany McAvoy)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION
1. Flammability: Non-flammable (DOT: Non-hazardous)
2. Ventilation: Use in a well ventilated area.
3. Skin and eye contact; protective clothing; treatment in case of contact: Prevent eye contact, wear safety glasses or goggles. If eye contact occurs remove contact lenses at once. Flush with water for at least 15 minutes. If irritation persists seek medical attention. Prevent skin contact, nitrile gloves are recommended. Boots, aprons, or bodysuits should be worn as necessary. Contact with product may cause slight redness. Prolonged or repeated exposure may cause drying of skin. If skin contact occurs wash affected area with copious amounts of soap and water. Respiratory protection is not normally required. If adequate ventilation is unavailable use NIOSH approved air-purifying respirator with organic vapor cartridge or canister. The product is not likely toxic. If ingestion occurs DO NOT induce vomiting. Rinse mouth thoroughly with water. Offer water to drink. DO NOT administer anything by mouth to an unconscious person.
4.a. Maximum storage temperature: Should not exceed 110°F (43.3°C)
4.b. Minimum storage temperature: Above 41°F (5°C)

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4.c. Optimum storage temperature range: Between 41°F and 110°F (5°C to 43.3°C)
4.d. Temperatures of phase separations and chemical changes: Stable. There is no known temperature within the maximum and minimum storage temperature that would cause phase separation, chemical changes, or other known alterations to the effectiveness of the product.

V. SHELF LIFE
Indefinite, product will not degrade over time.

VI. RECOMMENDED APPLICATION PROCEDURES
1. Application Method: VERU-SOLVE™ MARINE 200 HP is an aqueous based liquid without solids that can be readily applied through standard spray equipment. VERU-SOLVE™ MARINE 200 HP is suited for treating oil shorelines, sensitive environments, and for treating access limited areas. VERU-SOLVE™ MARINE 200 HP may be applied directly to oil on shoreline, beaches, rocks, or marsh surfaces by agricultural or standard sprayers attached to all terrain vehicles (ATVs), or workboats equipped with spray booms. The preferred and most effective method of application is to use a low-volume, low-pressure pump.
2. Concentration/Application Rate: The product can be applied undiluted to the spilled oil. VERU-SOLVE™ MARINE 200 HP should be applied as droplets, not fogged or atomized. System Calibration – Spray systems should be calibrated to insure accurate application rates for successful application and dosage control.
3. Conditions for Use: VERU-SOLVE™ MARINE 200 HP is sprayed directly on oil coated materials; and can be used on fresh or aged oil or oil combinations. Application may be limited at sub-freezing temperatures (<31°F) without inclusion of antifreeze additives. VERU-SOLVE™ MARINE 200 HP can be applied at temperatures above freezing without notable changes in viscosity with increasing temperature. Application is not affected by increasing salinity. VERU-SOLVE™ MARINE 200 HP can be used at temperatures above freezing and at temperatures above 70°F. VERU-SOLVE™ MARINE 200 HP will separate the oil and water from the sand or soiled surface. Cleaning of oil soaked surfaces should be done in a contained area and residue should be collected. For sand or vegetation cleaning, a berm may be constructed down slope that will collect the residue for disposal. Oil that has separated from sand or vegetation may be recovered from the substrate and collected for disposal. All disposal of residue should be done in accordance with federal, state, and local regulations. In general, the technique used for the collection of the oil/product residue should be determined by the On-Scene Coordinator based on the environment of the area to be cleaned, equipment and materials available for collection, and disposal regulations.

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VII. TOXICITY AND EFFECTIVENESSa. Toxicity:

Material Tested	Species	LC50 (ppm)
VERU-SOLVE™ MARINE	Menidia beryllina	418.32 96-hr
200 HP	Mysidopsis bahia	76.98 48-hr
No. 2 Fuel Oil	Menidia beryllina	13.36 96-hr
	Mysidopsis bahia	1.94 48-hr
VERU-SOLVE™ MARINE	Menidia beryllina	10.67 96-hr
200 HP & No. 2 Fuel Oil (1:10)	Mysidopsis bahia	2.51 48-hr
Reference Toxicant (SLS)	Menidia beryllina	13.36 96-hr
	Mysidopsis bahia	12.08 48-hr

b. Effectiveness: NA

VIII. MICROBIOLOGICAL ANALYSIS
NA

IX. PHYSICAL PROPERTIES
1. Flash Point: >93°C
2. Pour Point: +18°F
3. Viscosity: 1.77391 cSt @ 40°C
4. Specific Gravity: 1.017 @60°F
5. pH: 7.01
6. Surface Active Agents: PROPRIETARY
7. Solvents: None
8. Additives: None
9. Solubility: Miscible in oil, water, and solvents

X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

Compound	Concentration (ppm)
Arsenic	0.0025
Cadmium	<0.0010
Chromium	0.0326
Copper	0.0093
Lead	<0.0020
Mercury	0.00109
Nickel	0.0077
Zinc	0.0165
Cyanide	<0.010
Chlorinated Hydrocarbons	<0.025

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TECHNICAL PRODUCT BULLETIN #SW-53
USEPA, OEM REGULATIONS IMPLEMENTATION DIVISION
ORIGINAL LISTING DATE: JANUARY 26, 2011
"NATURAMA G3 A-5"

I. NAME, BRAND, OR TRADEMARK
NATURAMA G3 A-5
Type of Product: Surface Washing Agent

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT

Green Life Development, Inc.
5316 W. Charleston Boulevard
Las Vegas, NV 89146
Phone: (702) 966-1284
Mobile: (702) 355-5102
Fax: (702) 448-6977
E-mail: david@greenlifedevelopment.com
Website: www.greenlifedevelopment.com
(Mr. David A. Levy)

Merlin-Tao Ltd.
65 Yigal Alon Street POB 91
Tel Aviv, Israel 67443
Phone: 972-3-562-8020
Fax: 972-3-562-8021
E-mail: asaf@merlin-tao.com
Website: www.merlin-tao.com
(Mr. Asaf Yaari, CEO)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS

Green Life Development, Inc.
5316 W. Charleston Boulevard
Las Vegas, NV 89146
Phone: (702) 966-1284
Mobile: (702) 355-5102
Fax: (702) 448-6977
E-mail: david@greenlifedevelopment.com
Website: www.greenlifedevelopment.com
(Mr. David A. Levy)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION

1. Flammability: Non-flammable (DOT: Non-hazardous)
2. Ventilation: No special requirements.
3. Skin and eye contact; protective clothing; treatment in case of contact: No special equipment or clothing is required; however, goggles are recommended. If eye or skin irritation occurs, flush with plenty of water.
4.a. Maximum storage temperature: 120°F continuous, 140°F up to 5 days
4.b. Minimum storage temperature: 35°F
4.c. Optimum storage temperature range: 40°F to 120°F
4.d. Temperatures of phase separations and chemical changes: Stable

V. SHELF LIFE

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NATURAMA G3 A-5 has unlimited shelf life in sealed poly drums.

VI. RECOMMENDED APPLICATION PROCEDURES

1. Application Method: Product may be applied by any method (e.g., drum pump, pressurized spray applicator, brush, or aqueous wash tank), depending on the surface; and type and viscosity of the oil/contamination to be treated.
2. Concentration/Application Rate: The dilution ratio depends on the amount and type of contamination to be removed. For light contamination areas a 1:6 dilution ratio (product to fresh/salt water) with a 2-3 minutes wait. For heavier/thick/burnt contamination, the exact ratio should be determined by the field coordinator but a general starting point of 20-25% should remove most contamination (grease, burnt oil, diesel, tar, etc.) after a contact time of 10-15 minutes before rinsing with water/steam.
3. Conditions for Use: Cleanup residue must be collected and should be disposed of in accordance with local, state, and federal regulations. Where possible, the product/oil mixture can be recovered and processed using an oil separator system or a stagnant tank. A circulating wash tank fitted with an oil separator or filter system extends the life of NATURAMA G3 A-5 by weeks, greatly impacting the waste reduction.

VII. TOXICITY AND EFFECTIVENESS

a. Toxicity:

Material Tested	Species	LC50 (ppm)
NATURAMA G3 A-5	Menidia beryllina	577.68 96-hr
	Mysidopsis bahia	482.97 48-hr
No. 2 Fuel Oil	Menidia beryllina	2.39 96-hr
	Mysidopsis bahia	0.32 48-hr
NATURAMA G3 A-5 &	Menidia beryllina	3.68 96-hr
No. 2 Fuel Oil (1:10)	Mysidopsis bahia	2.24 48-hr
Reference Toxicant (SLS)	Menidia beryllina	12.25 96-hr
	Mysidopsis bahia	12.08 48-hr

b. Effectiveness: NA

VIII. MICROBIOLOGICAL ANALYSIS

NA

IX. PHYSICAL PROPERTIES

1. Flash Point: >93°C
2. Pour Point: +28°F
3. Viscosity: 1.3628 cSt @ 40°C
4. Specific Gravity: 1.006 @60°F
5. pH: 8.39
6. Surface Active Agents: PROPRIETARY
7. Solvents: PROPRIETARY
8. Additives: None
9. Solubility: Miscible in oil, water, and solvents

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X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

Compound	Concentration (ppm)
Arsenic	0.0092
Cadmium	<0.002
Chromium	0.0262
Copper	<0.006
Lead	0.0062
Mercury	0.0005
Nickel	<0.01
Zinc	<0.0166
Cyanide	0.014
Chlorinated Hydrocarbons	<26.30

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TECHNICAL PRODUCT BULLETIN #SW-54
USEPA, OEM REGULATIONS IMPLEMENTATION DIVISION
ORIGINAL LISTING DATE: FEBRUARY 25, 2011
"SAFE KLEEN"

I. NAME, BRAND, OR TRADEMARK
SAFE KLEEN
Type of Product: Surface Washing Agent

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT
Anti Slip Solutions Ltd
Bridge House
Severn Bridge
Riverside North, Bewdley, Worcestershire, DY12 1AB, UK
Phone: 44(0)1299-406-011
Fax: 44(0)1299-406-023
E-mail: info@safe-grip.co.uk
(Mr. Dan Bayliss)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS
V4 Distributing
507 West Bird Avenue
Nampa, ID 83686
Phone: (208) 571-8596
E-mail: info@v4distributing.com
(Mr. Todd Vitek)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION
1. Flammability: IMO Non-flammable (DOT: Non-hazardous)
2. Ventilation: Provide adequate ventilation.
3. Skin and eye contact; protective clothing; treatment in case of contact: Chemical eye goggles should be worn. In case of contact with eyes, rinse immediately with plenty of clean water for at least 15 minutes and seek medical advice. PVC or rubber gloves are recommended. Use protective clothing. Remove contaminated clothing and wash with soap and water.
4.a. Maximum storage temperature: 130°F
4.b. Minimum storage temperature: 40°F
4.c. Optimum storage temperature range: >40°F to <130°F
4.d. Temperatures of phase separations and chemical changes: Stable

V. SHELF LIFE
Five years if stored in tightly closed containers under dry conditions within temperature range.

VI. RECOMMENDED APPLICATION PROCEDURES
1. Application Method: For general use apply the product by spray, brush, mop, or standard

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pressure washing equipment.
2. Concentration/Application Rate: SAFE KLEEN is a concentrated liquid that can be used either as supplied or diluted with hot or cold, fresh or salt water. For small spills dilute 1:3 (product to water) and apply as described. For larger spills prepare a solution of SAFE KLEEN diluted with 50 percent water and apply as described. Concentrations may be adjusted to take account of temperatures, types and age of oil/contaminant and other local site conditions. Surface contact time will also be dependent on temperature. For low temperatures and conditions of heavy contamination extend the contact time, where possible agitation of the product during application time will assist the efficiency of the cleaning. Thoroughly rinse with water.
3. Conditions for Use: Response personnel can determine the best method to collect residue, which can include, but is not limited to, oil skimmers, collecting booms, vacuum equipment, absorbent materials, and other appropriate containment and collecting mechanisms. The cleanup residue should be collected and disposed of in accordance with local, state, and federal regulations.

VII. TOXICITY AND EFFECTIVENESS
a. Toxicity:

Materials Tested	Species	LC50 (ppm)	
SAFE KLEEN	Menidia beryllina	170.00	96-hr
	Mysidopsis bahia	258.00	48-hr
No. 2 Fuel Oil	Menidia beryllina	3.30	96-hr
	Mysidopsis bahia	6.20	48-hr
SAFE KLEEN &	Menidia beryllina	2.60	96-hr
No. 2 Fuel Oil (1:10)	Mysidopsis bahia	6.50	48-hr
Reference Toxicant (SDS)	Menidia beryllina	7.60	96-hr
	Mysidopsis bahia	16.90	48-hr

b. Effectiveness: NA

VIII. MICROBIOLOGICAL ANALYSIS
NA

IX. PHYSICAL PROPERTIES
1. Flash Point: NA; water-based product
2. Pour Point: NA; water-based product
3. Viscosity: 2.33 cSt @ 40°C
4. Specific Gravity: 1.060 @68°F
5. pH: 11.5-13.0
6. Surface Active Agents: PROPRIETARY
7. Solvents: None
8. Additives: PROPRIETARY
9. Solubility: Totally soluble

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X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

Compound	Concentration (ppm)
Arsenic	<0.31
Cadmium	<0.16
Chromium	<0.16
Copper	<0.16
Lead	<0.16
Mercury	<0.025
Nickel	<0.16
Zinc	<0.16
Cyanide	ND
Chlorinated Hydrocarbons	ND

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TECHNICAL PRODUCT BULLETIN #SW-55
USEPA, OEM REGULATIONS IMPLEMENTATION DIVISION
ORIGINAL LISTING DATE: FEBRUARY 25, 2011
"CORIBA 700 SR"
(aka, CORIBA 700 ER, CORIBA 700 OS)

I. NAME, BRAND, OR TRADEMARK
CORIBA 700 SR
(aka, CORIBA 700 ER, CORIBA 700 OS)
Type of Product: Surface Washing Agent

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT
Coriba Technologies, LLC
5708 Cadron Creek
North Little Rock, AR 72116
Phone: (501) 834-2972
E-mail: ronrios@bellsouth.net
(Mr. Harvey G. Cobb)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS
MLU Services
573 Hawthorne Avenue
Athens, GA 30606
Phone: (706) 569-7300
Fax: (706) 425-0300
(Mr. Billy Ulm)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION
1. Flammability: Non-flammable
2. Ventilation: Normal (contains ammonia)
3. Skin and eye contact; protective clothing; treatment in case of contact: Avoid eye contact due to possible mild eye irritation. In case of eye contact, flush eyes with water for at least 15 minutes. In the case of skin contact, flush with water for at least 15 minutes. If irritation occurs and persists, obtain medical attention. Protective clothing is not normally required.
4.a. Maximum storage temperature: 100°F
4.b. Minimum storage temperature: 33°F
4.c. Optimum storage temperature range: 33°F - 100°F
4.d. Temperatures of phase separations and chemical changes: Does not separate.

V. SHELF LIFE
Two years unopened minimum.

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VI. RECOMMENDED APPLICATION PROCEDURES1. Application Method: CORIBA 700 SR is covered by U.S. Patent #7678201 (issued on March 16, 2010). The process is designed to remove and recover oil from sand. The product does not react with or alter the oil. Contaminated sand is transferred into a standard sand washer filled with 700 SR. The product is an aqueous solution that, upon contact, reduces the interfacial tension between the oil and the sand. The oil no longer adheres to the sand and is free to float to the surface of the processor and is removed with an auger. The cleaned sand is dried in a centrifuge and the collected liquid is recycled back to the processor. The product has a high vapor pressure and evaporates from the sand leaving no residue or contamination. The separated oil is transferred to a conical vertical tower where it concentrates at the surface and is siphoned off to be used as a fuel or sent to a refinery for further processing. The process solution that collects in the conical tower is recycled back to the processor. The clean, dry sand can be disposed as appropriate. Any sand that collects in the bottom of the conical tower is sent back through the processor. The process can be set up on a beach, waste treatment facility or on a barge for treating sensitive areas like barrier islands. The process chemical is not designed to come into contact with any body of water. There process is not designed to treat contaminated water. The process does not consume the process chemical. Any chemical that remains after the sand has been cleaned can be returned to the manufacturer or sent to an appropriate waste treatment facility.
2. Concentration/Application Rate: CORIBA 700 SR is used at full strength. It is delivered in aqueous solution. The application rate is 200 gallons/ton of oil-contaminated sand.
3. Conditions for Use: CORIBA 700 SR can be applied to contaminated sand as long as the sand mixture is not frozen.

VII. TOXICITY AND EFFECTIVENESS
a. Toxicity:

Materials Tested	Species	LC50 (ppm)	
CORIBA 700 SR	Menidia beryllina	1470.00	96-hr
	Mysidopsis bahia	3810.00	48-hr
No. 2 Fuel Oil	Menidia beryllina	11.10	96-hr
	Mysidopsis bahia	3.29	48-hr
CORIBA 700 SR &	Menidia beryllina	22.80	96-hr
No. 2 Fuel Oil (1:10)	Mysidopsis bahia	3.58	48-hr
Reference Toxicant (SDS)	Menidia beryllina	5.70	96-hr
	Mysidopsis bahia	9.04	48-hr

b. Effectiveness: NA

VIII. MICROBIOLOGICAL ANALYSIS
NA

IX. PHYSICAL PROPERTIES
1. Flash Point: 102°F
2. Pour Point: 200°F
3. Viscosity: 1.0 cps
4. Specific Gravity: 0.981

5. pH: 11.4
6. Surface Active Agents: None
7. Solvents: None
8. Additives: PROPRIETARY
9. Solubility: Miscible with water

X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

Compound	Concentration (ppm)
Arsenic	0.05
Cadmium	<0.002
Chromium	0.031
Copper	0.25
Lead	0.02
Mercury	<0.01
Nickel	<0.01
Zinc	0.25
Cyanide	<0.1
Chlorinated Hydrocarbons	<0.1

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TECHNICAL PRODUCT BULLETIN #SW-56
USEPA, OEM REGULATIONS IMPLEMENTATION DIVISION
ORIGINAL LISTING DATE: FEBRUARY 25, 2011
"CORIBA 713 SR"
(aka, CORIBA 713 ER, CORIBA 713 OS)

I. NAME, BRAND, OR TRADEMARK
CORIBA 713 SR
(aka, CORIBA 713 ER, CORIBA 713 OS)
Type of Product: Surface Washing Agent

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT
Coriba Technologies, LLC
5708 Cadron Creek
North Little Rock, AR 72116
Phone: (501) 834-2972
E-mail: ronrios@bellsouth.net
(Mr. Harvey G. Cobb)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS
MLU Services
573 Hawthorne Avenue
Athens, GA 30606
Phone: (706) 569-7300
Fax: (706) 425-0300
(Mr. Billy Ulm)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION
1. Flammability: Non-flammable
2. Ventilation: Normal (contains ammonia)
3. Skin and eye contact; protective clothing; treatment in case of contact: Avoid eye contact due to possible mild eye irritation. Use chemical safety goggles and/or full face shield where splashing is possible. In case of eye contact, flush eyes with water for at least 15 minutes. Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact. In the case of skin contact, flush with water for at least 15 minutes. If irritation occurs and persists, obtain medical attention. Protective clothing is not normally required.
4.a. Maximum storage temperature: 100°F
4.b. Minimum storage temperature: 33°F
4.c. Optimum storage temperature range: 33°F - 100°F
4.d. Temperatures of phase separations and chemical changes: Does not separate.

V. SHELF LIFE
Two years unopened minimum.

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VI. RECOMMENDED APPLICATION PROCEDURES

1. Application Method: CORIBA 713 SR is covered by U.S. Patent #7678201 (issued on March 16, 2010). The process is designed to remove and recover oil from sand. The product does not react with or alter the oil. Contaminated sand is transferred into a standard sand washer filled with 713 SR. The product is an aqueous solution that, upon contact, reduces the interfacial tension between the oil and the sand. The oil no longer adheres to the sand and is free to float to the surface of the processor and is removed with an auger. The cleaned sand is dried in a centrifuge and the collected liquid is recycled back to the processor. The product has a high vapor pressure and evaporates from the sand leaving no residue or contamination. The separated oil is transferred to a conical vertical tower where it concentrates at the surface and is siphoned off to be used as a fuel or sent to a refinery for further processing. The process solution that collects in the conical tower is recycled back to the processor. The clean, dry sand can be disposed as appropriate. Any sand that collects in the bottom of the conical tower is sent back through the processor. The process can be set up on a beach, waste treatment facility or on a barge for treating sensitive areas like barrier islands. The process chemical is not designed to come into contact with any body of water. There process is not designed to treat contaminated water. The process does not consume the process chemical. Any chemical that remains after the sand has been cleaned can be returned to the manufacturer or sent to an appropriate waste treatment facility.

2. Concentration/Application Rate: CORIBA 713 SR is used at full strength. It is delivered in aqueous solution. The application rate is 200 gallons/ton of oil-contaminated sand.

3. Conditions for Use: CORIBA 713 SR can be applied to contaminated sand as long as the sand mixture is not frozen. The process is effective at ambient temperature.

VII. TOXICITY AND EFFECTIVENESS

a. Toxicity:

Materials Tested	Species	LC50 (ppm)	
CORIBA 713 SR	Menidia beryllina	1070.00	96-hr
	Mysidopsis bahia	2350.00	48-hr
No. 2 Fuel Oil	Menidia beryllina	11.10	96-hr
	Mysidopsis bahia	3.29	48-hr
CORIBA 713 SR &	Menidia beryllina	9.55	96-hr
No. 2 Fuel Oil (1:10)	Mysidopsis bahia	4.04	48-hr
Reference Toxicant (SDS)	Menidia beryllina	5.70	96-hr
	Mysidopsis bahia	9.04	48-hr

b. Effectiveness: NA

VIII. MICROBIOLOGICAL ANALYSIS

NA

IX. PHYSICAL PROPERTIES

1. Flash Point: 212°F

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2. Pour Point: 220°F
3. Viscosity: 1.0 cps
4. Specific Gravity: 0.997
5. pH: 11.0
6. Surface Active Agents: None
7. Solvents: None
8. Additives: PROPRIETARY
9. Solubility: Miscible with water

X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

Compound	Concentration (ppm)
Arsenic	0.05
Cadmium	<0.002
Chromium	0.031
Copper	0.25
Lead	0.02
Mercury	<0.01
Nickel	<0.01
Zinc	0.25
Cyanide	<0.1
Chlorinated Hydrocarbons	<0.1

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TECHNICAL PRODUCT BULLETIN #SW-57
USEPA, OEM REGULATIONS IMPLEMENTATION DIVISION
ORIGINAL LISTING DATE: MAY 11, 2011
"JEP-MARINE CLEAN"
(aka, ECOVOOM-MARINE)

I. NAME, BRAND, OR TRADEMARK
JEP-MARINE CLEAN
(aka, ECOVOOM-MARINE)
Type of Product: Surface Washing Agent

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT
Nuance Solutions
900 E. 103rd Street, Suite D
Chicago, IL 60628
Phone: (800) 621-8553
Fax: (800) 621-1276
(Mr. Neil Houtsma)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS
Jubilee Environmental Products
406 S. Boulder, Suite 820
Tulsa, OK 74103
Phone: (918) 277-1113
Fax: (918) 296-3997
E-mail: jubilinc@aol.com
Sales and Inquiries:
Phone: (918) 277-1113
Fax: (918) 296-3997
E-mail: jubilinc@aol.com
(Mr. Thomas J. Rhein, President)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION
1. Flammability: Non-flammable
2. Ventilation: Normal.
3. Skin and eye contact; protective clothing; treatment in case of contact: Respiratory protection not required under normal conditions. Protect against generated mists using protective clothing in order to minimize contact (i.e., boots, apron, face shield). Use safety glasses/goggles during handling and application to prevent eye contact. Wear rubber/PVC gloves to prevent skin contact.
4.a. Maximum storage temperature: 90°F
4.b. Minimum storage temperature: 40°F
4.c. Optimum storage temperature range: 40 – 90°F; product freezes at 32°F

4.d. Temperatures of phase separations and chemical changes: 120°F

V. SHELF LIFE
In unopened containers, shelf life is minimum 2 years.

VI. RECOMMENDED APPLICATION PROCEDURES
1. Application Method: Product may be diluted with fresh or salt water, and may be applied to any type of surfaces that have been coated with oil or other petroleum-based substances resulting from a spill (e.g., beaches, rocks). Manual pump sprayers should be used to presoak the contaminated areas, and pressure washers should be used to agitate the contaminated areas after a presoak has been applied.
2. Concentration/Application Rate: Shoreline Cleaning – presoak the surface needing to be cleaned, using a manual pump sprayer, with a dilution rate of one (1) part to three (3) parts water for approximately 10 to 15 minutes, without letting the product dry or evaporate. After the contaminated areas have been presoaking for the allotted time, run a dilution rate of one (1) part product to fifteen (15) parts water, through a pressure washer directly onto the contaminant.
3. Conditions for Use: Option temperature range for use is 45 to 212°F. When the contaminants have been released, they can be removed using sorbent pads, suction booms or skimmers, and hauled away and disposed of according to local, state, and federal law. It is recommended that for older or crustier contaminants higher pressure and stronger dilutions be used.

VII. TOXICITY AND EFFECTIVENESS
a. Toxicity:

Materials Tested	Species	LC50 (ppm)	
JEP-MARINE CLEAN	Menidia beryllina	88.40	96-hr
	Mysidopsis bahia	153.90	48-hr
No. 2 Fuel Oil	Menidia beryllina	2.70	96-hr
	Mysidopsis bahia	1.63	48-hr
JEP-MARINE CLEAN &	Menidia beryllina	3.58	96-hr
No. 2 Fuel Oil (1:10)	Mysidopsis bahia	2.32	48-hr
Reference Toxicant (SDS)	Menidia beryllina	8.84	96-hr
	Mysidopsis bahia	14.90	48-hr

b. Effectiveness: NA

VIII. MICROBIOLOGICAL ANALYSIS
NA

IX. PHYSICAL PROPERTIES
1. Flash Point: >100°C
2. Pour Point: -14°C
3. Viscosity: 1.1 cSt
4. Specific Gravity: 1.041
5. pH: 11.2
6. Surface Active Agents: CONFIDENTIAL

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7. Solvents: Water
8. Additives: CONFIDENTIAL
9. Solubility: Miscible with water

X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

Compound	Concentration (ppm)
Arsenic	<0.004
Cadmium	0.084
Chromium	0.082
Copper	0.138
Lead	<0.025
Mercury	<0.0012
Nickel	<0.025
Zinc	0.219
Cyanide	0.01
Chlorinated Hydrocarbons	<0.01

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TECHNICAL PRODUCT BULLETIN #SW-58
USEPA, OEM REGULATIONS IMPLEMENTATION DIVISION
ORIGINAL LISTING DATE: JUNE 28, 2011
"ETHOS CLEAN"

I. NAME, BRAND, OR TRADEMARK
ETHOS CLEAN
Type of Product: Surface Washing Agent

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT
MAG7 Venture Group, LLC, DBA MAG7 Technologies
1 Lepage Place, Suite 100
Syracuse, NY 13206
Phone: (855) 255-6247
Fax: (855) 255-6247
E-mail: greg.goodell@mag7venturegroup.com or trevor.quig@mag7venturegroup.com
Website: www.mag7technologies.com/Ethos/index.htm
(Mr. Greg Goodell or Mr. Trevor Quig)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS
MAG7 Venture Group, LLC, DBA MAG7 Technologies
1 Lepage Place, Suite 100
Syracuse, NY 13206
Phone: (855) 255-6247
Fax: (855) 255-6247
E-mail: greg.goodell@mag7venturegroup.com or trevor.quig@mag7venturegroup.com
Website: www.mag7technologies.com/Ethos/index.htm
(Mr. Greg Goodell or Mr. Trevor Quig)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION
1. Flammability: Non-flammable
2. Ventilation: Move subject to fresh air. If breathing is difficult, obtain medical help.
3. Skin and eye contact; protective clothing; treatment in case of contact: Wash affected skin area with water. Consult physician of irritation persists. Skin irritation will not occur with most users. Flush eyes with a large amount of water for at least 15 minutes. Consult physician if irritation persists. Wear safety glasses and neoprene or rubber gloves during application.
4.a. Maximum storage temperature: 120°F
4.b. Minimum storage temperature: 35°F
4.c. Optimum storage temperature range: 40°F to 120°F
4.d. Temperatures of phase separations and chemical changes: NA. Phase separation will not occur within the storage range. Product should be stored out of direct sunlight unless it is in an Ultraviolet (UV) light resistant container.

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V. SHELF LIFE2 years in a sealed (unopened) container (tote, drum, pail) as delivered. 1 year in an opened container).

VI. RECOMMENDED APPLICATION PROCEDURES

1. Application Method: Apply ETHOS CLEAN to oil or contaminant with sprayer, pressure washer, mop, sponge, brush, or rags. Application times will depend on the level of contaminant with a minimum of 30 minutes recommended soak time. The required soak time to remove oil will vary with oil density and degree of weathering. ETHOS CLEAN separates the oil from the physical surface to allow the oil to be sprayed off with a water rinse. ETHOS CLEAN should be mixed into soil applications to increase the effectiveness and reduce the application time.
2. Concentration/Application Rate: Pure concentrate can be used for heavy contamination. Dilution ratios for most applications range from 2 to 1 (parts water to parts ETHOS CLEAN) to 10 to 1 (parts water to parts ETHOS CLEAN). Dilution ratios are dependent on the contamination level and application with heavier crude oil spills requiring a lower dilution ratio. Dilutions up to 50 to 1 (parts water to parts ETHOS CLEAN) can be used for lighter contaminations and cleaning. Rinse with water after usage for residue free surface. Surface cleaning typically requires 5 to 1 or 10 to 1 dilution ratio. These dilution ratios will require 1 gallon of ETHOS CLEAN per 250 square feet of surface area. These dilution ratios can be used in many applications including shorelines, rocks, and beaches.
3. Conditions for Use: Salt or fresh water (temperature ranges from 35°F to 120°F). Oil or contaminant can be skimmed from the water or rinsed and captured into collection containers and disposed of per local, state, and federal regulations.

Dilution	Intended Use
2:1	Heavy contamination such as oil spills
5:1	Direct application to heavily soiled areas

VII. TOXICITY AND EFFECTIVENESS

a. Toxicity:

Materials Tested	Species	LC50 (ppm)	
ETHOS CLEAN	Menidia beryllina	3960.00	96-hr
	Mysidopsis bahia	4510.00	48-hr
No. 2 Fuel Oil	Menidia beryllina	26.30	96-hr
	Mysidopsis bahia	4.86	48-hr
ETHOS CLEAN &	Menidia beryllina	25.00	96-hr
No. 2 Fuel Oil (1:10)	Mysidopsis bahia	5.00	48-hr
Reference Toxicant (SDS)	Menidia beryllina	2.23	96-hr
	Mysidopsis bahia	7.93	48-hr

b. Effectiveness: NA

VIII. MICROBIOLOGICAL ANALYSIS

NA

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IX. PHYSICAL PROPERTIES

1. Flash Point: 142°F
2. Pour Point: 30°F
3. Viscosity: 32 SUS @60°F
4. Specific Gravity: 1.1664 @60°F
5. pH: 11.6
6. Surface Active Agents: CONFIDENTIAL
7. Solvents: CONFIDENTIAL
8. Additives: CONFIDENTIAL
9. Solubility: Complete in water

X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

Compound	Concentration (ppm)
Arsenic	ND
Cadmium	0.0813
Chromium	0.240
Copper	0.201
Lead	14.5
Mercury	5.0 (ppb)
Nickel	2.12
Zinc	ND
Cyanide	ND
Chlorinated Hydrocarbons	ND

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TECHNICAL PRODUCT BULLETIN #SW-59
USEPA, OEM REGULATIONS IMPLEMENTATION DIVISION
ORIGINAL LISTING DATE: JUNE 28, 2011
"OSR-10"

I. NAME, BRAND, OR TRADEMARK
OSR-10
Type of Product: Surface Washing Agent

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT
MAG7 Venture Group, LLC
1 Lepage Place, Suite 100
Syracuse, NY 13206
Phone: (855) 255-6247
Fax: (855) 255-6247
E-mail: greg.goodell@mag7venturegroup.com or trevor.quig@mag7venturegroup.com
Website: www.mag7technologies.com/OSR10.htm
(Mr. Greg Goodell or Mr. Trevor Quig)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS
MAG7 Venture Group, LLC
1 Lepage Place, Suite 100
Syracuse, NY 13206
Phone: (855) 255-6247
Fax: (855) 255-6247
E-mail: greg.goodell@mag7venturegroup.com or trevor.quig@mag7venturegroup.com
Website: www.mag7technologies.com/OSR10.htm
(Mr. Greg Goodell or Mr. Trevor Quig)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION
1. Flammability: Non-flammable
2. Ventilation: Move subject to fresh air. If breathing is difficult, obtain medical help.
3. Skin and eye contact; protective clothing; treatment in case of contact: Wash affected skin area with water. Consult physician of irritation persists. Skin irritation will not occur with most users. Flush eyes with a large amount of water for at least 15 minutes. Consult physician if irritation persists. Wear safety glasses and neoprene or rubber gloves during application.
4.a. Maximum storage temperature: 120°F
4.b. Minimum storage temperature: 35°F
4.c. Optimum storage temperature range: 40°F to 120°F
4.d. Temperatures of phase separations and chemical changes: NA. Phase separation will not occur within the storage range. Product should be stored out of direct sunlight unless it is in an Ultraviolet (UV) light resistant container.

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V. SHELF LIFE2 years in a sealed (unopened) container (tote, drum, pail) as delivered. 1 year in an opened container).

VI. RECOMMENDED APPLICATION PROCEDURES

1. Application Method: Apply OSR-10 to oil or contaminant with sprayer, pressure washer, mop, sponge, or brush. Application times will depend on the level of contaminant with a minimum of 10 minutes recommended soak time. The required soak time to remove oil will vary with oil density and degree of weathering. OSR-10 separates the oil from the physical surface to allow the oil to be sprayed off with a water rinse. OSR-10 should be mixed into soil applications and agitated to increase the effectiveness and reduce the application time.

2. Concentration/Application Rate: Dilution ratios for most applications range from 2 to 1 (parts water to parts OSR-10) to 15 to 1 (parts water to parts OSR-10). Dilution ratios are dependent on the contamination level and application with heavier crude oil spills requiring a lower dilution ratio. Rinse with water after usage for residue free surface. Surface cleaning typically requires 5 to 1 or 10 to 1 dilution ratio. These dilution ratios will require 1 gallon of OSR-10 per 300 square feet of surface area. These dilution ratios can be used in many applications including shorelines, rocks, and beaches.

3. Conditions for Use: Salt or fresh water (temperature ranges from 35°F to 120°F). Oil or contaminant can be skimmed from the water or rinsed and captured into collection containers and disposed of per local, state, and federal regulations.

Dilution	Intended Use
2:1	Heavy/severe contamination such as oil spills
5:1 to 10:1	Moderate contamination
15:1 to 30:1	Light contamination

VII. TOXICITY AND EFFECTIVENESS

a. Toxicity:

Materials Tested	Species	LC50 (ppm)	
OSR-10	Menidia beryllina	385.00	96-hr
	Mysidopsis bahia	399.00	48-hr
No. 2 Fuel Oil	Menidia beryllina	26.30	96-hr
	Mysidopsis bahia	4.86	48-hr
OSR-10 &	Menidia beryllina	16.00	96-hr
No. 2 Fuel Oil (1:10)	Mysidopsis bahia	4.77	48-hr
Reference Toxicant (SDS)	Menidia beryllina	2.23	96-hr
	Mysidopsis bahia	7.93	48-hr

b. Effectiveness: NA

VIII. MICROBIOLOGICAL ANALYSIS

NA

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IX. PHYSICAL PROPERTIES1. Flash Point: 143°F
2. Pour Point: 20°F
3. Viscosity: 37 SUS @60°F
4. Specific Gravity: 1.1672 @60°F
5. pH: 11.5
6. Surface Active Agents: CONFIDENTIAL
7. Solvents: CONFIDENTIAL
8. Additives: CONFIDENTIAL
9. Solubility: Complete in water

X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

Compound	Concentration (ppm)
Arsenic	ND
Cadmium	ND
Chromium	0.209
Copper	0.150
Lead	7.57
Mercury	6.8 (ppb)
Nickel	1.20
Zinc	ND
Cyanide	ND
Chlorinated Hydrocarbons	ND

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TECHNICAL PRODUCT BULLETIN #SW-60
USEPA, OEM REGULATIONS IMPLEMENTATION DIVISION
ORIGINAL LISTING DATE: JULY 13, 2011
"ACCELL CLEAN® SWA"

I. NAME, BRAND, OR TRADEMARK
ACCELL CLEAN® SWA
Type of Product: Surface Washing Agent

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT
Advanced BioCatalytics Corporation
18010 Skypark Circle, #130
Irvine, California 92614-6456
Office Phone: (949) 442-0880
General E-mail: info@abiocat.com
Website: www.abiocat.com
Product Management:
Mobile: (949) 981-6510
E-mail: cpodella@abiocat.com
(Mr. Carl Podella)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS
Advanced BioCatalytics Corporation
18010 Skypark Circle, #130
Irvine, California 92614-6456
Office Phone: (949) 442-0880
General E-mail: info@abiocat.com
Website: www.abiocat.com
Product Management:
Mobile: (949) 981-6510
E-mail: cpodella@abiocat.com
(Mr. Carl Podella)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION
1. Flammability: Non-flammable
2. Ventilation: Use in well-ventilated area.
3. Skin and eye contact; protective clothing; treatment in case of contact: Protective clothing is recommended. Avoid eye contact. In case of eye contact, immediately flush with large amounts of water for at least 15 minutes. Get prompt medical attention. Avoid direct contact with skin and clothing. In case of skin contact, immediately flush with large amounts of water. Remove contaminated clothing, including shoes, after flushing has begun. If irritation persists, seek medical attention. For open systems were contact is likely, wear long sleeve shirt, chemical resistant gloves, and protective chemical goggles.
4.a. Maximum storage temperature: 130°F/55°C

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4.b. Minimum storage temperature: 30°F/-1°C
4.c. Optimum storage temperature range: 40°F to 100°F/4°C to 38°C
4.d. Temperatures of phase separations and chemical changes: None

V. SHELF LIFE
The shelf life of unopened drums of ACCELL CLEAN® SWA is unlimited. Containers should always remain capped when not in use to prevent contamination and evaporation.

VI. RECOMMENDED APPLICATION PROCEDURES
1. Application Method: Spray ACCELL CLEAN® SWA onto oil-contaminated shorelines, mangroves, or seagrasses full strength as applied. Allow to soak for 15-30 minutes. Rocks may be scrubbed with a stiff bristle brush where appropriate. Rinse with fresh or salt water as appropriate. For weathered crude oil on sand, transfer oil-contaminated sand to sand washing equipment. Agitate sand/ACCELL CLEAN® SWA solution. ACCELL CLEAN® SWA will lift the oil from the sand due to its low interfacial tension. Remove water from sand by centrifuge.
2. Concentration/Application Rate: Recommended application rate is 1 gallon per 100 square feet, dependent on the amount of oil and the degree of weathering. For weathered crude oil from sand, prepare a cleaning solution of 0.25%-2.0% ACCELL CLEAN® SWA using fresh or salt water.
3. Conditions for Use: Collect the oil/product residue from the water's surface using skimmers, absorbent pads, or other conventional means. Dispose of used, clean up residue in accordance with local, state, and federal regulations. Dispose of clean sand as appropriate and ACCELL CLEAN® SWA solution can be recycled after centrifuge.

VII. TOXICITY AND EFFECTIVENESS
a. Toxicity:

Materials Tested	Species	LC50 (ppm)	
ACCELL CLEAN® SWA	Menidia beryllina	24.12	96-hr
	Mysidopsis bahia	59.46	48-hr
No. 2 Fuel Oil	Menidia beryllina	17.13	96-hr
	Mysidopsis bahia	2.92	48-hr
ACCELL CLEAN® SWA &	Menidia beryllina	12.25	96-hr
No. 2 Fuel Oil (1:10)	Mysidopsis bahia	2.25	48-hr
Reference Toxicant (DDS)	Menidia beryllina	10.00	96-hr
	Mysidopsis bahia	29.00	48-hr

b. Effectiveness: NA

VIII. MICROBIOLOGICAL ANALYSIS
NA

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IX. PHYSICAL PROPERTIES1. Flash Point: >180°F/82°C
2. Pour Point: 10°F/-12°C
3. Viscosity: 68 SUS @60°F
4. Specific Gravity: 1.0141 @60°F
5. pH: 8.12
6. Surface Active Agents: CONFIDENTIAL
7. Solvents: CONFIDENTIAL
8. Additives: CONFIDENTIAL
9. Solubility: Soluble in fresh or seawater

X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

Compound	Concentration (ppm)
Arsenic	<1.00
Cadmium	<0.50
Chromium	<1.00
Copper	<2.50
Lead	<1.00
Mercury	<0.020
Nickel	<4.00
Zinc	<6.00
Cyanide	<1.00
Chlorinated Hydrocarbons	ND

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TECHNICAL PRODUCT BULLETIN #SW-61USEPA, OEM REGULATIONS IMPLEMENTATION DIVISION
ORIGINAL LISTING DATE: OCTOBER 13, 2011
"EPA OIL FIELD SOLUTION™"
(aka, HYDRO-CLEAN™, GLOBAL ENVIRONMENTAL CLEANER™, AWAN PRA OIL FIELD SOLUTION™)

I. NAME, BRAND, OR TRADEMARK
EPA OIL FIELD SOLUTION™
(aka, HYDRO-CLEAN™, GLOBAL ENVIRONMENTAL CLEANER™, AWAN PRA OIL FIELD SOLUTION™)
Type of Product: Surface Washing Agent

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT
Environmental Protection Associates, Inc.
2578 Enterprise Road, Suite 141
Orange City, FL 32763
Phone: (407) 687-6742
E-mail: njrhall@epaworldwide.com
Website: www.epaworldwide.com
(Mr. Nathan Hall)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS

International Green Building Group, Inc.
10800 Main Street, Suite 150
Fairfax, VA 22030
Phone: (202) 300-8324
E-mail: info@internationalgreenbuildinggroup.com
Website: www.internationalgreenbuildinggroup.com

AWAN International General Trading
P.O. Box 75352
Kingdom of Bahrain
Phone: 973-173-111-28
Fax: 973-172-950-05
E-mail: james@awanpra.com
Website: www.awangroups.com
Website: www.awanpra.com
(Mr. James Gard)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION
1. Flammability: Non-flammable (DOT: Non-hazardous)
2. Ventilation: No special requirements.
3. Skin and eye contact; protective clothing; treatment in case of contact: No special equipment or clothing required, however goggles are recommended. If eye or skin irritation occurs, flush with plenty of fresh water.
4.a. Maximum storage temperature: 120°F continuous, 140°F up to 5 days
4.b. Minimum storage temperature: 35°F
4.c. Optimum storage temperature range: 40°F to 120°F
4.d. Temperatures of phase separations and chemical changes: Stable

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V. SHELF LIFEUnlimited in sealed polydrums or totes (as delivered). Avoid direct sunlight.

VI. RECOMMENDED APPLICATION PROCEDURES

1. Application Method: Product may be applied to surfaces for removal of oils. Select proper dilution depending on material surface prior to application. For treatment of large areas, properly diluted product may be applied by spraying with a pressure washer, portable fire pump, or any other suitable pump with seawater or freshwater suction that is equipped with a chemical inductor or feed pump. For smaller areas, properly diluted product may be applied with scrubber, mop, cloth or damp sponge. Apply liberally, adjusting dilution on site as necessary. For shorelines, mangroves, and seagrasses product is sprayed directly on the oiled rocky surfaces full strength as supplied. After a soak time of zero to 30 minutes, the cleaner and oil released from the shoreline surface can be collected and disposed. The soak time may vary with temperature, oil density, and degree of weathering.

2. Concentration/Application Rate: For heavily weathered oil on rocks, a diluted solution of 3 parts water to 1 part product is recommended. For heavily weathered oil on beaches/sand, a diluted solution of 5 parts water to 1 part product is ideal. For removing oil from vegetation, a diluted solution of 10-20 parts water to 1 part product is preferred. Product may be diluted with either salt or fresh water. Warmer water (greater than 78°F) and/or good agitation during application will require less of the product.

3. Conditions for Use: Best results are obtained by allowing diluted solution to soak for at least 30 minutes to soften the oil deposits. Reapplication may be necessary in severely contaminated areas. A sorbent boom or vacuum suction equipment should be positioned to collect the washed off effluent. When proper containment equipment is in place and a soaking period of at least 30 minutes has been achieved, a diluted solution of 20 parts water and 1 part product should be applied at mid-pressure (approximately 100 PSI). Adjust pressure and angle of the hose sprayer to achieve optimum results, adjusting the dilution as necessary on site. Product and effluent should be vacuumed up or absorbed in absorbent boom and disposed of according to local, state, and federal regulations. EPA Oil Field Solution™ is useful on shorelines using fresh or salt water. It can be used on all types of oil including heavily weathered and emulsified ("chocolate mousse") containing up to 50 percent water.

VII. TOXICITY AND EFFECTIVENESS

a. Toxicity:

Materials Tested	Species	LC50 (ppm)	
EPA OIL FIELD SOLUTION™	Menidia beryllina	113.76	96-hr
	Mysidopsis bahia	114.60	48-hr
No. 2 Fuel Oil	Menidia beryllina	3.00	96-hr
	Mysidopsis bahia	1.41	48-hr
EPA OIL FIELD SOLUTION™ &	Menidia beryllina	2.94	96-hr
No. 2 Fuel Oil (1:10)	Mysidopsis bahia	1.12	48-hr
Reference Toxicant (SLS)	Menidia beryllina	12.25	96-hr
	Mysidopsis bahia	12.06	48-hr

b. Effectiveness: NA

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VIII. MICROBIOLOGICAL ANALYSIS
NA

IX. PHYSICAL PROPERTIES
1. Flash Point: >95°F
2. Pour Point: -2°F
3. Viscosity: 1.137368 SUS @40°F
4. Specific Gravity: 1.11 @60°F
5. pH: 13.4
6. Surface Active Agents: Nonionic, proprietary, surfactants
7. Solvents: Proprietary
8. Additives: None
9. Solubility: Miscible in oil, water, and solvents

X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

Compound	Concentration (ppm)
Arsenic	<0.200
Cadmium	<0.0600
Chromium	<0.300
Copper	<0.300
Lead	<0.200
Mercury	<1.00 (ug/l)
Nickel	<0.500
Zinc	2.31
Cyanide	<0.0100
Chlorinated Hydrocarbons	<250 (ug/l)

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TECHNICAL PRODUCT BULLETIN #SW-62
USEPA, OEM REGULATIONS IMPLEMENTATION DIVISION
ORIGINAL LISTING DATE: MARCH 5, 2012
"PETROMAX PSC 3"
(aka, PETROMAX SOIL CLEANING AND WASHING AGENT)

I. NAME, BRAND, OR TRADEMARK
PETROMAX PSC 3
(aka, PETROMAX SOIL CLEANING AND WASHING AGENT)
Type of Product: Surface Washing Agent

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT
Saxon Petrotechnologies S.A.
Ancona 14-Bis
Carrasco, Montevideo
Uruguay
Phone: 598-2-604-1006
Unites States: (305) 600-4927
Fax: (508) 256-8318
E-mail: svb@saxon-technologies.com
Website: www.saxon-technologies.com
(Mr. Scot von Bergen)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS
Saxon Petrotechnologies
11410 NW 20th Street
Miami, FL 33172
Phone: (305) 600-4927 or (305) 412-6699
Fax: (508) 256-8138
E-mail: rbrawn@saxon-technologies.com or mvb@saxon-technologies.com
(Mr. Randy Brawn or Mrs. Marina von Bergen)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION
1. Flammability: Non-flammable (DOT: Non-hazardous)
2. Ventilation: No special requirements.
3. Skin and eye contact; protective clothing; treatment in case of contact: No special equipment or clothing required; however, goggles are recommended. If eye or skin irritation occurs, flush with plenty of fresh water.
4.a. Maximum storage temperature: 120°F continuous, 140°F up to 5 days
4.b. Minimum storage temperature: 35°F
4.c. Optimum storage temperature range: 40°F to 120°F
4.d. Temperatures of phase separations and chemical changes: Stable

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V. SHELF LIFE
Unlimited when stored in unopened, sealed 5 gallon containers, 55 gallon drums, polydrums, and totes.

VI. RECOMMENDED APPLICATION PROCEDURES
1. Application Method: PETROMAX PSC 3's mechanism of action is to reverse the charge of the particles (sand) holding the hydrocarbons, in such a way that the hydrocarbons and the particles reject each other thus allowing the hydrocarbons to be easily separated, removed, and collected. This is because the separated hydrocarbons maintain their globular integrity and are not dispersed nor solubilized into the water column.

PETROMAX PSC 3 is applied via hydroblaster directly to the contaminated sand/soil and as it becomes fluidized it is sucked through a four inch hose into a mobile containment tank set up for the purpose at the job site. The contaminated material is cleaned through a three phase separation process:

a) Solids Recovery: Once in the containment tank, the cleaned sand and soil particles precipitate immediately to the bottom, from which they are extracted via a slew-valve to secondary containment. Any entrained water within this containment is further recovered for reuse according to local, state, and federal regulations.
b) Oil Recovery: During this process the hydrocarbons float to the surface of the tank and are removed by skimming. These removed hydrocarbons are collected and are sent to a refinery for processing.
c) PETROMAX PSC 3/Water Recovery: This leaves only the used PETROMAX PSC 3/water solution in the tank, which can be reused or disposed of according to local, state, and federal regulations. The remaining water may contain some light particles in suspension. These particles are easily precipitated into cake residues which are then collected. The cake residues typically contain a water content below 10%. They can be dried in open air pits with plastic protection underneath or in 15 yard roll-off containers. Any contaminated water should be collected and sent to a standard water treatment facility.

2. Concentration/Application Rate: PETROMAX PSC 3 should be applied via hydroblaster lance with minimum 3200 psi pressure and 4-15 gallons per minute flow depending on material to be treated. For smaller spills, a smaller hydroblaster sprayer may be used, mixing fresh or salt water according to availability, and depending on the oil composition and viscosity in the contaminated sand and soil being treated. For large scale soil remediation and cleaning or soils and sands contaminated with heavy crude, direct PETROMAX PSC 3 directly on the spill (contaminated) material using a hydroblaster lance at a minimum pressure of 3500 psi, with a dilution ratio of approximately 1:10 (product:water). Lighter oil soil contamination will require a 1:20 to 1:30 product to water dilution ratio with pressures at 2800 psi minimum. Warmer water (greater than 70°F) may require less PETROMAX PSC 3.
3. Conditions for Use: A sorbent boom should be positioned during use to contain any runoff and the collected material should be disposed of according to local, state, and federal regulations.

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VII. TOXICITY AND EFFECTIVENESS

a. Toxicity:

Materials Tested	Species	LC50 (ppm)	
PETROMAX PSC 3	Menidia beryllina	20332.19	96-hr
	Mysidopsis bahia	13460.87	48-hr
No. 2 Fuel Oil	Menidia beryllina	1.90	96-hr
	Mysidopsis bahia	1.68	48-hr
PETROMAX PSC 3 &	Menidia beryllina	1.99	96-hr
No. 2 Fuel Oil (1:10)	Mysidopsis bahia	1.00	48-hr
Reference Toxicant (SLS)	Menidia beryllina	12.25	96-hr
	Mysidopsis bahia	12.35	48-hr

b. Effectiveness: NA

VIII. MICROBIOLOGICAL ANALYSIS

NA

IX. PHYSICAL PROPERTIES

1. Flash Point: >185°F
2. Pour Point: +22°F
3. Viscosity: 1.5 cst @40°C
4. Specific Gravity: 1.08 @60°F
5. pH: 13.23
6. Surface Active Agents: Anionic, proprietary
7. Solvents: None
8. Additives: Proprietary
9. Solubility: Miscible in oil, water, and solvents

X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

Compound	Concentration (ppm)
Arsenic	0.121
Cadmium	0.332
Chromium	0.067
Copper	<0.100
Lead	0.197
Mercury	<0.50 (ug/l)
Nickel	<0.100
Zinc	<0.100
Cyanide	<0.010
Chlorinated Hydrocarbons	<5.00 (ug/l)

ED_001324_00005599-00228

TECHNICAL PRODUCT BULLETIN #SW-63
USEPA, OEM REGULATIONS IMPLEMENTATION DIVISION
ORIGINAL LISTING DATE: JULY 12, 2012
"GREEN TECHNOLOGIES SOLUTIONS-OIL RECOVERY (GTS-OR)"

I. NAME, BRAND, OR TRADEMARK
GREEN TECHNOLOGIES SOLUTIONS-OIL RECOVERY (GTS-OR)
Type of Product: Surface Washing Agent

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT
International Technologies and Services
24050 Madison, Suite 108
Torrance, CA 90505
Phone: (310) 791-4487
Fax: (310) 378-1459
E-mail: pilarladybug@itsenvironmental.com
(Ms. Pilar Ortega)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS
International Technologies and Services
24050 Madison, Suite 108
Torrance, CA 90505
Phone: (310) 791-4487
Fax: (310) 378-1459
E-mail: pilarladybug@itsenvironmental.com
(Ms. Pilar Ortega)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION
1. Flammability: Non-flammable
2. Ventilation: Handle in well ventilated space.
3. Skin and eye contact; protective clothing; treatment in case of contact: Product may cause minor irritation, so avoid eye and skin contact by wearing protective goggles, impermeable protective gloves, and protective clothing while handling the product. Wash contaminated clothing with soap and water, and dry prior to reuse. In case of contact, flush with large amounts of water for at least 15 minutes. Product may harmful if inhaled. In case of inhalation, move affected person to fresh air, and call a physician. Product may be harmful if swallowed. In case of ingestion, induce vomiting, give water, and call a physician.
4.a. Maximum storage temperature: 120°F
4.b. Minimum storage temperature: 30°F
4.c. Optimum storage temperature range: >50°F to <100°F
4.d. Temperatures of phase separations and chemical changes: None

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V. SHELF LIFEOne year minimum when stored between 50°F and 100°F.

VI. RECOMMENDED APPLICATION PROCEDURES

1. Application Method: GTS-OR may clean oil from beaches, rocks, riprap, pilings, and seawalls. GTS-OR application method can be adjusted depending on the scale and type of area to be cleaned. For large areas, GTS-OR can be sprayed from water trucks or water boats equipped with pumps, hoses, and nozzles to deliver the product as an aerial spray. The pump should be equipped with a chemical inductor or feed pump. In smaller applications, GTS-OR can be applied directly onto oiled surfaces using a pressure washer, steam powered unit, fire hose, or chemical boom sprayer with nozzles at mid-pressure (i.e., approximately 100 PSI) that produce a shearing action. For small applications, the product may be applied with mops, cloth, or damp sponges. For application in tidally influenced areas and to maximize contact time, GTS-OR should be applied during ebb tide (i.e., receding). Oil trapped between rocks or in crevices may be released over several days, requiring containment devises to be left in place.

2. Concentration/Application Rate: For heavily weathered oil on rocks, a diluted solution of 15 parts water to 1 part product is recommended. For heavily weathered oil on beaches/sand, a diluted solution of 10 parts water to 1 part product is ideal. For lightly-to-moderately oiled shorelines, mangroves, and seagrasses, the product should be sprayed directly to the affected surface at a 1:20 dilution ratio; a 1:10 dilution ratio is preferred for heavily oiled areas.

3. Conditions for Use: GTS-OR may be used in freshwater, estuarine, and marine environments. In all applications, the product may be diluted with either salt or fresh water, and the mixture should be allowed to penetrate and dissolve weathered petroleum for at least 30 minutes. Cold weather applications will require more contact time. Reapplication may be necessary for heavily oiled areas. The product may be used on both lighter oils (e.g., No. 2 Fuel Oil) and heavy ends (e.g., crude oil, No. 6 Fuel Oil). Prior to application, booms, oil skimmers, or other appropriate containment and collection mechanism should be deployed and operational. Collected product and oil mixture should be disposed of according to local, state, and federal regulations.

VII. TOXICITY AND EFFECTIVENESS

a. Toxicity:

Materials Tested	Species	LC50 (ppm)	
GTS-OR	Menidia beryllina	3930	96-hr
	Mysidopsis bahia	916	48-hr
No. 2 Fuel Oil	Menidia beryllina	8.16	96-hr
	Mysidopsis bahia	4.47	48-hr
GTS-OR &	Menidia beryllina	5.77	96-hr
No. 2 Fuel Oil (1:10)	Mysidopsis bahia	2.18	48-hr
Reference Toxicant (SDS)	Menidia beryllina	1.24	96-hr
	Mysidopsis bahia	4.77	48-hr

b. Effectiveness: NA

VIII. MICROBIOLOGICAL ANALYSIS

NA

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IX. PHYSICAL PROPERTIES

1. Flash Point: 171°F
2. Pour Point: 35°F
3. Viscosity: 8.5 cSt @40°C
4. Specific Gravity: 1.009 @60°F
5. pH: 9.0
6. Surface Active Agents: CONFIDENTIAL
7. Solvents: None
8. Additives: CONFIDENTIAL
9. Solubility: Soluble in water

X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

Compound	Concentration (ppm)
Arsenic	0.0084
Cadmium	<0.004
Chromium	0.00064
Copper	0.180
Lead	0.00025
Mercury	<0.00010
Nickel	0.0012
Zinc	0.017
Cyanide	<0.200
Chlorinated Hydrocarbons	<2.5

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TECHNICAL PRODUCT BULLETIN #SW-64
USEPA, OEM REGULATIONS IMPLEMENTATION DIVISION
ORIGINAL LISTING DATE: JANUARY 23, 2014
"NONTOX™ SURFACE WASHING AGENT"

I. NAME, BRAND, OR TRADEMARK
NOTOX™ SURFACE WASHING AGENT
Type of Product: Surface Washing Agent

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT
Bio-Organic Catalyst, Inc. (wholly owned subsidiary of Neozyme International, Inc.)
711 West 17th Street, Suite E-6
Costa Mesa, CA 92627
Phone: (949) 515-1301
Phone: (800) 982-8676
Fax: (949) 515-1314
Email: parker@bio-organic.com
Website: www.bio-organic.com
(Mr. Parker Dale, President)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS

Government Logistics Solutions
3540 Chaneyville Road
Owings, MD 20736
Phone: (410) 286-0098
Fax: (301) 812-2878
(Mr. Charles M. Baker, Retired USAF (SMSgt sel), President)
(Kelly Davis – (240) 691-3946)

Rolling Hills Construction and Demolition Recycling Center
6990 Rolling Hills Road
Pensacola, FL 32505
Phone: (850) 477-2687
(Mr. John Levitan – Mobile (850) 497-2724)
(Mr. Scott Miller – Mobile (850) 723-5715)
(Mr. Charlie Davidson – Mobile (850) 776-2852)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION
1. Flammability: >93°C
2. Ventilation: None required. No respiratory protection required.
3. Skin and eye contact; protective clothing; treatment in case of contact: The use of protective eyewear and rubber gloves is recommended under good manufacturing practices.
4.a. Maximum storage temperature: 55°C
4.b. Minimum storage temperature: 2°C
4.c. Optimum storage temperature range: 25°C to 40°C
4.d. Temperatures of phase separations and chemical changes: No phase separations or chemical changes observed under optimum storage temperatures.

V. SHELF LIFE
A minimum of two (2) years.

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VI. RECOMMENDED APPLICATION PROCEDURE

1. Application Method: For general use apply the product by spray, mop or with standard steam and pressure wash cleaning equipment. It can also be applied using a foam generator or any convenient sprayer. Product can be used as is or by using heat and pressure or mechanical scrubbing. Rinse thoroughly with salt or fresh water for a residue-free surface. For direct applications foaming will be most effective as it will allow more contact time for the product to work. In a foam-cleaning application operation, the surface to be cleaned will be thoroughly covered with foam and allowed to stand for several minutes. The foam is rinsed away with clean water using a high pressure washer. The product can be applied with a variety of spraying or washing equipment, depending on the type and scale of the shoreline or beach to be cleaned. For large areas, such as beaches, the product can be sprayed from water trucks or other vehicles equipped with pumps, hoses and nozzles to aerially deliver the product. On smaller oily surfaces, the product can be applied with hand sprayers or portable pumps may be used to spray directly onto the contaminated areas.

2. Concentration/Application Rate: For spills on shorelines and beaches, the product can be used at a dilution of 1:17 parts product to water using salt or fresh water. After application, the product should be allowed to penetrate and dissolve the oily surface for up to 30 minutes. Longer is preferable to maximize contact time. For light cleaning use a ratio up to 1:50 parts product to water. For heavy cleaning use a ratio up to 1:17 parts product to water. Dose rates may vary depending on type and amount of petroleum spilled, and other site conditions such as water, temperatures and porosity of shoreline. Cold weather applications will require more contact time before initiating recovery.

3. Conditions for Use: The product can be used on sand beaches, gravel, cobble, and coarse sand and rocky shores. Water salinity should not negatively impact product use. Water temperatures below 2°C may impact application. Aged or highly viscous concentrations of hydrocarbons my require presoaking prior to removal. The treated product can be collected and removed by several means including, but not limited to, sorbent pads, oil skimmers, collection booms, or other appropriate containment and collection mechanism. All oily water mixtures should follow disposal procedures in accordance with current local, state and federal regulations.

VII. TOXICITY AND EFFECTIVENESS

a. Toxicity:

Material Tested	Species	LC50 (ppm)
NONTOX™ SURFACE WASHING AGENT	Menidia beryllina	203.04 96-hr
	Mysidopsis bahia	316.23 48-hr
No. 2 Fuel Oil	Menidia beryllina	2.51 96-hr
	Mysidopsis bahia	2.24 48-hr
NONTOX™ SURFACE WASHING AGENT &	Menidia beryllina	3.29 96-hr
No. 2 Fuel Oil (1:10)	Mysidopsis bahia	2.19 48-hr
Reference Toxicant (SLS)	Menidia beryllina	12.25 96-hr
	Mysidopsis bahia	12.08 48-hr

b. Effectiveness: NA

VIII. MICROBIOLOGICAL ANALYSIS

NA

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IX. PHYSICAL PROPERTIES

1. Flash Point (ASTM 92): >93°C
2. Pour Point: 2.22°C
3. Viscosity: 2.3373 cST @ 40°C
4. Specific Gravity: 1.005 at 68°F
5. pH: 3.46
6. Surface Active Agents: CONFIDENTIAL
7. Solvents: None
8. Additives: CONFIDENTIAL
9. Solubility: 100% soluble

X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

Compound	Concentration (ppm)
Arsenic	<0.0100
Cadmium	<0.0050
Chromium	0.1515
Copper	0.1530
Lead	<0.0100
Mercury	<0.5000 ug/L
Nickel	<0.0250
Zinc	4.781
Cyanide	<0.0100
Chlorinated Hydrocarbons	<2.50

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TECHNICAL PRODUCT BULLETIN #SW-65
USEPA, OEM REGULATIONS IMPLEMENTATION DIVISION
ORIGINAL LISTING DATE: JULY 9, 2013
"SIMPLE GREEN® 2013 Reformulation"

I. NAME, BRAND, OR TRADEMARK
SIMPLE GREEN® 2013 Reformulation
Type of Product: Surface Washing Agent

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT
Sunshine Makers, Inc.
15922 Pacific Coast Highway
Huntington Beach, CA 92649
Phone: (800) 228-0709
Phone: (562) 795-6000
Fax: (562) 592-3830
Email: CChapin@simplegreen.com
(Ms. Carol Chapin)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS
Sunshine Makers, Inc.
15922 Pacific Coast Highway
Huntington Beach, CA 92649
Phone: (800) 228-0709
Phone: (562) 795-6000
Fax: (562) 592-3830
Email: CChapin@simplegreen.com
(Ms. Carol Chapin)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION
1. Flammability: Non-flammable.
2. Ventilation: Not expected to cause respiratory irritation. However, use in well ventilated areas. If adverse effect occurs, move to fresh air.
3. Skin and eye contact; protective clothing; treatment in case of contact: Not expected to cause eye irritation. However, use protective glasses if splashing or spray-back is likely. If adverse effect occurs, flush eyes with water. Not expected to cause skin irritation. However, dermally sensitive users may experience dry skin and should use protective gloves. If adverse effect occurs, rinse skin with water. General hygiene considerations include washing hands thoroughly after handling and before eating or drinking. Ensure adequate ventilation. Keep out of reach of children. If ingested, drink plenty of water to dilute.
4.a. Maximum storage temperature: 109°F
4.b. Minimum storage temperature: 41°F
4.c. Optimum storage temperature range: 42°F to 108°F

4.d. Temperatures of phase separations and chemical changes: SIMPLE GREEN® is stable and phase separation will not occur at temperatures within the maximum and minimum storage temperatures. If separation occurs, mix the product for reconstitution.

V. SHELF LIFE

SIMPLE GREEN® has a 5-year shelf life. Keep away from heat, sparks, open flame and direct sunlight. Do not pierce any part of the container. Keep container tightly closed. Keep in a cool dry area. Avoid prolonged exposure to direct sunlight. Do not store at temperatures above 109ºF (42.7ºC).

VI. RECOMMENDED APPLICATION PROCEDURE

1. Application Method: Spray or apply on oily surfaces (e.g., beaches, rocks, shorelines, pilings, etc.).

2. Concentration/Application Rate:

a) Mix SIMPLE GREEN® in clean water at recommended concentration for strength of surface being cleaned:

Degree that Surface is Covered in Oil	**Concentration of Simple Green®**
HEAVY – fresh, thick, viscous oil; porous surfaces	Full strength to 25%
MEDIUM – weathered, thinner coats of oil; non-porous surfaces – use pressure washer equipment	25% to 10%
LIGHT – very light oil film; non-porous surfaces	Less than 10%

b) Apply SIMPLE GREEN® or diluted solution of Simple Green® to oiled surface via sponge, mop, coarse spray, foaming applicator, or pressure washer.

c) Whenever possible, allow several minutes (5-10) of contact time to loosen oil. Do not allow product to dry on the surface or it will be difficult to remove.

d) Wash and scrub as necessary.

e) Rinse cleansed surfaces with clean water. Whenever possible, rinse should enter a pretreatment system (e.g., clarifier, oil/water separator, municipal sanitary sewer) before repurposing.

3. Conditions for Use: SIMPLE GREEN® can be used in freshwater, estuarine, and marine environments at all temperatures. Prior to application, booms, oil skimmers, or other appropriate containment and collection mechanism should be deployed and operational. Collected product and oil mixture should be disposed of according to local, state, and federal regulations.

VII. TOXICITY AND EFFECTIVENESS

a. Toxicity:

Material Tested	Species	LC50 (ppm)
SIMPLE GREEN®	Menidia beryllina	735.00 96-hr
	Mysidopsis bahia	541.00 48-hr
No. 2 Fuel Oil	Menidia beryllina	26.40 96-hr
	Mysidopsis bahia	3.37 48-hr
SIMPLE GREEN® & No. 2 Fuel Oil (1:10)	Menidia beryllina	28.50 96-hr
	Mysidopsis bahia	5.05 48-hr
Reference Toxicant (DSS)	Menidia beryllina	1.69 96-hr

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Mysidopsis bahia	6.60	48-hr

NOTE: This toxicity data was derived using the concentrated product. See Section VI of this bulletin for information regarding the manufacturer's recommendations for concentrations and application rates for field use.
b. Effectiveness: NA

VIII. MICROBIOLOGICAL ANALYSIS
SIMPLE GREEN® contains no microorganisms, enzymes, or biological material.

IX. PHYSICAL PROPERTIES
2. Flash Point (ASTM 92): 98°C
No Flash Point seen at or below 212°F (ASTM 93)
2. Pour Point: 0°C
3. Viscosity: <2.0 mm^2/s at 40°C
4. Specific Gravity: 1.0283 g/ml at 60°F
5. pH: 9.0
6. Surface Active Agents: CONFIDENTIAL
7. Solvents: None
8. Additives: CONFIDENTIAL
9. Solubility: 100% soluble

X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

Compound	Concentration (ppm)
Arsenic	0.0031
Cadmium	<0.0005
Chromium	0.013
Copper	<0.0025
Lead	<0.0005
Mercury	0.0016
Nickel	0.0054
Zinc	0.016
Cyanide	<0.08
Chlorinated Hydrocarbons	<5

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TECHNICAL PRODUCT BULLETIN #SW-66
USEPA, OEM REGULATIONS IMPLEMENTATION DIVISION
ORIGINAL LISTING DATE: MAY 7, 2015
"FORMULA 206-1x BIO-WASH™"
(aka, CAST OFF™, FORMULA 206-1x)

I. NAME, BRAND, OR TRADEMARK
FORMULA 206-1x BIO-WASH™
(aka, CAST OFF™, FORMULA 206-1x)
Type of Product: Surface Washing Agent

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT
Natural Soap Formulas, Inc.
1206 Stirling Road, Suite 4A
Dania Beach, FL 33004
Phone: (954) 922-4003
Fax: (954) 922-4009
Email: kaylin@naturalsoapformulas.com; or michael@naturalsoapformulas.com
(Ms. Kaylin D'Aire or Mr. Michael Metcalfe)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS
Natural Soap Formulas, Inc.
1206 Stirling Road, Suite 4A
Dania Beach, FL 33004
Phone: (954) 922-4003
Fax: (954) 922-4009
Email: kaylin@naturalsoapformulas.com; or michael@naturalsoapformulas.com
(Ms. Kaylin D'Aire or Mr. Michael Metcalfe)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION
1. Flammability: Non-flammable (DOT: Non-Hazardous)
2. Ventilation: Normal ventilation is adequate. No respiratory protection is required. If respiratory irritation or distress occurs, remove exposed person to fresh air. Seek medical attention if respiratory irritation or distress continues.
3. Skin and eye contact; protective clothing; treatment in case of contact: Protective eyewear is advisable for operator's comfort. If eye irritation occurs, flush eyes with water. After initial flushing, removal any contact lenses and continue flushing for 1 minute. Please seek medical attention, if eye irritation symptoms persist or if there are additional concerns. Wash hands after handling. If ingested, drink 2-4 glasses of water and allow the product to pass through the digestive system naturally. Ingesting large amounts may cause gastrointestinal distress due to emulsification of grease and oil in the digestive tract. Please seek medical attention, if symptoms persist of if there additional concerns.

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4.a. Maximum storage temperature: 120°F continuous, 130°F up to 5 days
4.b. Minimum storage temperature: 30°F
4.c. Optimum storage temperature range: 40°F to 110°F
4.d. Temperatures of phase separations and chemical changes: Stable

V. SHELF LIFE
5 years in sealed poly drums or IBC totes (as delivered).

VI. RECOMMENDED APPLICATION PROCEDURE
1. Application Method: FORMULA 206-1x BIO-WASH™ may be applied to hard surfaces including beaches, shorelines, and rocks; specifically to aid in the removal of oil and oil saturated soiling. Product may be applied by spray, high pressure wash, mop, scrub brush, cloth or sponge. Once applied to target surface, allow for a 5 to 30 minute dwell time, the product may be agitated using suitable physical methods (i.e., scrubbing to increase effectiveness). For large areas such as shorelines, product can be applied by vehicle or boat; spraying from fire eduction systems or boom system, hand-held or backpack sprayers, garden type sprayers, or from hoses attached to small pumps through power washers, fire pump or other portable pump with suction that is equipped with a chemical inductor or feed pump. After application, the removal of oil or oil saturated soiling can be done by rinsing with water where practicable followed by removal with physical methods, such as sorbent pads, mop or vacuum application to prevent contamination to open water. Ensure boom containment continues to be in place during oil/product removal procedures.

2. Concentration/Application Rate: FORMULA 206-1x BIO-WASH™ is typically diluted with using tap-water at ambient temperature; and can be diluted with sea water or any other suitable field expedient water source. The product is not affected by salinity or hard water dilution. Apply using a typical dilution ratio of 1:10 in the first instance. Product dilution varies with the severity of the contamination, contaminant viscosity, area of application and porosity, and nature of the surface to be decontaminated. A dilution ratio ranging from 1:5 to 1:200 is recommended for this product, there is no specific application rate; however, for large area application, 15 to 50 U.S. gallons per acre can be considered optimal. During application, the rate and concentration of the product can be adjusted to suit the cleaning effect desired.

3. Conditions for Use: FORMULA 206-1x BIO-WASH™ is most effective on hydrocarbon and bio-organic soiling on hard surfaces including beaches, shorelines, and rocks. A sorbent boom or other containment equipment should be positioned prior and remain in place during product use to collect runoff from application and removal operations. Collect and contain runoff from oil/product mixture and dispose of such material in accordance with local, state, and federal regulations.

VII. TOXICITY AND EFFECTIVENESS
a. Toxicity:

Material Tested	Species	LC50 (ppm)
FORMULA 206-1x BIO-WASH™	Menidia beryllina	157.00 96-hr

	Mysidopsis bahia	123.00 48-hr
No. 2 Fuel Oil	Menidia beryllina	3.60 96-hr
	Mysidopsis bahia	5.80 48-hr
FORMULA 206-1x BIO-WASH™ &	Menidia beryllina	3.90 96-hr
No. 2 Fuel Oil (1:10)	Mysidopsis bahia	4.10 48-hr
Reference Toxicant (SDS)	Menidia beryllina	10.00 96-hr
	Mysidopsis bahia	19.00 48-hr

b. Effectiveness: NA

VIII. MICROBIOLOGICAL ANALYSIS
NA

IX. PHYSICAL PROPERTIES
3. Flash Point (ASTM 93): 130°F
2. Pour Point (D2500): 30°F
3. Viscosity (ASTM D88): 26 SUS @ 100°F
4. Specific Gravity (ASTM D1217): 1.0137 g/ml at 60°F
5. Ph (EPA 9040C): 10.6
6. Surface Active Agents: Natural fatty acid soaps
7. Solvents: Hydrofurfuryl Alcohol
8. Additives: NA
9. Solubility: Miscible in oil, water, and solvents

X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

Compound	Concentration (ppm)
Arsenic	ND
Cadmium	ND
Chromium	0.0173
Copper	0.115
Lead	ND
Mercury	ND
Nickel	0.160
Zinc	0.556
Cyanide	ND
Chlorinated Hydrocarbons	ND

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TECHNICAL PRODUCT BULLETIN #SW-67
USEPA, OEM REGULATIONS IMPLEMENTATION DIVISION
ORIGINAL LISTING DATE: AUGUST 3, 2015
"RHAMNOWASH 10"

I. NAME, BRAND, OR TRADEMARK
RHAMNOWASH 10
Type of Product: Surface Washing Agent

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT
Rhamnolipid, Inc.
511 West Bay Street, Suite 350
Tampa, FL 33606
Phone: (813) 930-5550
Direct: (704) 564-6445
Email: greccosg@rhamnolipids.com
Website: http://www.rhamnolipids.com/RhamnoWash10
(Mr. Samuel G. Grecco)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS
Rhamnolipid Companies, Inc.
511 West Bay Street, Suite 350
Tampa, FL 33606
Phone: (813) 930-5550
Direct: (704) 564-6445
Email: kdesanto@rhamnolipids.com
Website: http://www.rhamnolipids.com/RhamnoWash10
(Mr. Keith DeSanto)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION
1. Flammability: IMO, Non-flammable; DOT, Non-Hazardous
2. Ventilation: Inhalation causes irritation. Use in properly ventilated areas, with approved respiratory mask and goggles. Avoid creating mist where possible. If inhaled, allow plenty of fresh air and loosen clothing around neck. Contact physician immediately.
3. Skin and eye contact; protective clothing; treatment in case of contact: Exposure to skin can cause irritation if person has a history of dermal allergic reaction. Limit exposure and use rubber gloves. Wash with soap and water. If product comes in contact with the eyes, excess redness and swelling of the conjunctiva may occur. Causes moderate to severe irritation, which is experienced as discomfort or pain, excessive blinking and tear production, with marked excessive redness and swelling. Corneal injury may occur. Immediately flush with water for at least 15 minutes. DO NOT remove contact lenses, if worn. Obtain medical attention without delay, preferably from an ophthalmologist. To avoid eye contact, wear goggles or a face shield. Ingestion of product can lead to nausea or diarrhea. If ingested, give two glasses of water to

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dilute product. DO NOT induce vomiting. Contact physician immediately. Treat as you would any chemical or biological material. Always wash hands thoroughly after use. Follow product sheets and SDS instructions.
4.a. Maximum storage temperature: 105°F
4.b. Minimum storage temperature: 35°F
4.c. Optimum storage temperature range: 35°F to 75°F
4.d. Temperatures of phase separations and chemical changes: Phase separation may occur over time, but mild agitation will reconstitute mixture.

V. SHELF LIFE
The shelf life of unopened containers (i.e., drums, totes, etc.) of RHAMNOWASH 10 exceeds five (5) years. Containers should always be capped when not in use to prevent spillage and/or contamination.

VI. RECOMMENDED APPLICATION PROCEDURE
1. Application Method: RHAMNOWASH 10 can remove oil (e.g., crude, different grades of fuel oil, gasoline, and other petrochemicals) from soil, shorelines, sandy beaches, mangroves, or sea grasses. The product may be applied by hand or using mechanical sprayers, pressure washers, or mechanical soil washing equipment. After a soak time of approximately 30 minutes to 3 to 4 hours (depending on the nature of the spill repeat as necessary), the residual mixture may be recovered using conventional methods. Actual cleaning time will likely depend on the environmental conditions, chemistry of the spilled oil, and the cleaning method employed.

2. Concentration/Application Rate: On heavy oils, use RHAMNOWASH 10 (neat) directly on the spill, or use a 1:100 dilution ratio (product:water) depending on the nature of the oil (e.g., crude vs refined) and environmental conditions (e.g., warm vs cold water). Lighter oils may need a 1:100 to 1:1000 dilution ratios depending on the oil's specific gravity and environmental conditions. RHAMNOWASH 10 maintains its surfactant properties at high levels of dilution, and works best when diluted with water (can use either saltwater or freshwater).

3. Conditions for Use: RHAMNOWASH 10 can be applied on oiled surfaces and shorelines in both freshwater and saltwater. Water temperatures less than 65°F may require higher dilution rates. Sorbent booms, oil skimmers, or other containment equipment should be positioned prior to and remain in place during product use to collect runoff from application and removal operations. Collect and contain runoff from oil/product mixture and dispose of such material in accordance with local, state, and federal regulations.

VII. TOXICITY AND EFFECTIVENESS
a. Toxicity:

Material Tested	Species	LC50 (ppm)
RHAMNOWASH 10	Menidia beryllina	76.64 96-hr
	Mysidopsis bahia	164.61 48-hr
No. 2 Fuel Oil	Menidia beryllina	10.85 96-hr
	Mysidopsis bahia	2.27 48-hr
RHAMNOWASH 10 &	Menidia beryllina	13.70 96-hr

No. 2 Fuel Oil (1:10)	Mysidopsis bahia	2.15 48-hr
Reference Toxicant (SDS)	Menidia beryllina	7.52 96-hr
	Mysidopsis bahia	5.47 48-hr

b. Effectiveness: NA

VIII. MICROBIOLOGICAL ANALYSIS
NA

IX. PHYSICAL PROPERTIES
1. Flash Point (ASTM D-56): >100°C
2. Pour Point (ASTM D-97): 2.6°C
3. Viscosity (ASTM D-445): 2.02 cst @ 40°C
4. Specific Gravity (ASTM D1298): 1.009 at 60°F
5. pH (ASTM D-1293): 6.5
6. Surface Active Agents: Anionic and nonionic, proprietary surfactants
7. Solvents: None
8. Additives: None
9. Solubility: Miscible

X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

Compound	Concentration (ppm)
Arsenic	<0.250
Cadmium	<0.099
Chromium	<0.250
Copper	<0.740
Lead	<0.200
Mercury	<0.0033
Nickel	<0.200
Zinc	<5.000
Cyanide	<2.500
Chlorinated Hydrocarbons	<5.000

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TECHNICAL PRODUCT BULLETIN #S-5
USEPA, OEM REGULATIONS IMPLEMENTATION DIVISION
LISTING DATE: JUNE 29, 2012
"THICKSLICK 6535"

I. NAME, BRAND, OR TRADEMARK
THICKSLICK 6535
Type of Product: Surface Collecting Agent

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT
Desmi, Inc.
1119 Cavalier Boulevard
Chesapeake, VA 23323
Phone: (716) 662-0632
E-mail: pla@desmi.com
Website: http://www.desmi.com
(Mr. Peter Lane)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS
Desmi, Inc.
1119 Cavalier Boulevard
Chesapeake, VA 23323
Phone: (716) 662-0632
E-mail: pla@desmi.com
Website: http://www.desmi.com
(Mr. Peter Lane)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION
1. Flammability: IMO – Non-Flammable; DOT – Non-Hazardous
2. Ventilation: Use with ventilation equal to unobstructed outdoors in a moderate breeze
3. Skin and eye contact; protective covering; treatment in case of contact: May produce eye irritation in some persons and produce eye damage 24 hours or more after instillation. May cause skin irritation after prolonged or repeated exposure. Avoid skin and clothing contact. If skin contact occurs, immediately wash with large amounts of soap and water (if possible). Remove any contaminated clothing and shoes. Launder before reusing. If irritation persists, seek medical assistance. For areas where contact is likely, wear long sleeve shirt, chemical resistant gloves, and chemical resistant goggles.
4.a. Maximum storage temperature: 120°F
4.b. Minimum storage temperature: -40°F
4.c. Optimum storage temperature range: 59°F to 77°F
4.d. Temperatures of phase separations and chemical changes: None

V. SHELF LIFE

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Minimum of three years in unopened container.

VI. RECOMMENDED APPLICATION PROCEDURE
1. Application Method: Spray on water around the perimeter of an oil slick using a pressurized backpack sprayer or aerial applicator.
2. Concentration/Application Rate: 6.4 U.S. gallons/mile (or 15L/km).
3. Conditions for Use: THICKSLICK 6535 is designed to aid in situ burning of free oil in calm water with drift ice where fire boom would be ineffective. When sprayed on the water around the perimeter of an oil slick, THICKSLICK 6535 will concentrate the oil to a thickness suitable for igniting a burn. It works in all water temperatures and salinities and works best with fluid petroleum that has not weathered significantly.

VII. TOXICITY AND EFFECTIVENESS
a. Toxicity

Material Tested	Species	LC50 (ppm)
THICKSLICK 6535	Menidia beryllina	138 96-hr
	Mysidopsis bahia	286 48-hr
No. 2 Fuel Oil	Menidia beryllina	37.6 96-hr
	Mysidopsis bahia	2.43 48-hr
THICKSLICK 6535 & No. 2	Menidia beryllina	5.91 96-hr
Fuel Oil (1:10)	Mysidopsis bahia	1.53 48-hr
Reference Toxicant (SDS)	Menidia beryllina	3.02 96-hr
	Mysidopsis bahia	8.23 48-hr

b. Effectiveness:
NA

VIII. MICROBIOLOGICAL ANALYSIS
NA

IX. PHYSICAL PROPERTIES
1. Flash Point: >180°F
2. Pour Point: 21.2 °F
3. Viscosity: 118 SUS at 100 °F
4. Specific Gravity: 0.9745 at 60°F
5. pH: 6.45
6. Surface Active Agents: CONFIDENTIAL
7. Solvents: CONFIDENTIAL
8. Additives: None
9. Solubility in Water: Partly miscible

ED_001324_00005599-00245

X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

Compound	Concentration (ppm)
Arsenic	ND
Cadmium	ND
Chromium	ND
Copper	ND
Lead	ND
Mercury	ND
Nickel	ND
Zinc	ND
Cyanide	ND
Chlorinated Hydrocarbons	ND

ED_001324_00005599-00246

TECHNICAL PRODUCT BULLETIN #S-6
USEPA, OEM REGULATIONS IMPLEMENTATION DIVISION
LISTING DATE: JUNE 29, 2012
"SILTECH OP-40"

I. NAME, BRAND, OR TRADEMARK
SILTECH OP-40
Type of Product: Surface Collecting Agent

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT
Desmi, Inc.
1119 Cavalier Boulevard
Chesapeake, VA 23323
Phone: (716) 662-0632
E-mail: pla@desmi.com
Website: http://www.desmi.com
(Mr. Peter Lane)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS
Desmi, Inc.
1119 Cavalier Boulevard
Chesapeake, VA 23323
Phone: (716) 662-0632
E-mail: pla@desmi.com
Website: http://www.desmi.com
(Mr. Peter Lane)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION
1. Flammability: IMO – Non-Flammable; DOT – Non-Hazardous
2. Ventilation: Use with ventilation equal to unobstructed outdoors in a moderate breeze
3. Skin and eye contact; protective covering; treatment in case of contact: May produce eye irritation in some persons and produce eye damage 24 hours or more after instillation. May cause skin irritation after prolonged or repeated exposure. Avoid skin and clothing contact. If skin contact occurs, immediately wash with large amounts of soap and water (if possible). Remove any contaminated clothing and shoes. Launder before reusing. If irritation persists, seek medical assistance. For areas where contact is likely, wear long sleeve shirt, chemical resistant gloves, and chemical resistant goggles.
4.a. Maximum storage temperature: 120°F
4.b. Minimum storage temperature: -40°F
4.c. Optimum storage temperature range: 59°F to 77°F
4.d. Temperatures of phase separations and chemical changes: None

ED_001324_00005599-00247

V. SHELF LIFE
Minimum of three years in unopened container.

VI. RECOMMENDED APPLICATION PROCEDURE
1. Application Method: Spray on water around the perimeter of an oil slick using a pressurized backpack sprayer or aerial applicator.
2. Concentration/Application Rate: 6.4 U.S. gallons/mile (or 15L/km).
3. Conditions for Use: SILTECH OP-40 is designed to aid in situ burning of free oil in calm water with drift ice where fire boom would be ineffective. When sprayed on the water around the perimeter of an oil slick, SILTECH OP-40 will concentrate the oil to a thickness suitable for igniting a burn. It works in all water temperatures and salinities and works best with fluid petroleum that has not weathered significantly.

VII. TOXICITY AND EFFECTIVENESS
a. Toxicity

Material Tested	Species	LC50 (ppm)
SILTECH OP-40	Menidia beryllina	3.33 96-hr
	Mysidopsis bahia	6.83 48-hr
No. 2 Fuel Oil	Menidia beryllina	40.50 96-hr
	Mysidopsis bahia	6.43 48-hr
SILTECH OP-40 & No. 2	Menidia beryllina	9.70 96-hr
Fuel Oil (1:10)	Mysidopsis bahia	3.27 48-hr
Reference Toxicant (SDS)	Menidia beryllina	2.33 96-hr
	Mysidopsis bahia	8.68 48-hr

b. Effectiveness:
NA

VIII. MICROBIOLOGICAL ANALYSIS
NA

IX. PHYSICAL PROPERTIES
1. Flash Point: >180°F
2. Pour Point: -74.2 °F
3. Viscosity: 53 SUS at 100 °F
4. Specific Gravity: 0.98816 at 60°F
5. pH: 8.03
6. Surface Active Agents: CONFIDENTIAL
7. Solvents: None
8. Additives: None
9. Solubility in Water: Partly miscible

ED_001324_00005599-00248

X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

Compound	Concentration (ppm)
Arsenic	ND
Cadmium	ND
Chromium	ND
Copper	ND
Lead	ND
Mercury	ND
Nickel	ND
Zinc	ND
Cyanide	ND
Chlorinated Hydrocarbons	ND

ED_001324_00005599-00249

EPA HAS NOT RECEIVED UPDATED CONTACT INFORMATION FOR THIS PRODUCT: 11/19/14

PRODUCT NO LONGER MANUFACTURED

TECHNICAL PRODUCT BULLETIN #B-10
USEPA, OEM REGULATIONS IMPLEMENTATION DIVISION
ORIGINAL LISTING DATE: JULY 9, 1985
REVISED LISTING DATE: JANUARY 11, 1996
"INIPOL EAP 22"

I. NAME, BRAND, OR TRADEMARK
INIPOL EAP 22
Type of Product: Biological Additive

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT
Société CECA S.A.
12 place de l'Iris - Cedex 54
92062 Paris-la-Défense
France
Phone: 011.33.1.47.96.92.91
Telex: CECAS 611444F
Fax: 011.33.1.47.96.92.33
E-mail: serge.kuchto@ceca.fr
(Mr. Serge Kuchto)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS
Elf Atochem North America, Inc.
2000 Market Street, Suite 1900
Philadelphia, PA 19103

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION
1. Flammability: INIPOL EAP 22 is non-flammable.
2. Ventilation: Ventilation of the work place is not necessary.
3. Skin and eye contact; protective clothing; treatment in case of contact: In case of contact with skin or eyes, wash with plenty of water.
4.a. Maximum storage temperature: 122°F
4.b. Minimum storage temperature: 52°F
4.c. Optimum storage temperature range: 55°F-65°F
4.d. Temperatures of phase separations: <52°F and >122°F

ED_001324_00005599-00250

V. SHELF LIFEThe recommended shelf life is one year. However, if the product is stored indoors within the optimum temperature range, this shelf life can be extended. For instance, the shelf life can reach 400 days if the product is stored at 60°F. On the contrary, if the storage temperature is higher than the optimum range, the shelf life will decrease. At 86°F the shelf life will be only 100 days.

VI. RECOMMENDED APPLICATION PROCEDURE

1. Application Method: Application of INIPOL EAP 22 can be made by using any spreading system, including typical spreading systems for marine dispersants. It can be sprayed from airplanes, helicopters, or ships equipped with spray racks. It can also be sprayed with fire hose nozzles or any other means allowing product spreading.
2. Concentration/Application Rate: The application rate is 10% based on amount of oil, i.e., 26 gallons per ton of oil.
3. Conditions for Use: INIPOL EAP 22 should be used in sea waters with temperatures above 52°F. It is effective on weathered oils and is recommended for shore cleanup.

VII. TOXICITY AND EFFECTIVENESS

a. Effectiveness

Bioremediation Agent Effectiveness Test (40 CFR 300.900), Federal Register September 15, 1994:

Summary Data Table

DAYS	PRODUCT 3 REPS/PROD	TOTAL MEAN ALKANES (ppm)	RED% 28 DAYS	TOTAL MEAN AROMATICS (ppm)	RED% 28 DAYS
0	CONTROL	29965.2	0	5620.5	0
	NUTRIENT	31494.8	0	6660.2	0
	INIPOL EAP 22	30823.2	0	5483.4	0
7	CONTROL	30101.5	0	5610.1	0
	NUTRIENT	8073.9	0	5026.6	0
	INIPOL EAP 22	18804.7	0	5349.8	0
28	CONTROL	28785.6	3.94	5512.7	1.92
	NUTRIENT	706.2	97.76	4863.7	26.97
	INIPOL EAP 22	1888.6	93.87	4208.5	23.25

Results of Gravimetric Analysis:

Percentage (%) Decrease in Weight of Oil on Day 28

Control	Nutrient	Product (INIPOL EAP 22)
-6.41%	50.91%	49.95%

ED_001324_00005599-00251

b. Toxicity

Material Tested	Species	LC50 (ppm)	
INIPOL EAP 22	Menidia beryllina	135.0	96-hr
	Mysidopsis bahia	23.0	48-hr
No. 2 Fuel Oil	Menidia beryllina	280.0	96-hr
	Mysidopsis bahia	47.0	48-hr
INIPOL EAP 22 &	Menidia beryllina	125.0	96-hr
No. 2 Fuel Oil (1:10)	Mysidopsis bahia	35.0	48-hr
Reference Toxicant (DSS)	Menidia beryllina	2.7	96-hr
	Mysidopsis bahia	7.0	48-hr

NOTE: This toxicity data was derived using the concentrated product.
See Section VI of this bulletin for information regarding the manufacturer's recommendations for concentrations and application rates for field use.

VIII. MICROBIOLOGICAL ANALYSIS

In the presence of crude oil treated by INIPOL EAP 22, a considerable growth of the heterotrophic microflora can be observed; the number of bacteria increases from 1,000 per ml. to 1,000,000 per ml. This activity remains constant during the whole test period, while crude oil, just by its presence, creates a fall in the metabolic activities.

IX. PHYSICAL PROPERTIES

1. Flash Point: >212°F
2. Pour Point: 52°F
3. Viscosity: 34 Furol sec @ 72°F, (250 cPo @ 68°F)
4. Specific Gravity: 0.996
5. pH of 10% Solution: 7.0
6. Solubility: in sea water dispersible, in raw water dispersible, in hydrocarbons soluble

X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

NA: INIPOL EAP 22 is a microemulsion containing nitrogen and phosphorus compounds in assimilated form. It does not contain any heavy metal, cyanide or chlorinated hydrocarbons.

ED_001324_00005599-00252

TECHNICAL PRODUCT BULLETIN #B-19
USEPA, OEM REGULATIONS IMPLEMENTATION DIVISION
ORIGINAL LISTING DATE: JUNE 18, 1990
REVISED LISTING DATE: JANUARY 11, 1996
"WMI-2000"

I. NAME, BRAND, OR TRADEMARK
WMI-2000
Type of Product: Biological Additive

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT
WMI International, Inc.
4901 Milwee Street, Suite 109
Houston, TX 77092
Phone: (713) 956-4001
Mobile: (832) 798-5610
Fax: (713) 956-7305
E-mail: wmiintlinc@yahoo.com
(Mr. Joseph F. Jennings, President)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS
WMI International, Inc.
4901 Milwee Street, Suite 109
Houston, TX 77092
Phone: (713) 956-4001
Mobile: (832) 798-5610
Fax: (713) 956-7305
E-mail: wmiintlinc@yahoo.com
(Mr. Joseph F. Jennings, President)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION
1. Flammability:
WMI-2000 is non-flammable.
2. Ventilation:
Avoid breathing dust or aerosol due to possibility of sensitization. Use adequate ventilation.
3. Skin and eye contact; protective clothing; treatment in case of contact:
Minimize contact with eyes, skin, and clothing. Wash hands thoroughly after handling culture.
4.a. Maximum storage temperature: 100°F
4.b. Minimum storage temperature: 35°F
4.c. Optimum storage temperature range: 45°F - 90°F
Store in a cool, dry location. Keep partially-used containers tightly closed. Prolonged exposure to high temperature and humidity, may lower activity of product.
4.d. Temperatures of phase separations and chemical changes: NA

ED_001324_00005599-00253

V. SHELF LIFE
The shelf life of WMI-2000 is 2 years if stored at ambient temperatures

VI. RECOMMENDED APPLICATION PROCEDURE
1. Application Method:
The culture should be activated for 2 hours in water, when applicable. Conditions for use vary depending on substrate concentration and type, pH, temperature, availability of nutrients, oxygen content, and liquid medium (static or flowing).
2. Concentration/Application Rate:
Inoculation concentration is 5-9 billion spores per gram.
3. Conditions for Use:
Temperature requirements are between 35°F and 100°F. The optimum dissolved oxygen content is 2 ppm at the sludge-to-water interface. Nitrogen and phosphorous are key nutrients which promote cultural growth, and should be maintained at concentrations of 15-20 ppm and 2.5-5 ppm, respectively. The optimum pH range is between 7.0 and 8.0.

VII. TOXICITY AND EFFECTIVENESS
a. Effectiveness:
Bioremediation Agent Effectiveness Test (40 CFR 300.900), Federal Register September 15, 1994:
Summary Data Table

DAYS	**PRODUCT**	**TOTAL MEAN**	**RED%**	**TOTAL MEAN**	**RED%**
	3 REPS/PROD	**ALKANES (ppm)**	**28 DAYS**	**AROMATICS (ppm)**	**28 DAYS**
0	CONTROL	2626.7	0	1850.0	0
	NUTRIENT	2763.3	0	2030.0	0
	WMI-2000	2453.3	0	1880.0	0
7	CONTROL	2246.7	0	1823.3	0
	NUTRIENT	1920.0	0	1666.7	0
	WMI-2000	1243.3	0	1456.7	0
28	CONTROL	2240.0	14.7	1866.7	-0.9
	NUTRIENT	1210.0	56.2	1480.0	27.0
	WMI-2000	973.3	60.3	1253.0	33.3

ED_001324_00005599-00254

Results of Gravimetric Analysis:
Percentage (%) Decrease in Weight of Oil on Day 28

Control	Nutrient	Product (WMI-2000)
0%	25%	44%

b. Toxicity: NA

VIII. MICROBIOLOGICAL ANALYSIS
1. Listing of all microorganisms by species and percentage in the composition:
CONFIDENTIAL
2. Optimum pH, temperature, and salinity ranges for use of the additives:
Optimum pH: 7.0
Optimum temperature: 45°F - 90°F
Optimum salinity: Fresh water to sea water
3. Minimum and maximum pH, temperature, and salinity levels below or above which the effectiveness of the additive is reduced to half its optimum capacity:
pH: 6.0 - 8.0
Temperature: 40°F - 120°F
Salinity range: Fresh to sea water
4. Special nutrient requirements:
None
5. Test results regarding the determination of the following:
Salmonella - Negative
Fecal Coliform - Negative
Shigella - Negative
Staphylococcus Coagulase positive - Negative
Beta hemolytic Streptococcus - Negative

IX. PHYSICAL PROPERTIES
NA

X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS
NA

ED_001324_00005599-00255

TECHNICAL PRODUCT BULLETIN #B-36
USEPA, OEM REGULATIONS IMPLEMENTATION DIVISION
ORIGINAL LISTING DATE: JULY 17, 1991
REVISED LISTING DATE: OCTOBER 6, 1996
"OPPENHEIMER FORMULA"
(aka, THE OPPENHEIMER FORMULA I, MICROSORB SC)

I. NAME, BRAND, OR TRADEMARK
OPPENHEIMER FORMULA
(aka, THE OPPENHEIMER FORMULA I, MICROSORB SC)
Type of Product: Biological Additive

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT
Oppenheimer Biotechnology, Inc.
P.O. Box 5919
Austin, TX 78763
Phone: (512) 474-1016
Fax: (512) 681-0367
E-mail: jen.neve@obio.com
Website: www.obio.com
(Ms. Jen Neve)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS
Oppenheimer Biotechnology, Inc.
P.O. Box 5919
Austin, TX 78763
Phone: (512) 474-1016
Fax: (512) 681-0367
E-mail: jen.neve@obio.com
Website: www.obio.com
(Ms. Jen Neve)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION
1. Flammability: Non-flammable
2. Ventilation: Special ventilation is not required. Treat product as an hygroscopic powder. In closed spaces use dust protective measures.
3. Skin and eye contact; protective clothing; treatment in case of contact: The application of the dry powder requires the usual precautions of a dust irritant to membranes. The material is easily removed by washing or flushing, and in confined areas or use, a protective mask and eye glasses are recommended.
4.a. Maximum storage temperature: 130°F
4.b. Minimum storage temperature: 32°F
4.c. Optimum storage temperature range: 82°F

ED_001324_00005599-00256

V. SHELF LIFE
The shelf life of the product is approximately 5 year.

VI. RECOMMENDED APPLICATION PROCEDURE
1. Application Method: Optimal application is by powder seeding directly at the source of oil contamination. Application over larger areas of water surface can be accomplished by aerial powder dusting, spraying a water mixture of nutrients/formula over the oil area, or by dusting with mechanical powder pumps.
2. Concentration/Application Rate: The application rate at the source oil slick is 1 pound per cubic yard of oil. In the open sea slick, the basic application rate is 10 pounds per acre, but this may vary in different situations related to speed of clean up. In estuaries, a larger biomass is recommended and may be at a rate of up to 100 pounds per acre, depending on the oil type and concentration. Heavier oils may require a higher biomass than light oils.
3. Conditions for Use: THE OPPENHEIMER FORMULA may be used in a wide range of environmental conditions of temperature and salinities, ranging from fresh to 100 ppt salts. The formula is especially valuable in grass flats, marshes and the open sea. It has also proved effective in soil and fresh water oil clean up and municipal waste treatment, septic tanks and grease traps.

VII. TOXICITY AND EFFECTIVENESS
a. Effectiveness:
Bioremediation Agent Effectiveness Test (40 CFR 300.900), Federal Register September 15, 1994:
Summary Data Table

DAYS	**PRODUCT**	**TOTAL MEAN**	**RED%**	**TOTAL MEAN**	**RED%**
	3 REPS/PROD	**ALKANES (ppm)**	**28 DAYS**	**AROMATICS (ppm)**	**28 DAYS**
0	CONTROL	29965.2	0	5620.5	0
	NUTRIENT	31494.8	0	6660.2	0
	OPPENHEIMER	31140.6	0	5528.2	0
7	CONTROL	30101.5	0	5610.1	0
	NUTRIENT	8073.9	0	5086.6	0
	OPPENHEIMER	5019.7	0	4338.9	0
28	CONTROL	28785.6	3.9	5512.7	1.9
	NUTRIENT	706.2	97.8	4863.7	27.0
	OPPENHEIMER	3396.8	89.1	3417.8	38.2

ED_001324_00005599-00257

Results of Gravimetric Analysis:
Percentage (%) Decrease in Weight of Oil on Day 28

Control	Nutrient	Product (Oppenheimer)
- 6.4 %	50.9 %	10.4 %

b. Toxicity:
NA

VIII. MICROBIOLOGICAL ANALYSIS
1. Listing of all microorganisms by species and percentage in the composition:
Natural, ubiquitous, hydrocarbon-oxidizing, microorganisms for use in removing hydrocarbons and organic materials from soils, fresh and salt waters by natural oxidative pathways.
2. Optimum pH, temperature, and salinity ranges for use of the additive:
pH: 7.6
Temperature: 82°F
Salinity: Fresh water to 20 percent salts
Optimal: 0.5 to 3.5%
3. Minimum and maximum pH, temperature, and salinity levels below or above which the effectiveness of the additive is reduced to half its optimum capacity:
pH: 5.5-11
Temperature: 32°F-140°F
Salinity: Fresh to 15%
4. Special nutrient requirements:
NA
5. Test results regarding the determination of the presence of the following:
Salmonella: Negative
Fecal coliform: <90/100 ml
Shigella: Negative
Staphylococcus Coagulase positive: Negative
Beta hemolytic Streptococci: Negative

IX. PHYSICAL PROPERTIES
NA

X. ANALYSIS OF HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS
NA

ED_001324_00005599-00258

TECHNICAL PRODUCT BULLETIN #B-41
USEPA, OEM REGULATIONS IMPLEMENTATION DIVISION
ORIGINAL LISTING DATE: DECEMBER 18, 1991
REVISED LISTING DATE: JANUARY 21, 1997
"MICRO-BLAZE®"

I. NAME, BRAND, OR TRADEMARK
MICRO-BLAZE®
Type of Product: Biological Additive

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT
Verde Environmental, Inc.
9223 Eastex Freeway
Houston, TX 77093
Phone: (713) 691-6468
(800) 626-6598
Fax: (713) 691-2331
Website: www.micro-blaze.com
E-mail: bscogin@micro-blaze.com
(Mr. William L. Scogin)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS
Verde Environmental, Inc.
9223 Eastex Freeway
Houston, TX 77093
Phone: (713) 691-6468
(800) 626-6598
Fax: (713) 691-2331
Website: www.micro-blaze.com
E-mail: bscogin@micro-blaze.com
(Mr. William L. Scogin)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION
1. Flammability: Non-flammable
2. Ventilation: Normal room ventilation
3. Skin and eye contact; protective clothing; treatment in case of contact: Avoid eye contact. Wear protective gloves, and wash hands with soap and water after handling the product. Wash contaminated clothing and footwear before reuse.
4. Optimum Storage Conditions:
4.a. Maximum storage temperature: 120°F
4.b. Minimum storage temperature: 35°F
4.c. Optimum storage range temperature: NA
4.d. Temperatures of phase separations and chemical changes: NA

ED_001324_00005599-00259

V. SHELF LIFE
Minimum 10 years, with proper storage, in original containers. Freezing will not kill these microbes; however, extreme heat (over 180°F) for long periods of time will kill the microbes.

VI. RECOMMENDED APPLICATION PROCEDURE
MICRO-BLAZE® is a liquid formulation of several microbial strains, surfactants, and nutrients designed to bioremediate organics and hydrocarbons in soil and water as well as control odors.
1. Application Method: Use normal spray equipment, fire or response equipment, eductor setups, water trucks, etc. as methods of application. Mix MICRO-BLAZE®/water mixture with contaminated soils and liquids thoroughly for maximum contact. Pick up treated contamination after volatile hazard has been negated per local regulatory parameters.

For general bioremediation: For in-situ soils, mix MICRO-BLAZE®/water mixture can be tilled into the contaminated area. For shallower contamination, areas can be over sprayed with normal spray equipment, eductor setups, water trucks, etc. For deeper contamination, application can be applied through underground setups using perforated piping per regulatory recommendations. For wastewater and other operational by-product sludges and soils extracted from contaminated areas, a bioslurry or bioreactor can be setup using MICRO-BLAZE® and water in the process.
2. Concentration/Application Rate: For more viscous or less hazardous contamination, apply MICRO-BLAZE® at a 3% solution mixed with water (3 parts MICRO-BLAZE®, 97 parts water). When bioremediating soils, generally, per every 10 cubic yards of contaminated soils, use one gallon of concentrate, diluted with water according to contamination type.
3. Conditions for Use: Water Salinity: Can be mixed with any fresh, brackish or brine. However, brine reduces the effectiveness by 10%.
Water Temperature: 35°F - 180°F
pH: 4 to 11.5
Temperature: 32°F - 120°F
Nutrient Requirements: Nutrients for microbes are included in product. However, for longer-term bioremediation projects, additional applications for Bio-Catalyst may be added to boost microbial activity.

Type and Ages of Pollutants: For use on organics and hydrocarbon-based materials. These strains of bacteria provide the capability of biodegrading various straight chained, branched chained, aromatic and polynuclear aromatic hydrocarbons found in diesel and other fuels. Age of contamination is not a factor as much as its density. Tar-like substances may need to be cut for timely remediation.

VII. TOXICITY AND EFFECTIVENESS
Non-toxic, naturally-occurring spore-forming microorganisms common to soil and water. Non-pathogenic, certified by count; will not mutate.
a. Effectiveness:
Bioremediation Agent Effectiveness Test (40 CFR 300,900) Federal Register September 15, 1994.

ED_001324_00005599-00260

Microbiological Results - Average
Day 0 - 1.7×10^9 Day 7 - 8.43×10^8 Day 28 - 5.2×10^7
The organisms in this product convert to a spore state (dormant) to survive an unfavorable environment and will reactivate upon favorable conditions. Documentation available from Verde Environmental.
Summary Data Table

DAYS	PRODUCT	TOTAL MEAN	RED%	TOTAL MEAN	RED%
	3 REP/PROD	ALKANES (ppm)	28 DAYS	AROMATICS (ppm)	28 DAYS
0	CONTROL	31258.6	0	973	0
	NUTRIENT	28251.8	0	976.6	0
	MICRO-BLAZE®	29548.9	0	1081.2	0
7	CONTROL	31401.73	0	990.5	0
	NUTRIENT	20728.3	26.6	619.1	36.6
	MICRO-BLAZE®	12870.5	56.4	496.3	54.1
28	CONTROL	32465.8	0	925.7	0
	NUTRIENT	1787.2	93.7	722.6	26.0
	MICRO-BLAZE®	1758.2	94.1	566.9	47.6

Alkanes showed significant reductions with aromatic components less dramatic but still significant.

Results of Gravimetric Analysis:
Percentage (%) Decrease in Weight of Oil on Day 28

Control	Nutrient	Product (MICRO-BLAZE®)
<1%	17.6%	12%

CONCLUSIONS: The MICRO-BLAZE® product shows an initial rapid consumption of all measured hydrocarbons at seven (7) days. This rate apparently slows over 28-day period in a closed environment which may be due to a change in the environment of the flask due to the rapid degradation rates. Because of the high microbial population at the end of the test, it is to be assumed that the quantity of metabolites might account for the increased weight as determined by the gravimetric analysis.
b. Toxicity:
NA

ED_001324_00005599-00261

VIII. MICROBIOLOGICAL ANALYSIS1. Listing of all microorganisms by species and percentage in the composition: CONFIDENTIAL
2. Optimum pH, temperature, salinity ranges for use of the additive:
pH: 7.5
Temperature: 45°F - 105°F
Salinity: 0-10%
3. Minimum and maximum pH, temperature, salinity levels below or above which the effectiveness of the additive is reduced to half its optimum capacity:
pH: <5.9, >9.0
Temperature: <32°F, >180°F
Salinity: <0%, 10%
4. Special nutrient requirements: None
5. Test results regarding the determination of the presence of the following:
Product is determined to be free of gram negative contamination.
Salmonella: Negative
Fecal coliform: Negative
Shigella: Negative
Staphylococcus Coagulase positive: Negative
Beta hemolytic Streptococci: Negative

IX. PHYSICAL PROPERTIES
NA

X. ANALYSIS OF HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS
NA

ED_001324_00005599-00262

TECHNICAL PRODUCT BULLETIN #B-42
USEPA, OEM REGULATIONS IMPLEMENTATION DIVISION
ORIGINAL LISTING DATE: JANUARY 3, 1992
REVISED LISTING DATE: FEBRUARY 5, 1997
"VB591™, VB997™, BINUTRIX®"

I. NAME, BRAND, OR TRADEMARK
VB591™, VB997™, BINUTRIX® – Patented, partial encapsulated oleophilic (oil-loving) nutrient
Type of Product: Biological Additive (a nutrient additive that contains no microorganisms)

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT
BioNutraTech Inc.
P.O. Box 290
Porter, TX 77365
Phone: (281) 354-5900
Mobile: (713) 301-0254
Fax: (281) 354-1997
E-mail: shruza@bionutratech.com
Website: www.bionutratech.com
(Ms. Sandra L. Hruza)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS
BioNutraTech Inc.
P.O. Box 290
Porter, TX 77365
Phone: (281) 354-5900
Mobile: (713) 301-0254
Fax: (281) 354-1997
E-mail: shruza@bionutratech.com
Website: www.bionutratech.com
(Ms. Sandra L. Hruza)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION
1. Flammability: Non-flammable
2. Ventilation: Normal ventilation is adequate.
3. Skin and eye contact; protective clothing; treatment in case of contact: Normal precautions and protective equipment for handling any type of powder, such as dust protectors and eye shield. Avoid contact with eyes and do not take internally. Upon contact with eyes, flush with water immediately for a minimum of 15 minutes. If redness or irritation continues, contact a physician. Avoid breathing dust.
4.a. Maximum storage temperature: >140°F
4.b. Minimum storage temperature: NA

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4.c. Optimum storage temperature range: 50°F to 80°F
4.d. Temperature phase separations and chemical changes: NA

V. SHELF LIFE
The shelf life is approximately three years if kept dry. Store in dry location and avoid contact with moisture. Prolonged storage may result in the formation of soft clumps, which are easily broken by mechanical disruption.

VI. RECOMMENDED APPLICATION PROCEDURE
VB591™, VB997™, BINUTRIX® is a powder, and can be applied using conventional powder spraying equipment. No pre-mixing or dilution is required.
1. Application Method: Application for localized spills can be done using hand-held pressurized dust blowers. For inland waterways, ship channels, marinas or coastal wetlands, large dust blowers mounted on barges or ships can be employed to apply the product. Application by aircraft using conventional dust spraying systems is recommended for treatment of large uncontained spreading spills or spills in open waters or at sea.
2. Concentration/Application Rate: Recommended initial application rate is 5 to 15 pounds of VB591™, VB997™, BINUTRIX® per barrel of spilled oil. Follow-up applications at 48 to 72 hour intervals should be adjusted to allow for reduction in oil due to clean-up activities and natural loss by evaporation, droplet formation and dispersion and microbial activity. Applications should not exceed 250 pounds per acre per application.
3. Conditions for Use: VB591™, VB997™, BINUTRIX® should be applied to spilled oil as soon as possible following spillage to stimulate natural oil utilizing microbial populations to maximize biodegradation activity. Application of VB591™, VB997™, BINUTRIX® to spilled oil does not significantly alter the physical consistency of the spilled oil, and as such will not adversely affect conventional cleanup activities, nor will conventional and removal activities adversely affect the activity of VB591™, VB997™, BINUTRIX®. Dispose of waste in accordance with local, state, and federal regulations. Information regarding use of VB591™, VB997™, BINUTRIX® in conjunction with chemical dispersing agents is at present not available.

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VII. TOXICITY AND EFFECTIVENESS

a. Effectiveness:

Bioremediation Agent Effectiveness Test (40 CFR 300.900), Federal Register September 15, 1994:

Summary Data Table

DAYS	PRODUCT	TOTAL MEAN	RED%	TOTAL MEAN	RED%
	3 REPS/PROD	ALKANES (ppm)	28 DAYS	AROMATICS (ppm)	28 DAYS
0	CONTROL	31041.7	0	973.1	0
	NUTRIENT	28251.8	0	976.6	0
	VB591™, VB997™, BINUTRIX®	28813.8	0	932.8	0
7	CONTROL	31436.33	0	990.5	0
	NUTRIENT	20728.3	26.6	619.1	36.6
	VB591™, VB997™, BINUTRIX®	14637.4	49.2	733.1	21.4
28	CONTROL	32465.8	0	925.7	0
	NUTRIENT	1787.2	93.7	722.6	26.0
	VB591™, VB997™, BINUTRIX®	937.97	96.8	290.8	73.1

Results of Gravimetric Analysis:

Percentage (%) Decrease in Weight of Oil on Day 28

Control	Nutrient	Product
<1%	17.6%	18.0%

b. Toxicity:

NA

VIII. MICROBIOLOGICAL ANALYSIS

VB591™, VB997™, BINUTRIX® is an oleophilic nutrient additive and contains no preserved natural or mutated microorganisms of any type.

1. Listing of all microorganisms by species and percentage in the composition:

None

2. Optimum pH, temperature, and salinity ranges for use of the additive:

VB591™, VB997™, BINUTRIX® may be used under any conditions where natural populations of oil-degrading microbes are active.

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3. Minimum and maximum pH, temperature, and salinity levels below or above which the effectiveness of the additive is reduced to half its optimum capacity:
pH: NA
Temperature: NA
Salinity: NA
4. Special nutrient requirements:
None
5. Test results regarding the determination of the presence of the following:
Salmonella: NA
Fecal coliform: NA
Shigella: NA
Staphylococcus coagulase positive: NA
Beta hemolytic Streptococci: NA

IX. PHYSICAL PROPERTIES
NA

X. ANALYSIS OF HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS
NA

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TECHNICAL PRODUCT BULLETIN #B-43
USEPA, OEM REGULATIONS IMPLEMENTATION DIVISION
ORIGINAL LISTING DATE: MARCH 12, 1992
REVISED LISTING DATE: MARCH 21, 1997
"STEP ONE"
(aka, B&S INDUSTRIAL)

I. NAME, BRAND, OR TRADEMARK
STEP ONE
Type of Product: Biological Additive

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT
B&S Research, Inc.
4345 Highway 21
Embarrass, MN 55732
Phone: (218) 984-3757
Fax: (218) 984-3212
E-mail: farmforprofit@frontier.com
(Mr. H. W. Lashmett)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS

B&S Research, Inc.
4345 Highway 21
Embarrass, MN 55732
Phone: (218) 984-3757
Fax: (218) 984-3212
E-mail: farmforprofit@frontier.com
(Mr. H. W. Lashmett)

Bioremediation International
4345 Highway 21
Embarrass, MN 55732
Phone: (218) 984-3757
Fax: (218) 984-3212
E-mail: farmforprofit@frontier.com
(Mr. H. W. Lashmett)

Farm for Profit Research
and Development
4345 Highway 21
Embarrass, MN 55732
Phone: (800) 232-7692
Fax: (218) 984-3212
E-mail: farmforprofit@frontier.com
(Mr. H. W. Lashmett)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION
1. Flammability: None
2. Ventilation: Normal ventilation is adequate
3. Skin and eye contact; protective clothing; treatment in case of contact: Avoid contact with skin, especially when there are open wounds. In case of skin contact, wash with soapy water.

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The use of protective gloves is recommended. Avoid contact with eyes. In case of eye contact, immediately flush eyes with plenty of water continuously for at least 15 minutes. Consult a physician. The use of protective goggles is recommended. Avoid inhalation and ingestion. It is recommended that workers wear dust mask and not eat or smoke while handling the product(s).
4.a. Maximum storage temperature: 90°F
4.b. Minimum storage temperature: -30°F
4.c. Optimum storage temperature range: 32°F to 70°F
4.d. Temperature phase separations and chemical changes: NA

V. SHELF LIFE
Over 3 years

VI. RECOMMENDED APPLICATION PROCEDURE
1. Application Method: Components of the product STEP ONE (BC101) and STEP ONE (MSE2.5) are only sold together. B&S Research will make application recommendations based on contamination and ppm of contamination at time of purchase order and employ specified application methods (spray, plowing, agitation, etc.) appropriate for a particular situation.
2. Concentration/Application Rate: Nominally, the STEP ONE water mixture can be used on most hydrocarbons, including crude and refined petroleum products, pesticides, etc., on land, fresh water or ocean water. Laboratory tests also indicate effectiveness in destruction of PCB's. In certain circumstances, B&S Research, Inc. may require laboratory soil and water contamination tests before the product may be used (see VI 1. above).

VII. TOXICITY AND EFFECTIVENESS
a. Effectiveness:
Bioremediation Agent Effectiveness Test (40 CFR 300.900), Federal Register September 15, 1994:
Summary Data Table

DAYS	PRODUCT	TOTAL MEAN	RED %	TOTAL MEAN	RED %
	3 REPS/PROD.	ALKANES (ppm)	28 DAYS	AROMATICS (ppm)	28 DAYS
0	CONTROL	29959.5		5391.8	
	NUTRIENT	29008.5		5163.0	
	STEP ONE	30477.8		5499.8	
7	CONTROL	33471.3		5720.9	
	NUTRIENT	22723.7		5050.1	
	STEP ONE	24196.8		3110.2	
28	CONTROL	30997.4	0.0 %	5388.9	0.0 %
	NUTRIENT	1103.9	96.19%	4582.4	11.23%

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STEP ONE	17059.4	44.03%	2501.9	54.51%

Results of Gravimetric Analysis:
Percentage (%) Decrease in Weight of Oil on Day 28

Control	Nutrient	Product (STEP ONE)
0%	19%	51%

b. Toxicity:
NA

VIII. MICROBIOLOGICAL ANALYSIS
1. Listing of all microorganisms by species and percentages in the composition:
CONFIDENTIAL
2. Optimum pH, temperature, and salinity ranges for use of the additive:
pH: 6-8
Temperature: 70°F to 90°F
Salinity: Fresh or salt (ocean <110 ppm) water, land or dry surfaces
3. Minimum and maximum pH, temperature, and salinity levels below or above which the effectiveness of the additive is reduced to half its optimum capacity:
pH: <5 or <9, (apply neutralizing agents -- lime or P205
Temperature: <50°F or >135°F
Salinity: <0 or >110 ppm
4. Special nutrient requirements:
None
5. Test results regarding the determination of the presence of the following:
Salmonella: Negative
Fecal coliform: Negative
Shigella: Negative
Staphylococcus Coagulase positive: Negative
Beta hemolytic Streptococci: Negative

IX. PHYSICAL PROPERTIES
1. Flash Point: >212°F
2. Pour Point: -7°F
3. Viscosity: 2.8 cSt @ 50°F
3.5 cSt @ 32°F
5.9 cSt @ -4°F
4. Specific Gravity: 1.03 @ 59°F
5. pH: 7.2 (1:2.5:80 BC101:MSE2.5:water mixture)
6. Chemical Name and Percentage by Weight of the Total Formulation: CONFIDENTIAL
7. Surface Active Agents: Noedal
8. Solvents: None

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9. Additives: Phosphoric acid as P205
3% emulsifier <.5% by weight
10. Solubility: Infinite

X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

Compound	Concentration
Arsenic	<0.0200
Cadmium	<0.0030
Chromium	0.0859
Copper	0.0177
Lead	0.0090
Mercury	0.0002
Nickel	<0.0080
Zinc	0.0602
Cyanide	0.2830
Chlorinated Hydrocarbons	<0.0050

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TECHNICAL PRODUCT BULLETIN #B-45
USEPA, OEM REGULATIONS IMPLEMENTATION DIVISION
ORIGINAL LISTING DATE: JANUARY 28, 1993
REVISED LISTING DATE: NOVEMBER 14, 1995
"SYSTEM E.T. 20" (formerly MCW.B 20)

I. NAME, BRAND, OR TRADEMARK
SYSTEM E.T. 20
Type of Product: Biological Additive

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT
Environmental Restoration Services
9211 Lakewood Drive
Windsor, CA 95492
E-mail: ERS.BTI@gmail.com
Phone: (619) 253-0664
(Mr. John Chase)
Phone: (760) 746-5145
Fax: (760) 746-2034
(Mr. Jack Roberts)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS
Environmental Restoration Services
14384 Highland Valley Road
Escondido, CA 92025
E-mail: ERS.BTI@gmail.com
Phone: (619) 253-0664
(Mr. John Chase)
Phone: (760) 746-5145
Fax: (760) 746-2034
(Mr. Jack Roberts)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION
1. Flammability: SYSTEM E. T. 20 is non-flammable
2. Ventilation: No special ventilation is required under normal use.
3. Skin and eye contact; protective clothing; treatment in case of contact: In its primary form, no special handling or storage is required. Avoid excessive inhalation, and protect the nose and mouth with a dust protection mask. Wear protective gloves, and wash hands with soap and water after handling the product.
4.a. Maximum storage temperature:
4.b. Minimum storage temperature:
4.c. Optimum storage temperature range: 4°C - 20°C (39°F - 68°F). Place in a dry area, shaded from sunlight.

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4.d. Temperatures of phase separations and chemical changes: NA

V. SHELF LIFE
2 years if maintained at 4°C (39°F).

VI. RECOMMENDED APPLICATION PROCEDURE
SYSTEM E. T. 20 can be used on a broad range of hydrocarbon compounds (including PAH's) found in open and closed water systems (salt or fresh) or in soil (beach, sands, or inland soil types). SYSTEM E.T. 20 protocols can be used with indigenous and introduced bacteria. SYSTEM E.T. 20 is an oleophilic, non-water soluble nutrient, which releases nitrogen and phosphorous enzymatically, thus allowing SYSTEM E.T. 20 to be used in water and soil applications including: conditions requiring fast degradation rates due to regulations, limited space or cost; under conditions where weathered or heavy oils, sludges or PAH's exist that require consistently high populations of hydrocarbon degrading bacteria to metabolize these long or more complex carbon chains; tropical or sub-tropical conditions that support large, indigenous, non-beneficial bacterial populations that would otherwise dilute the effectiveness of standard bioaugmentation approaches; aqueous conditions in which soluble or time release nutrient compounds would be washed away or diluted, i.e., beaches, frequent rains, floods, streams, stream banks, estuaries and areas affected by tides; sensitive environmental conditions that demand low or no toxicity; toxicity in soil or water during bioremediation may be stimulated by adding broadly available nutrients which may activate disease carrying bacilli or pathogens; controlled nutrient release to SYSTEM E. T. 20 bacteria prevents over-nitrification; conditions requiring the elimination of oil discoloration caused by the presence of polar fractions; and conditions where salt water conditions exist or where only salt water is available for bacteria application.
1. Application Methods:

Biopile	Land farm	Pump and Treat
Bioreactor	Bio slurry	
In situ	Windrow	

Topical application to discolored rocks or soil.
Topical application to beaches.
2. Concentration/Application Rate:
Concentration and rate of application will vary from site to site depending upon the type of contaminant and the area contaminated. Contact QET for specific information.
3. Conditions for Use:
Before applying SYSTEM E. T. 20, QET recommends that the site be evaluated for its physical and chemical soil characteristics (i.e., pH, salinity, conductivity, physical parameters, moisture content, hydrocarbon type and concentration, nitrogen content, etc.), and toxicity of both the soil and the contaminant, by biological screening tests.
Basic biological requirements of SYSTEM E. T. 20, site conditions and SYSTEM E. T. 20 capabilities dictate the appropriate procedures for application of SYSTEM E. T. 20.
Biological requirements for SYSTEM E. T. 20 bacteria are nutrients, adequate oxygen supply, hydrocarbon food source, neutral pH and a 15% minimum moisture level for soil remediation applications.

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VII. TOXICITY AND EFFECTIVENESS

a. Effectiveness:

Bioremediation Agent Effectiveness Test (40 CFR 300.900), Federal Register September 15, 1994:

Summary Data Table

DAYS	PRODUCT	TOTAL MEAN	RED%	TOTAL MEAN	RED%
	3 REPS/PROD	ALKANES (ppm)	28 DAYS	AROMATICS (ppm)	28 DAYS
0	CONTROL	29959.5	0	5391.8	0
	NUTRIENT	29008.5	0	5163.0	0
	SYSTEM E.T. 20	30476.1	0	5311.3	0
7	CONTROL	33471.3	0	5720.9	0
	NUTRIENT	22723.7	0	5050.1	0
	SYSTEM E.T. 20	3837.1	0	2928.8	0
28	CONTROL	30997.4	0	5383.9	0.2
	NUTRIENT	1103.9	96.2	4582.4	11.2
	SYSTEM E.T. 20	261.9	99.1	1188.0	77.0

Results of Gravimetric Analysis:

Percentage (%) Decrease in Weight of Oil on Day 28

Control	Nutrient	Product (SYSTEM E.T. 20)
0%	19%	18%

b. Toxicity:

NA

VIII. MICROBIOLOGICAL ANALYSIS

1. Listing of all microorganisms by species and percentage in the composition:

CONFIDENTIAL

2. Optimum pH, temperature, and salinity ranges for use of the additive: pH: 7.5, (6.5 to 8.5)

Temperature: 4°C to 35°C (39°F to 95°F)

Salinity: Fresh to 2.5% (average ocean salt level)

3. Minimum and maximum pH, temperature, and salinity levels below or above which the effectiveness of the additive is reduced to half its optimum capacity:

pH: <6.5 and >8.5

Temperature: <5°C and >35°C (<41°F and >95°F)

Salinity: >3%

4. Special nutrient requirements:

Recommendation is for a non-soluble nutrient. The specific types of nutrients will be dependent

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on the site requirements.
5. Test results regarding the determination of the presence of the following:
Salmonella: Negative
Fecal coliform: Negative
Shigella: Negative
Staphylococcus Coagulase positive: Negative
Beta hemolytic Streptococci: Negative

IX. PHYSICAL PROPERTIES
NA

X. ANALYSIS OF HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS
NA

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EPA HAS NOT RECEIVED UPDATED CONTACT INFORMATION FOR THIS PRODUCT: 11/19/14

TECHNICAL PRODUCT BULLETIN #B-48
USEPA, OEM REGULATIONS IMPLEMENTATION DIVISION
ORIGINAL LISTING DATE: NOVEMBER 10, 1993
REVISED LISTING DATE: AUGUST 31, 2000
"BET BIOPETRO"
(formerly BET BIOPETRO HEAVY)

I. NAME, BRAND, OR TRADEMARK
BET BIOPETRO
Type of Product: Biological Additive

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT
BioEnviroTech
14615 FM 2920
Tomball, Texas 77375
(Mr. Warren Butler)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS
BioEnviroTech
14615 FM 2920
Tomball, Texas 77375
(Mr. Warren Butler)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION
1. Flammability: Non-Flammable
2. Ventilation: Normal ventilation
3. Skin and eye contact; protective clothing; treatment in case of contact: Avoid eye and skin contact. In case of eye contact, flush eyes with water or eyewash, and refrain from rubbing. For skin contact, wash with mild soap and apply hand cream if itching or redness occurs. Avoid inhalation. In case of inhalation, seek fresh air. Repeated inhalation has been associated with respiratory allergy in some persons. Such allergic individuals should wear protective clothing and eye goggles. In enclosed buildings, workers should wear single use nuisance dust masks appropriate for fine particulate dust. In outdoor field applications, no dust mask is required.
4.a. Maximum storage temperature: 105°F
4.b. Minimum storage temperature: 32°F
4.c. Optimum storage temperature range: 50°F to 75°F
4.d. Temperatures of phase separations and chemical changes: NA

V. SHELF LIFEMore than 3 years in unopened original shipping container, stored in cool dry area.

VI. RECOMMENDED APPLICATION PROCEDURE
1. Application Method: BET BIOPETRO is a powder containing granules of bacterial product formulated to provide performance in the bioremediation of heavy refined and crude hydrocarbon contaminants in both soil and water environments.
Application procedure and treatment schedule will vary with specific environmental conditions and bioremediation requirements. Contact BET for specific technical advice.
2. Concentration/Application Rate: Dosage will vary with specific environmental conditions and bioremediation requirements. Contact BET for specific technical advice.
3. Conditions for Use: BET BIOPETRO should be used at temperatures in the range of 45°F to 100°F, pH range of 5.5 to 8.5, and dissolved oxygen level of 3 to 5 mg/l. The product is effective in both salt and fresh waters. However, where extreme salinity is projected, testing and evaluation of the bacteria in bioremediation are advised. BET BIOPETRO cultures exhibit some resistance to toxic shocks from strong chemicals. Nonetheless, highly chlorinated compounds, acids, caustics, disinfectants, germicides, and chlorine will render the cultures ineffective, just like other bacteria. Where such chemicals are anticipated, testing and evaluation of the bacteria in bioremediation are advised.

BET BIOPETRO cultures require supplemental nutrients for optimum performance (See section VIII. 4).

VII. TOXICITY AND EFFECTIVENESS
a. Effectiveness:
Bioremediation Agent Effectiveness Test (40 CFR 300.900), Federal Register September 15, 1994:
Summary Data Table

DAYS	PRODUCT	TOTAL MEAN	RED%	TOTAL MEAN	RED %
	3 REPS/PROD	ALKANES (ppm)	28 DAYS	AROMATICS (ppm)	28 DAYS
0	CONTROL	29965.2	0	5620.5	0
	NUTRIENT	31494.8	0	6660.2	0
	BET BIOPETRO	25914.5	0	5569.1	0
7	CONTROL	30101.5	0	5610.1	0
	NUTRIENT	8073.9	0	5086.6	0
	BET BIOPETRO	373.0	0	1220.0	0
28	CONTROL	28785.6	4.0	5512.7	2.0
	NUTRIENT	706.2	98.0	4863.7	27.0

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BET BIOPETRO	350.3	99.0	1882.9	67.0

Results of Gravimetric Analysis:
Percentage (%) Decrease in Weight of Oil on Day 28

Control	Nutrient	Product (BET BIOPETRO)
0%	51%	30%

b. Toxicity:
NA

VIII. MICROBIOLOGICAL ANALYSIS
1. Listing of all microorganisms by species and percentage in the composition:
CONFIDENTIAL
2. Optimum pH, temperature, and salinity ranges for use of the additive
pH: 6.6 to 7.4
Temperature: 70°F to 95°F
Salinity: Fresh to Salt water
3. Minimum and maximum pH, temperature, and salinity levels below or above which the effectiveness of the additive is reduced to half its optimum capacity.
pH: <5.5 and >8.5
Temperature: <45°F and >105°F
Salinity: Extreme salinity
4. Special nutrient requirements
BioEnviroTech, Inc. recommends nutrient supplements for optimum performance of the product in bioremediation application. The required nutrients are dependent upon hydrocarbon contamination levels. Contact BET for specific nutrient dosing requirements.
5. Test results regarding the determination of the presence of the following:
Salmonella: Negative
Fecal coliform: Negative
Shigella: Negative
Staphylococcus Coagulase positive: Negative
Beta hemolytic Streptococci: Negative

IX. PHYSICAL PROPERTIES
NA

X. ANALYSIS OF HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS
NA

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TECHNICAL PRODUCT BULLETIN #B-53USEPA, OEM REGULATIONS IMPLEMENTATION DIVISION
ORIGINAL LISTING DATE: AUGUST 26, 1996
REMOVAL DATE: AUGUST 16, 2005
RELISTING DATE: SEPTEMBER 18, 2009
"OIL SPILL EATER II (OSE II)"

I. NAME, BRAND, OR TRADEMARK
OIL SPILL EATER II (OSE II)
Type of Product: Bioremediation Agent (Biological Enzyme Additive [previously listed as a Nutrient Additive])

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT
OSEI Corporation (Formerly Sky Blue Chems)
P.O. Box 515429
Dallas, TX 75251-5429
Phone: (972) 669-3390
E-mail: oseicorp@msn.com
Website: www.osei.us
(Mr. Steven Pedigo, Chairman, CEO, Inventor)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS
OSEI Corporation (Formerly Sky Blue Chems)
P.O. Box 515429
Dallas, TX 75251-5429
Phone: (972) 669-3390
E-mail: oseicorp@msn.com
Website: www.osei.us
(Mr. Steven Pedigo, Chairman, CEO, Inventor)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION
1. Flammability: Water-based, non-flammable
2. Ventilation: Needs no ventilation; aqueous-based product; does not emit hazardous vapors
3. Skin and eye contact; protective clothing; treatment in case of contact: OSE II is not a primary dermal irritant. Avoid eye contact, and wear goggles if possible for the spray to come in direct contact with eyes. Facilities for quick and copious eye flushing should be provided and prompt medical attention should be sought if exposure and irritation persists. Protective rubber gloves are suggested during handling. Before mixing the product has a smell of fermentation. The product does not give off any harmful vapors.
4.a. Maximum storage temperature: 120°F
4.b. Minimum storage temperature: None; OSE II can freeze and thaw without adverse effects
4.c. Optimum storage temperature range: 72°F
4.d. Temperatures of phase separations and chemical changes: 120°F

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V. SHELF LIFE

OSE II has a recommended shelf life of 5 years. After 5 years at optimum storage temperature, there is an approximate 10% decrease per year in product capability.

VI. RECOMMENDED APPLICATION PROCEDURE

1. Application Method:

A. Use surface spray apparatus, such as small hand held tanks, back pack, large mixing tanks with mechanical pumping devices, vessels with booms for spraying wide paths, or spray devices on airplanes or helicopters.

B. OSE II can be applied by eductor systems from vessels, fire trucks, etc. Set the eductor system to 2% and apply 1 gallon of mixed OSE II to each spilled gallon of hydrocarbon.

2. Concentration/Application Rate:

General – OSE II generally takes 3 to 30 minutes to penetrate the molecular walls of hydrocarbons. However, once you spray OSE II on the hydrocarbons, OSE II attaches itself and will eventually engulf the hydrocarbons regardless of where the hydrocarbons may spread on the surface of salt or fresh water. Additionally, once you spray OSE II, the hydrocarbons cannot attach itself to the shoreline, rocks, or any equipment in its path. OSE II breaks down the adhesion properties of hydrocarbons and causes hydrocarbons to float, thereby, eliminating secondary contamination of the water column or any other areas, and holding the contaminated area to the water's surface, the original contaminated area.

- If OSE II is to be used on ocean spills or on intertidal zones OSE II should be mixed with ocean water.
- If OSE II is to be used on lakes, rivers, streams, ponds, or on land mix the product with water from a lake, stream, or pond.
- If you are performing a cleanup, make sure the water used to mix with OSE II, and the water used to keep the area saturated, is the type of water normally associated with that area.
- If you use fresh water in an area normally contacted with salt water or vice versa, the different types of bacteria and competition could occur, not to mention the problems with salinity for fresh water organisms.

[Note: Do not mix tap water with OSE II if possible: Chlorine in tap water slows bacterial enhancement]

Spills on Water:

Dilute each gallon of OSE II with 50 gallons of fresh, brackish, or salt water – depending on the water associated with the area that has been impacted by the spill. Apply OSE II at a ratio of 1 gallon mixed OSE II to each gallon of hydrocarbon spilled. Apply using hand held sprayers, tank sprayers, booms from vessels, helicopters, or airplanes; by spraying the perimeter first then working toward the middle of the spilled area. Next spray the entire surface of the spill. If the spill is very heavy (more than 2 inches thick) it is recommended that OSE II be applied every day until you have met a 1:1 ratio of OSE II and water mixture to spilled oil/hydrocarbons.

- Use 1 gallon OSE II for every 50 gallons of hydrocarbons.
- Use 1 drum of OSE II for every 2,750 gallons of hydrocarbons.
- If you know gallons of hydrocarbons spilled, multiply gallons of hydrocarbons by 0.02 to get amount of OSE II needed [gallons of hydrocarbons x 0.02 = gallons of OSE II].

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- If you know barrels of crude oil spilled, multiply barrels of crude oil by 0.015 to get drums of OSE II needed [barrels of crude oil x 0.015 = drums of OSE II].
- If you do not know gallons of hydrocarbons or barrels of crude oil, multiply size of spill by 0.0023 to get drums of OSE II needed or by 0.12 to get gallons of OSE II needed [(yards long x yards wide x inches thick) x 0.0.0023 = drums of OSE II or (yards long x yards wide x inches thick) x 0.015 = gallons of OSE II].

Intertidal Zone:
Mix each 55 gallon drum of OSE II with 2,750 gallons of fresh, brackish, or salt water. The water used is determined by the type of water associated with the site. OSE II should be applied as the tide recedes (if there is a tide) and once the tide comes in the application should cease until the tide recedes again. Additional applications should only be warranted if spill has been allowed time to percolate into the depths of the soil.

If there is no tide, but waves have pushed the spill into the intertidal zone, then there will be direct access to the spill at all times. If possible use string or stakes to grid off the beach or intertidal zone area, and then you can calculate how much premixed OSE II to apply to a given area. If unable to grid off an area then calculate how much OSE II to apply and then determine how much premixed OSE II will flow through a nozzle (gallons per minute) then let application technician know how many gallons to apply in a given area and this can be determined by applying product for a certain time period to get the correct amount of OSE II applied to gain the 1:1 ratio.

Note: If the intertidal zone is associated with the sea then mix OSE II with salt water. If the spill area is in an area of brackish water then mix OSE II with brackish water. If the intertidal zone is associated with fresh water such as lakes, rivers, streams, ponds, creeks, aquifers, or drinking water wells then use fresh water to mix OSE II.

3. Conditions for Use:

- OSE II can remediate hydrocarbon-based material including chlorinated hydrocarbons, PCB's, dioxins, and some pesticides.
- As the age of spilled hydrocarbons increases, the time necessary for bioremediation increases. In general, fresh crude, gasoline of BTEX takes from 72 hours to 30 days to completely bioremediate.
- Variations of sea water salinity should have no effect, but as long as microbial life can exist, then OSE II will be effective.
- OSE II bioremediation slows somewhat at temperatures below 40°F. OSE II however, will continue to work at any liquid water temperature that will sustain microbial life.

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VII. TOXICITY AND EFFECTIVENESSa. Effectiveness:
Summary Data Table

DAYS	PRODUCT	TOTAL MEAN	RED%	TOTAL MEAN	RED%
	3 REPS/PROD	ALKANES (ppm)	28 DAYS	AROMATICS (ppm)	28 DAYS
0	CONTROL	43,170	-	11,435	-
	NUTRIENT	40,569	-	11,785	-
	OSE II	41,730	-	12,155	-
7	CONTROL	39,250	9.1	10,355	9.4
	NUTRIENT	34,815	14.2	9,898	16.0
	OSE II	26,316	36.9	8,072	33.6
28	CONTROL	35,797	17.1	9,534	16.6
	NUTRIENT	26,507	34.7	8,938	24.2
	OSE II	4,273	89.8	1,268	89.6

Results of Gravimetric Analysis:
Percentage (%) Decrease in Weight of Oil on Day 28

Control	Nutrient	Product
16.5%	52.0%	85.4%

b. Toxicity: NA

VIII. MICROBIOLOGICAL ANALYSIS

1. Listing of each component of the total formulation, other than enzymes, by chemical name and percentage by weight: CONFIDENTIAL
2. Enzyme Names: CONFIDENTIAL
3. I.U.B.: CONFIDENTIAL
4. Source of Enzymes: Fermentation process
5. Units: No less than 1% and no more than 50% by weight
6. Specific Gravity: 1.05
7. Optimum Conditions:
    a. pH: 7.0
    b. Temperature: 72°F
    c. Salinity Ranges: Fresh water to salt water
    d. Maximum and Minimum pH: 3.5 – 8.0
    e. Maximum and Minimum Temperature: 28°F – 128°F

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f. Maximum and Minimum Salinity Levels – Salinity level above that will support microbial activity will adversely affect OSE II's performance
g. Enzyme Shelf Life: Up to 5 years when properly stored
h. Enzyme Optimal Storage Conditions: 72°F is optimal, enzyme range is freezing to 120°F, never leave OSE II in direct sunlight for more than a couple of hours

IX. PHYSICAL PROPERTIES
NA

X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS
NA

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EPA HAS NOT RECEIVED UPDATED CONTACT INFORMATION FOR THIS PRODUCT: 11/19/14

PRODUCT NO LONGER MANUFACTURED

TECHNICAL PRODUCT BULLETIN #B-54
USEPA, OEM REGULATIONS IMPLEMENTATION DIVISION
LISTING DATE: JUNE 28, 1999
"PRISTINE SEA II (formerly MICROPRO D)"

I. NAME, BRAND, OR TRADEMARK
PRISTINE SEA II
Type of Product: Bioremediation Agent (Biological Additive)

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT
Fluid Tech, Inc.
6450 Spring Mountain Road, Suite 9
Las Vegas, NV 89146
Phone: (702) 871-1884
Fax: (702) 871-3269
(Mr. Stan True)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS
Fluid Tech, Inc.
6450 Spring Mountain Road, Suite 9
Las Vegas, NV 89146
Phone: (702) 871-1884
Fax: (702) 871-3269
(Mr. Stan True)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION
1. Flammability: PRISTINE SEA II is non-flammable.
2. Ventilation: Provide adequate ventilation in enclosed areas. Avoid creating dust.
3. Skin and eye contact: In case of eye or skin contact, flush affected areas thoroughly with water. Wear protective gloves, safety glasses, and dust respirators in dusty conditions. Provide eye wash facility and washing area. Exercise reasonable personal cleanliness.
4.a. Maximum storage temperature: 48°C
4.b. Minimum storage temperature: 6°C
4.c. Optimum storage temperature range: 24°C - 30°C
4.d. Temperatures of phase separations and chemical changes: NA

V. SHELF LIFE
As a dry bacterial blend, the shelf life is 1 year, and as a liquid bacterial mixture, the shelf life is

6 months.

VI. RECOMMENDED APPLICATION PROCEDURE

1. Application Method: Soak at a rate of 1 kg to 4 L influent waste and 4 L tap water, or add directly to system.
2. Concentration/Application Rate: Product dosage will vary according to contaminant, matrix, and environmental conditions. Contact technical representatives for recommendations.
3. Conditions for Use: PRISTINE SEA II can be used to treat (degrade) refinery and petrochemical waste constituents (i.e., alkanes and aromatics) such as phenol, PAHs, creosols, paraffinic intermediates, sulfides, alcohols, and related solvents. The product also improves settling and minimizes foam formation and/or production.

VII. TOXICITY AND EFFECTIVENESS

a. Effectiveness

PRISTINE SEA II is expected to be effective in the degradation of refinery and petrochemical wastes. These bioremediation test results are provided by EPA's Risk Reduction Laboratory, Cincinnati, Ohio.

DAYS	**PRODUCT**	**RED%**
11	CONTROL	28
	ALKANE	93.6
	AROMATIC	86
20	CONTROL	26
	ALKANE	95.5
	AROMATIC	90

b. Toxicity

NA

VIII. MICROBIOLOGICAL ANALYSIS

CONFIDENTIAL

IX. PHYSICAL PROPERTIES

NA

X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

NA

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EPA HAS NOT RECEIVED UPDATED CONTACT INFORMATION FOR THIS PRODUCT: 11/19/14

TECHNICAL PRODUCT BULLETIN B-55
USEPA, OEM REGULATIONS IMPLEMENTATION DIVISION
LISTING DATE: SEPTEMBER 10, 1999
"LAND AND SEA RESTORATION PRODUCT 001 (VELITE)"

I. NAME, BRAND, OR TRADEMARK
"LAND AND SEA RESTORATION PRODUCT 001 (VELITE)"
Type of Product: Bioremediation Agent (Nutrient Additive)

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT
Land and Sea Restoration LLC
4147 Acorn Hill
San Antonio, TX 78217
(Mr. T. Shawn Parker)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS
Land and Sea Restoration LLC
4147 Acorn Hill
San Antonio, TX 78217
(Mr. T. Shawn Parker)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION
1. Flammability: Flash Point 250°C (482°F)
2. Ventilation: Normal ventilation
3. Skin and eye contact; protective clothing; treatment in case of contact: Protective clothing and glasses. In case of eye contact, flush eyes with water or eyewash and refrain from rubbing. For skin contact, wash with mild soap and apply cream if itching or redness occurs. Avoid inhalation. In case of inhalation, seek fresh air. Wear protective clothing and eye goggles. Workers should wear single use nuisance dust masks appropriate for fine particulate dust.
4.a. Maximum storage temperature: 65°C (150°F)
4.b. Minimum storage temperature: 0°C (32°F)
4.c. Optimum storage temperature range: 0°C to 65°C (32 to 150°F)
4.d. Temperatures of phase separations and chemical changes: NA

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V. SHELF LIFEMore than 5 years in unopened original shipping container, store in a cool, dry place. Avoid moisture prior to use.

VI. RECOMMENDED APPLICATION PROCEDURE
1. Application Method: On water, spread over contaminated area at 1 to 3 ratios. On soil, blend to depth equivalent to contamination level. On hard surfaces, spread over contaminated area. Make sure the spill is completely absorbed. For best results agitate with broom. (Will not damage cured asphalt if used as an absorbent for spills.) Remove and dispose of in accordance with all state and federal laws, after absorption is complete.
2. Concentration/Application Rate:
1 part 001 to 3 parts hydrocarbon.
3. Conditions for Use:
NA

VII. TOXICITY AND EFFECTIVENESS
a. Effectiveness:
Bioremediation Agent Effectiveness Test (40 CFR 300.900), Federal Register September 15, 1994:
Summary Data Table

DAYS	PRODUCT	TOTAL MEAN	RED%	TOTAL MEAN	RED%
	3 REPS/PROD	ALKANES (ppm)	28 DAYS	AROMATICS (ppm)	28 DAYS
0	CONTROL	13.8239	0	0.0443	0
	001	13.5856	0	0.0509	0
7	CONTROL	14.3292	0	0.0473	0
	001	10.1005	29.52	0.0437	0
28	CONTROL	14.4675	0	0.0401	0
	001	8.2629	42.92	0.0273	31.92

Results of Gravimetric Analysis:
Percentage (%) Decrease in Weight of Oil on Day 28

Control	Product (001)
0%	25.18%

b. Toxicity: NA

VIII. MICROBIOLOGICAL ANALYSIS
1. Listing of all microorganisms by species and percentages in the composition:
CONFIDENTIAL

2. Optimum pH, temperature, and salinity ranges for use of the additive:
pH: 6 to 8
Temperature: 25°C to 30°C (77°F to 86°F)
Salinity: Fresh to salt water
3. Minimum and maximum pH, temperature, and salinity levels below or above which the effectiveness of the additive is reduced to half its optimum capacity:
pH: NA
Temperature: NA
Salinity: NA
4. Special nutrient requirements:
The product "001" is a nutrient, therefore no nutrients are required.
5. Test results regarding the determination of the presence of the following:
Salmonella: Negative
Fecal coliform: <3
Shigella: Negative
Staphylococcus Coagulase positive: <10
Beta hemolytic Streptococci: 1,100

IX. PHYSICAL PROPERTIES
1. Flash Point: 250°C (482°F)
2. Pour Point: NA
3. Viscosity: NA
4. Specific Gravity: NA
5. pH: NA
6. Surface Active Agents: NA
7. Solvents: NA
8. Additives: NA
9. Solubility in Water: NA

X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS
NA

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TECHNICAL PRODUCT BULLETIN B-56
USEPA, OEM REGULATIONS IMPLEMENTATION DIVISION
LISTING DATE: JULY 24, 2002
"S-200C (formerly S-200)"

I. NAME, BRAND, OR TRADEMARK
S-200C (formerly S-200)
Type of Product: Bioremediation Agent (Nutrient Additive)

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT
International Environmental Products, LLC
Two Villanova Center
795 E. Lancaster Ave., Suite 280
Villanova, PA 19085
Phone: (610) 520-7665
Fax: (610) 520-7663
E-mail: info@iepusa.com
(Mr. Jim Lynn)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS
International Environmental Products, LLC
Two Villanova Center
795 E. Lancaster Ave., Suite 280
Villanova, PA 19085
Phone: (610) 520-7665
Fax: (610) 520-7663
E-mail: info@iepusa.com
(Mr. Jim Lynn)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION
1. Flammability: Non-flammable.
2. Ventilation: Ventilation of the work place is not necessary.
3. Skin and eye contact; protective clothing; treatment in case of contact: In case of contact with skin or eyes, wash with plenty of water.
4.a. Maximum storage temperature: 132°F
4.b. Minimum storage temperature: 32°F
4.c. Optimum storage temperature range: 55°F - 85°F
4.d. Temperatures of phase separations and chemical changes: <32°F and >140°F

V. SHELF LIFE
The recommended shelf life of S-200C is 1½ years if kept in the unopened original container.

VI. RECOMMENDED APPLICATION PROCEDURE

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1. Application Method: S-200C is a light amber liquid, and as such can be sprayed with traditional liquid spraying equipment, such as pressurized sprayers or backpack sprayers.
2. Concentration/Application Rate: The recommended application rate is approximately 10% by of the S-200C as compared to the hydrocarbon being remediated. In other words, use 1 pound of S-200C for every 10 pounds of hydrocarbon you are remediating. For applications on soil contaminated below 1 foot, the soil is turned and the material is applied. This allows air to circulate and thereby maintains an aerobic condition. On a surface application, the amount to use is approximately 0.1 to 1 pound of S-200C for every square yard of surface area. The amount sprayed is dependent on the amount of hydrocarbon on the surface you are spraying.
To remediate a sheen on water, the same application ratio for a surface application is used.
3. Conditions for Use: S-200C is a bioremediation accelerator used for the remediation of hydrocarbon spills or leaks. It is a non-intrusive, cost effective remedy for the cleanup of these hydrocarbons. These hydrocarbons include but are not limited to gasoline, No. 2 up to No. 6 diesel fuel, jet fuels, kerosene, lubricating oils, hydraulic oils, and crude oils.

VII. TOXICITY AND EFFECTIVENESS
a. Effectiveness:
Bioremediation Agent Effectiveness Test (40 CFR 300.900), Federal Register September 15, 1994:
Summary Data Table

DAYS	**PRODUCT**	**TOTAL MEAN**	**RED%**	**TOTAL MEAN**	**RED%**
	3 REPS/PROD	**ALKANES (ppm)**	**28 DAYS**	**AROMATICS (ppm)**	**28 DAYS**
0	CONTROL	27666	0	5600	0
	S-200C	29333	0	5666	0
7	CONTROL	21333	0	4333	0
	S-200C	11000	0	4400	0
28	CONTROL	18771	32	5597	0.05
	S-200C	660	98	5073	10.4

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Results of Gravimetric Analysis:
Percentage (%) Decrease in Weight of Oil on Day 28

Control	Product (001)
-18.57%	27.82%

b. Toxicity:

Material Tested	Species	LC50 (ppm)
S-200C	Menidia beryllina	39.69 96-hr
	Mysidopsis bahia	21.33 48-hr
No. 2 Fuel Oil	Menidia beryllina	35.36 96-hr
	Mysidopsis bahia	35.36 48-hr
S-200C & No. 2 Fuel Oil (1:10)	Menidia beryllina	25.33 96-hr
	Mysidopsis bahia	17.67 48-hr
Reference Toxicant (SDS)	Mysidopsis bahia	22.96 48-hr

VIII. MICROBIOLOGICAL ANALYSIS
1. Listing of all microorganisms by species and percentages in the composition:
S-200C is a nutrient bioremediation accelerator and does not contain bacterial cultures or amendments. However, with the addition of S-200C, the microbiological data shows a continued viability of microbial incubations over time.
2. Optimum pH, temperature, and salinity ranges for use of the additive:
pH: 7.0
Temperature: 86°F
Salinity: Fresh to salt water
3. Minimum and maximum pH, temperature, and salinity levels below or above which the effectiveness of the additive is reduced to half its optimum capacity:
pH: 4.5 - 10.0
Temperature: 50°F - 120°F
Salinity: 0% - 10%
4. Special nutrient requirements:
NA
5. Test results regarding the determination of the presence of the following:
Salmonella: Negative
Fecal coliform: Negative
Shigella: Negative
Staphylococcus Coagulase positive: Negative
Beta hemolytic Streptococci: Negative

IX. PHYSICAL PROPERTIES
1. Flash Point: >212°F
2. Pour Point: 40°F
3. Viscosity:100cp@70°F
4. Specific Gravity: 0.996
5. pH: 4.5
6. Surface Active Agents: NA

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7. Solvents: NA
8. Additives: NA
9. Solubility in Water: Dispersible

X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

S-200C does not contain any heavy metals, cyanide, or chlorinated hydrocarbons.

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TECHNICAL PRODUCT BULLETIN B-57
USEPA, OEM REGULATIONS IMPLEMENTATION DIVISION
LISTING DATE: JANUARY 8, 2007
"SPILLREMED (MARINE)®"
(aka, AGROREMED, HYDROREMED, SPILLREMED (INDUSTRIAL), VAPORREMED)

I. NAME, BRAND, OR TRADEMARK
SPILLREMED (MARINE)®
(aka, AGROREMED, HYDROREMED, SPILLREMED (INDUSTRIAL), VAPORREMED)
Type of Product: Bioremediation Agent (Biological Additive: Microbiological Culture)

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT
Sarva Bio Remed, LLC
25 Marianne Drive, Suite 'B'
York, PA 17406
Phone: (717) 779-0040
Phone : (877) 717-2782
Fax: (419) 710-5831
E-mail: sales@sarvabioremed.com
Website: www.sarvabioremed.com
(Mr. Satya Ganti)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS

Sarva Bio Remed, LLC
25 Marianne Drive, Suite 'B'
York, PA 17406
Phone: (717) 779-0040
Phone : (877) 717-2782
Fax: (419) 710-5831
E-mail: sales@sarvabioremed.com
Website: www.sarvabioremed.com
(Mr. Satya Ganti)

Edward R. Stephen Co., Inc.
10 Dunham Road
Billerica, MA 01821
Phone: (978) 667-6399
E-mail: bohs@erstephen.com
(Mr. Barry Ohs)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION
1. Flammability: Non-flammable.
2. Ventilation: No special ventilation required.
3. Skin and eye contact; protective clothing; treatment in case of contact: On contact with product, wash with plenty of water and for eye contact consult your physician. Use of gloves and eye protection is recommended during field application to protect eyes from spray.
4.a. Maximum storage temperature: 100°F
4.b. Minimum storage temperature: 32°F
4.c. Optimum storage temperature range: Ambient
4.d. Temperatures of phase separations and chemical changes: <32°F and >100°F

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V. SHELF LIFE
The recommended shelf life is one year.

VI. RECOMMENDED APPLICATION PROCEDURE
1. Application Method:
SPILLREMED (MARINE)® is a ready to use liquid product. It can be sprayed undiluted over the spill in open water conditions.
2. Concentration/Application Rate:
SPILLREMED (MARINE)® is applied in a product to oil ratio of 1:10. Rate of application is one gallon per 10 minutes.
3. Conditions for Use:
SPILLREMED (MARINE)® is a marine salt formulation and is not effective in fresh water conditions. Optimal effectiveness is in the salinity range of 10 to 35 ppt.

VII. TOXICITY AND EFFECTIVENESS
a. Effectiveness:
Bioremediation Agent Effectiveness Test (40 CFR 300.900), Federal Register September 15, 1994:
Summary Data Table

DAYS	**PRODUCT**	**TOTAL MEAN**	**RED%**	**TOTAL MEAN**	**RED%**
	3 REPS/PROD	**ALKANES (ppm)**	**28 DAYS**	**AROMATICS (ppm)**	**28 DAYS**
0	CONTROL	48,963.31		13,467.59	
	NUTRIENT	46,963.33		13,779.24	
	SPILLREMED (MARINE)®	52,063.18		14,143.06	
7	CONTROL	47,606.78		11,262.98	
	NUTRIENT	40,853.28		11,329.01	
	SPILLREMED (MARINE)®	43,236.67		11,076.99	
28	CONTROL	45,467.28	7	12,560.37	7
	NUTRIENT	7,210.06	98	9,927.87	28
	SPILLREMED (MARINE)®	1,310.09	97	7,442.71	47

Results of Gravimetric Analysis:

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Percentage (%) Decrease in Weight of Oil on Day 28

Control	Nutrient	Product
6.00%	76%	85%

b. Toxicity:

Material Tested	Species	LC50 (ppm)
SPILLREMED (MARINE)®	Menidia beryllina	392.30 96-hr
	Mysidopsis bahia	343.80 48-hr
No. 2 Fuel Oil	Menidia beryllina	40.50 96-hr
	Mysidopsis bahia	17.40 48-hr
SPILLREMED (MARINE)®	Menidia beryllina	37.50 96-hr
& No. 2 Fuel Oil (1:10)	Mysidopsis bahia	22.40 48-hr
Reference Toxicant (SDS)	Menidia beryllina	8.00 96-hr
	Mysidopsis bahia	15.90 48-hr

VIII. MICROBIOLOGICAL ANALYSIS

1. Listing of all microorganisms by species and percentages in the composition:
CONFIDENTIAL
2. Optimum pH, temperature, and salinity ranges for use of the additive:
pH: 7.6
Temperature: 55°F
Salinity: 30 ppt
3. Minimum and maximum pH, temperature, and salinity levels below or above which the effectiveness of the additive is reduced to half its optimum capacity:
pH: 6.5 – 6.9
Temperature: 40°F – 90°F
Salinity: 10 ppt – 35 ppt
4. Special nutrient requirements: None
5. Test results regarding the determination of the presence of the following:
Salmonella: Negative
Fecal coliform: Negative
Shigella: Negative
Staphylococcus Coagulase positive: Negative
Beta hemolytic Streptococci: Negative

IX. PHYSICAL PROPERTIES

NA

X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

NA

ED_001324_00005599-00294

EPA HAS NOT RECEIVED UPDATED CONTACT INFORMATION FOR THIS PRODUCT: 11/19/14

TECHNICAL PRODUCT BULLETIN B-58
USEPA, OEM REGULATIONS IMPLEMENTATION DIVISION
LISTING DATE: DECEMBER 3, 2007
"JE1058BS"

I. NAME, BRAND, OR TRADEMARK
JE1058BS
Type of Product: Bioremediation Agent (Nutrient Additive)

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT
Japan Energy Corporation
Business Development Department, Bio Research Center
3-17-35 Niizo-Minami
Toda-shi, Saitama 335-8502
Japan
Phone: (81) 48-433-2191
Fax: (81) 48-444-3223
(Hisashi Saeki)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS
Japan Energy Corporation
Business Development Department, Bio Research Center
3-17-35 Niizo-Minami
Toda-shi, Saitama 335-8502
Japan
Phone: (81) 48-433-2191
Fax: (81) 48-444-3223
(Hisashi Saeki)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION
1. Flammability: Non-flammable.
2. Ventilation: Use adequate ventilation. Treat product as a hygroscopic powder.
3. Skin and eye contact; protective clothing; treatment in case of contact: Avoid contact with eyes and do not take internally. Upon contact with eyes, flush with plenty of fresh water. Avoid breathing dust. Normal protective equipment for handling of powder, such as a dust mask and eye shield can be used.
4.a. Maximum storage temperature: 105°F
4.b. Minimum storage temperature: NA
4.c. Optimum storage temperature range: 0°F - 68°F
4.d. Temperatures of phase separations and chemical changes: NA

V. SHELF LIFE
The shelf life of the product is approximately 2 years if stored in a cool dry area.

VI. RECOMMENDED APPLICATION PROCEDURE
1. Application Method:
JE1058BS contains biosurfactant and has an ability to stimulate the biodegradation of oil by indigenous microorganisms. JE1058BS, which is a powder, can be applied using conventional spraying equipment, for example a powder mist duster attached with boom type multi-hole head.
2. Concentration/Application Rate:
JE1058BS is applied in a product:oil ratio of 1:10. No pre-mixing or dilution by water is required.
3. Conditions for Use:
JE1058BS may be used in a wide range of environmental conditions of temperature and salinities where natural populations of oil-degrading microbes are active. The mechanical removal of as much oil as possible should be done before the product is introduced to the slick.

VII. TOXICITY AND EFFECTIVENESS
a. Effectiveness:
Bioremediation Agent Effectiveness Test (40 CFR 300.900), Federal Register September 15, 1994:
Summary Data Table

DAYS	**PRODUCT**	**TOTAL MEAN**	**RED%**	**TOTAL MEAN**	**RED%**
	3 REPS/PROD	**ALKANES (ppm)**	**28 DAYS**	**AROMATICS (ppm)**	**28 DAYS**
0	CONTROL	48,213		11,413	
	NUTRIENT	51,833		13,056	
	JE1058BS	52,280		13,211	
7	CONTROL	48,030		11,108	
	NUTRIENT	33,423		11,755	
	JE1058BS	13,453		10,188	
28	CONTROL	48,257	0	10,429	8.6
	NUTRIENT	16,953	67.3	11,837	9.3
	JE1058BS	3,854	92.6	8,061	39.0

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Results of Gravimetric Analysis: DATA MISSING
Percentage (%) Decrease in Weight of Oil on Day 28

Control	Nutrient	Product
5.9%	60.0%	81.8%

b. Toxicity:

Material Tested	Species	LC50 (ppm)
JE1058BS	Menidia beryllina	91.70 96-hr
	Mysidopsis bahia	72.09 48-hr
No. 2 Fuel Oil	Menidia beryllina	5.56 96-hr
	Mysidopsis bahia	2.19 48-hr
JE1058BS & No. 2 Fuel Oil (1:10)	Menidia beryllina	8.68 96-hr
	Mysidopsis bahia	2.44 48-hr
Reference Toxicant (SLS)	Menidia beryllina	12.23 96-hr
	Mysidopsis bahia	11.70 48-hr

VIII. MICROBIOLOGICAL ANALYSIS
1. Listing of all microorganisms by species and percentages in the composition:
CONFIDENTIAL
2. Optimum pH, temperature, and salinity ranges for use of the additive: NA
3. Minimum and maximum pH, temperature, and salinity levels below or above which the effectiveness of the additive is reduced to half its optimum capacity:
Store in dry location and avoid contact with moisture
4. Special nutrient requirements: NA
5. Test results regarding the determination of the presence of the following:
Salmonella: Negative
Fecal coliform: Negative
Shigella: Negative
Staphylococcus Coagulase positive: Negative
Beta hemolytic Streptococci: Negative

IX. PHYSICAL PROPERTIES
NA

X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS
NA

ED_001324_00005599-00297

TECHNICAL PRODUCT BULLETIN B-59USEPA, OEM REGULATIONS IMPLEMENTATION DIVISION
LISTING DATE: NOVEMBER 24, 2008
"BIOWORLD BIOREMEDIATION TREATMENT PRODUCTS (BIOWORLD BHTP)"

I. NAME, BRAND, OR TRADEMARK
BIOWORLD BIOREMEDIATION TREATMENT PRODUCTS (BIOWORLD BHTP)
Type of Product: Bioremediation Agent (Microbiological Additive)

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT
BioWorld Products
International Headquarters
P.O. Box 2920
8244 W. Hillsdale Court
Visalia, CA 93279
Phone: (559) 651-2042
Fax: (559) 651-9041
E-mail: mail@bioworldusa.com
Website: www.bioworldusa.com
(Ms. Diane R. Barnes)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS
BioWorld Products
P.O. Box 2920
8244 W. Hillsdale Court
Visalia, CA 93279
Phone: (559) 651-2042
Fax: (559) 651-9041
E-mail: mail@adbio.com
Website: www.adbio.com
(Mr. Donald E. Damschen)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION
1. Flammability: Non-hazardous.
2. Ventilation: Use adequate ventilation. Treat dry product as a hygroscopic powder and avoid ventilation.
3. Skin and eye contact; protective clothing; treatment in case of contact: Avoid contact with eyes and do not take internally. Upon contact with eyes, flush with plenty of fresh water. Avoid breathing dust. Normal protective equipment for handling of powder, such as a dust mask and eye shield are recommended to be used. Wash hands and body contacted areas with soap and water.
4.a. Maximum storage temperature: 110°F
4.b. Minimum storage temperature: 34°F – containers may break if frozen
4.c. Optimum storage temperature range: 34°F - 90°F

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4.d. Temperatures of phase separations and chemical changes: <32°F and > 140°F

V. SHELF LIFE
The recommended shelf life exceeds 3 years when stored properly in cool, dry place out of direct sun light.

VI. RECOMMENDED APPLICATION PROCEDURE
1. Application Method:
BioWorld BHTP is a two part product 1) Bioremediation Enhancer liquid and 2) Hydrocarbon Digesting Microbes in a dry form. Prior to use the microbes are rehydrated in 100°F water for 10 to 300 minutes.
Example for small volume applications – best results are obtained by applying Bioremediation Enhancer first followed by the rehydrated Hydrocarbon Microbe solution in the same location.
Example for large volume applications – the two parts of BioWorld BHTP can be mixed with additional water and applied together to spray over the perimeter and over the top of the spill.
Example for soil and groundwater applications – evenly apply to soils and mix with till or discing equipment. Oxygen additions are periodically used in certain situations and can be applied with mechanical generation and/or by using oxygen release compound products.
2. Concentration/Application Rate:
BioWorld BHTP is applied at an approximate rate of 40 gallons Bioremediation Enhancer liquid and 4 pounds Hydrocarbon Microbes per surface acre treated. Increased quantities and multiple applications may be required to meet shorter cleanup time constraints and desired results.
3. Conditions for Use:
BioWorld BHTP can be used in freshwater conditions, wetlands, rock or sand shorelines, contaminated soil areas, salt marshes and salt water conditions (up to 60 ppt salinity).

VII. TOXICITY AND EFFECTIVENESS
a. Effectiveness:
Bioremediation Agent Effectiveness Test (40 CFR 300.900), Federal Register September 15, 1994:
Summary Data Table

DAYS	PRODUCT	TOTAL MEAN	RED%	TOTAL MEAN	RED%
	3 REPS/PROD	ALKANES (ppm)	28 DAYS	AROMATICS (ppm)	28 DAYS
0	CONTROL	61,234		9,395	
	NUTRIENT	64,803		8,873	
	BioWorld BHTP	63,192		9,220	
	CONTROL	57,907	5	7,290	22
7					

	NUTRIENT	49,747	14	5,956	18
	BioWorld BHTP	41,480	28	4,405	40
28	CONTROL	49,364	19	6,499	31
	NUTRIENT	21,490	67	5,259	41
	BioWorld BHTP	1,948	97	1,078	88

Results of Gravimetric Analysis:
Percentage (%) Decrease in Weight of Oil on Day 28

Control	Nutrient	Product
21%	64%	96%

b. Toxicity:

Material Tested	Species	LC50 (ppm)
BioWorld BHTP	Menidia beryllina	8,848.70 96-hr
	Mysidopsis bahia	7,348.70 48-hr
No. 2 Fuel Oil	Menidia beryllina	4.50 96-hr
	Mysidopsis bahia	3.21 48-hr
BioWorld BHTP &	Menidia beryllina	13.90 96-hr
No. 2 Fuel Oil (1:10)	Mysidopsis bahia	7.10 48-hr
Reference Toxicant (SLS)	Menidia beryllina	15.00 96-hr
	Mysidopsis bahia	15.90 48-hr

VIII. MICROBIOLOGICAL ANALYSIS
1. Listing of all microorganisms by species and percentages in the composition:
CONFIDENTIAL
2. Optimum pH, temperature, and salinity ranges for use of the additive:
pH: 6-8
Temperature: 80°F-100°F
Salinity: 0-1 for use of the additive
3. Minimum and maximum pH, temperature, and salinity levels below or above which the effectiveness of the additive is reduced to half its optimum capacity:
pH: 3-10
Temperature: 33°F-120°F
Salinity: >5
Use under any conditions where indigenous populations of oil-degrading microbes are/are not present
4. Special nutrient requirements: Some sites may benefit with various nutrients added depending on project variables
5. Test results regarding the determination of the presence of the following:
Salmonella: Negative
Fecal coliform: <2
Shigella: Negative

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Staphylococcus Coagulase positive: <10
Beta hemolytic Streptococci: <10

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IX. PHYSICAL PROPERTIESNA

X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS
NA

ED_001324_00005599-00302

TECHNICAL PRODUCT BULLETIN: B-60
USEPA, OEM REGULATIONS IMPLEMENTATION DIVISION
LISTING DATE: OCTOBER 28, 2010
"MUNOX SR®"

I. NAME, BRAND, OR TRADEMARK
MUNOX SR®
Type of Product: Bioremediation Agent (Microbiological Culture)

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT
Osprey Biotechnics
1833-A 57th Street
Sarasota, FL 34243
Phone: (941) 351-2700
Fax: (941) 351-0026
E-mail: ldanielson@ospreybiotechnics.com
E-mail: kbrattan@ospreybiotechnics.com
(Ms. Lauren Danielson, President and CEO)
(Ms. Kate Brattan, Director of Technical Sales)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS
CL Solutions, LLC
1776 Mentor Avenue, Suite 76-305
Cincinnati, OH 45212
Phone: (877) 257-6588
E-mail: mts@cl-solutions.com
(Mr. Mike Saul)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION
1. Flammability: Non-flammable
2. Ventilation: No special ventilation is required under normal use.
3. Skin and eye contact; protective clothing; treatment in case of contact: No special handling necessary. In case of skin contact, wash with soap and water. In case of eye contact, flush with water. In case of eye contact, flush with water. Wear protective gloves and wash hands with soap and water after handling.
4.a. Maximum storage temperature: 100°F
4.b. Minimum storage temperature: 32°F
4.c. Optimum storage temperature range: 35°F to 95°F. Store in a cool, dry location.
4.d. Temperatures of phase separations and chemical changes: <32°F and >212°F

V. SHELF LIFE
MUNOX SR® is stable for over one year when stored at temperatures from 35°F to 95°F.

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VI. RECOMMENDED APPLICATION PROCEDURE

1. Application Method:

MUNOX SR® is a consortium of robust organisms that tolerate the natural salinity of seawater up to approximately 5% and water temperatures below 100°F. MUNOX SR® is effective on fresh and weathered crude oil and refined products because the metabolic pathways of the organisms are based on beta oxidation that is effective on a wide range of constituents of petroleum including aromatic, aliphatic and polyaromatic compounds. MUNOX SR® is provided with a microbial density of $1x10^8$ cfu/mL in stabilized liquid form or after the freeze-dried form is hydrated. The target population for effective treatment is $2.5x10^5$ cfu/mL.

One unit consists of one 55-gallon drum of hydrated MUNOX SR® or the amount of freeze-dried powder to mix with 55-gallons of water to formulate the equivalent hydrated microbial solution. Based on this formulation and treatment ratio, one unit of MUNOX SR® will treat approximately 22,000 gallons of impacted water.

Apply using in situ, hand sprayer, pump, pressure washer, etc. Product is ready to use and does not require dilution of additional formulation.

2. Concentration/Application Rate:

Surface water: MUNOX SR® provides organisms that can be effective in the destruction and removal of petroleum hydrocarbons in surface water. It is best applied in areas where vertical water mixing is minimal in order to maintain high microbial density in the vicinity of floating hydrocarbons and near the water surface where there is a maximal oxygen concentration..

Beach application: The best application on the beach is by mixing the microbes in the beach between the tide marks. Assuming the contractor will be mixing the microbes to a depth of 12 inches and there is 30% porosity, 5 drums per acres will provide sufficient MUNOX SR® microbes for treatment.

Marsh or wetland application: This application of MUNOX SR® provides the greatest value because it is the treatment approach that will not cause more damage to the wetlands. The microbes will be sprayed on the oiled wetland from a boat or aircraft so the vegetation is not disturbed. The recommended volume of MUNOX SR® will provide enough microbes to degrade a moderate oiling level to acceptable levels. This application rate will treat the oil in surface water, attached to vegetation, and on the soil surface. Assuming the wetland is submerged to a depth of six inches during high tide, an application rate of 8 units per acre will provide sufficient microbes for treatment.

3. Conditions for Use:

MUNOX SR® is formulated for the bioremediation and metabolism of a wide range of petroleum hydrocarbons including crude oil and refined fuels. Because petroleum in all of its forms is made up of a wide variety of components, the dosage and application of MUNOX SR® will depend on the type of hydrocarbon, degree of weathering, and environmental conditions.

Heavy petroleum compounds such as crude oil and refined products, such as bunker fuel, with a high proportion of complex aliphatics will require a high dosage than lighter petroleum compounds such as gasoline. The dosage will be site specific and will be determined with the

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assistance of CL Solutions at no cost to the U.S. EPA or the user.

MUNOX SR® will tolerate a wide range of environmental conditions; however, some conditions may reduce the effectiveness of MUNOX SR®. MUNOX SR® is most effective at a neutral pH, but can tolerate a pH range from 5 to 8.5. The salinity of water should be less than 5%. MUNOX SR® will also be most effective at moderately high temperatures from 70°F to 100°F. MUNOX SR® will tolerate low temperatures and will become dormant at freezing temperatures. However, MUNOX SR® will not tolerate temperatures above 105°F.

VII. TOXICITY AND EFFECTIVENESS

a. Effectiveness:

Bioremediation Agent Effectiveness Test (40 CFR 300.900), Federal Register September 15, 1994:

Summary Data Table

DAYS	PRODUCT	TOTAL MEAN	RED%	TOTAL MEAN	RED%
	3 REPS/PROD	ALKANES (ppm)	28 DAYS	AROMATICS (ppm)	28 DAYS
0	CONTROL	1,003	0	3,609	0
	NUTRIENT	1,096	0	4,661	0
	MUNOX SR®	806	0	4,063	0
7	CONTROL	1,039	0	3,932	0
	NUTRIENT	815	0	3,172	0
	MUNOX SR®	199	0	3,292	0
28	CONTROL	847	15.5	3,578	0.85
	NUTRIENT	832	24	3,674	21.2
	MUNOX SR®	41	94.9	996	75.5

Results of Gravimetric Analysis:

Percentage (%) Decrease in Weight of Oil on Day 28

Control	Nutrient	Product
0.2%	9.9%	14.3%

b. Toxicity:

NA

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VIII. MICROBIOLOGICAL ANALYSIS

1. Listing of all microorganisms by species and percentages in the composition:
CONFIDENTIAL

2. Optimum pH, temperature, and salinity ranges for use of the additive:
pH: 6-8
Temperature: 4°C-35°C
Salinity: Fresh water to salt water, <110 ppm

3. Minimum and maximum pH, temperature, and salinity levels below or above which the effectiveness of the additive is reduced to half its optimum capacity:
pH: <6.0 and >8.0
Temperature: <4°C->35°C
Salinity: >110 ppm

4. Special nutrient requirements: None required. In application, MUNOX SR® may be supplemented with the following Nutrient Mix at a ratio up to 1:10.

Nutrient Mix Composition:
Soy Peptone – 2.2%
Yeast Extract – 2.2%
Dextrose – 0.2%
Sodium Nitrate – 0.2%
Di-potassium Phosphate – 0.2%
Sodium Thiosulfate – 0.01%

5. Test results regarding the determination of the presence of the following:
Salmonella: Negative.
Fecal coliform: Negative.
Shigella: Negative.
Staphylococcus Coagulase positive: Negative.
Beta hemolytic Streptococci: Negative.

IX. PHYSICAL PROPERTIES
NA

X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS
NA

ED_001324_00005599-00306

TECHNICAL PRODUCT BULLETIN: B-61
USEPA, OEM REGULATIONS IMPLEMENTATION DIVISION
LISTING DATE: NOVEMBER 17, 2010
"SOIL RX"
(aka, BIO-REGEN HYDROCARBON)

I. NAME, BRAND, OR TRADEMARK
SOIL RX
(aka, BIO-REGEN HYDROCARBON)
Type of Product: Bioremediation Agent (Microbiological Culture, Nutrient Additive)

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT
3 Tier Technologies LLC
Worldwide Headquarters
250 National Place, Suite 142
Longwood, FL 32750
Phone: (877) 226-7498
Fax: (877) 570-0072
E-mail: dburdette@3tiertech.com
Website: www.3tiertech.com
(Daniel J. Burdette, President)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS
Direct Sales
3 Tier Technologies LLC
Worldwide Headquarters
250 National Place, Suite 142
Longwood, FL 32750
Phone: (877) 226-7498
Fax: (877) 570-0072
E-mail: dburdette@3tiertech.com
Website: www.3tiertech.com
(Daniel J. Burdette, President)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION
1. Flammability: Non-flammable
2. Ventilation: Normal ventilation is adequate.
3. Skin and eye contact; protective clothing; treatment in case of contact: Ingestion: No effect if ingested in small amounts. A single dose of this product is rarely toxic by ingestion. Irritation of the mouth, pharynx, esophagus and stomach can develop. Give two glasses of water. Do not induce vomiting. Contact physician if needed. Eyes: Avoid eye contact. This material may cause eye irritation. Immediately flush with water for 15 minutes. Contact physician if needed. Skin: Slight redness on hands and forearms if individual has a history of dermal allergic reactions.

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Dermatitis and skin sensitization can develop after repeated and/or prolonged contact. Remove contaminated clothing and footwear. Wash with soap and water.

Always consult a physician if needed. Respirators are not required for recommended uses. Rubber gloves are not required, but recommended. Safety glasses are not required, but recommended. Wash hands with soap and water after handling product. Wash contaminated clothing and footwear before reuse.
4.a. Maximum storage temperature: 120°F
4.b. Minimum storage temperature: 34°F – do not allow product to freeze
4.c. Optimum storage temperature range: 45°F to 95°F.
4.d. Temperatures of phase separations and chemical changes: NA, stable.

V. SHELF LIFE
Shelf life exceeds 2 years when properly stored in the unopened original container.

VI. RECOMMENDED APPLICATION PROCEDURE
SOIL RX (aka, BIO-REGEN HYDROCARBON) is a concentrated liquid formulation of activated humic acid, highly concentrated hydrocarbon-oxidizing bacteria, and a readily biodegradable natural amino acid complex consisting of a nutrient-rich extract with a broad-spectrum package of identifiable amino acids, surfactants, and other proteins. This product is designed to digest organics and hydrocarbons in soil and water.
1. Application Method: SOIL RX (aka, BIO-REGEN HYDROCARBON) is a liquid concentrate that must be diluted prior to use. The product can be sprayed after dilution using standard spray application equipment, including but not limited to hand sprayers, mechanical sprayers, water trucks, fire or emergency response equipment, pressure washers, etc. Mix or saturate concentrate/water mixture with contaminated soils thoroughly for maximum performance. For shallow/surface contamination, drench affected areas with enough dilution to fully saturate the soil using normal spray equipment and water trucks. For general contamination less than two feet, contaminated soil may require tilling or excavation to properly mix concentrate/water dilution into soils. For deeper contamination greater than two feet, product application can be applied through boring the area and using perforated piping per regulatory recommendations or excavate the material and treat while land farming or bio-piling. For contaminated water, such as marshes, shoreline and open water with floating hydrocarbons, apply dilution directly to the contaminated areas using appropriate spray equipment and water cannons.
2. Concentration/Application Rate: SOIL RX (aka, BIO-REGEN HYDROCARBON) must be diluted using 1 part concentrate to 10 parts clean water prior to use. Product can be diluted up to 100 parts water as directed for specific applications. Application rates are determined by level of contamination, area of application, and speed required for cleanup. Specific application rates are determined prior to sale by the manufacturer and the distributor. A normal application rate for contaminated soil is on gallon 10:1 diluted product per cubic yard of soil. Normal application rate for water applications is three gallons 10:1 diluted product per 1000 square feet of contaminated surface area.
3. Conditions for Use: SOIL RX (aka, BIO-REGEN HYDROCARBON) is safe for application in ocean and fresh water, all soil types, and shoreline treatments.

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Water Salinity: Product should be diluted with fresh, clean water. Use of brackish or brine water may be used if fresh water is not available. It should be noted that the use of brine water may slightly reduce product performance or increase overall remediation time.
Water Temperature: Water must be between 42° to 110°F for normal product performance.
pH: Optimum water pH ranges between 4 to 8.
Temperature: Temperatures are below 32° and above 120°F may decrease product performance.
Nutrient Requirements: None. Nutrients required are in the product.
Type and Age of Pollutants: For use on most organic based contaminants and hydrocarbon based materials like gasoline, jet fuels, diesel fuels, grease, tar, motor oils, crude oils, solvents, etc. Age of contamination is not a factor as much as level of contamination, depth of contamination, and length of time required for the remediation process. For materials that have hardened and are tar-like, additional procedures may be required for effective remediation.

VII. TOXICITY AND EFFECTIVENESS
a. Effectiveness:
Bioremediation Agent Effectiveness Test (40 CFR 300.900), Federal Register September 15, 1994:
Summary Data Table

DAYS	PRODUCT	TOTAL MEAN	RED%	TOTAL MEAN	RED%
	3 REPS/PROD	ALKANES (ppm)	28 DAYS	AROMATICS (ppm)	28 DAYS
0	CONTROL	34908.9	0	6051.3	0
	NUTRIENT	34863.3	0	6047.4	0
	SOIL RX	34993.0	0	6069.0	0
7	CONTROL	35206.2	+0.08	5720.9	5.45
	NUTRIENT	32894.1	5.64	5745.8	4.98
	SOIL RX	24446.0	30.14	3219.2	46.96
28	CONTROL	34287.8	1.779	5892.7	2.621
	NUTRIENT	32610.0	6.463	5205.1	13.928
	SOIL RX	17597.0	49.713	1600.1	73.635

Results of Gravimetric Analysis:
Percentage (%) Decrease in Weight of Oil on Day 28

Control	Nutrient	Product
8.01%	7.43%	30.14%

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ED_001324_00005599-00310

b. Toxicity:
NA

VIII. MICROBIOLOGICAL ANALYSIS
1. Listing of all microorganisms by species and percentages in the composition:
CONFIDENTIAL
2. Optimum pH, temperature, and salinity ranges for use of the additive:
pH: 4-8
Temperature: 42°F-100°F
Salinity: NA
3. Minimum and maximum pH, temperature, and salinity levels below or above which the effectiveness of the additive is reduced to half its optimum capacity:
pH: 2-10
Temperature: 34°F-125°F
Salinity: NA
4. Special nutrient requirements: None
5. Test results regarding the determination of the presence of the following:
Salmonella: Negative
Fecal coliform: Negative
Shigella: Negative
Staphylococcus Coagulase positive: Negative
Beta hemolytic Streptococci: Negative

IX. PHYSICAL PROPERTIES
NA

X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS
NA

ED_001324_00005599-00311

TECHNICAL PRODUCT BULLETIN: B-62USEPA, OEM REGULATIONS IMPLEMENTATION DIVISION
LISTING DATE: DECEMBER 15, 2010
"PRO-ACT"
(aka, OILCLEAN w/ACTIVATOR)

I. NAME, BRAND, OR TRADEMARK
PRO-ACT
(aka, OILCLEAN w/ACTIVATOR)
Type of Product: Bioremediation Agent (Biological Additive: Microbiological Culture w/ Nutrient Additive)

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT
Pro-Act Microbial, Inc.
P.O. Box 345
Warren, RI 02885
Phone: (401) 245-7004
Fax: (401) 633-6270
E-mail: bd@proactbiotech.com
Website: www.oilclean.com
(Mr. William Donohue)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS
Pro-Act Microbial, Inc.
P.O. Box 345
Warren, RI 02885
Phone: (401) 245-7004
Fax: (401) 633-6270
E-mail: bd@proactbiotech.com
Website: www.oilclean.com
(Mr. William Donohue)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION
1. Flammability: Non-flammable
2. Ventilation: No special requirements.
3. Skin and eye contact; protective clothing; treatment in case of contact: No special equipment or clothing is required in the handling, storage and field application of this product. For skin and eye contact, wear goggles. If eye or skin irritation occurs, flush with plenty of fresh water.
4.a. Maximum storage temperature: 110°F, up to 5 days
4.b. Minimum storage temperature: 35°F, do not freeze
4.c. Optimum storage temperature range: 40°F to 90°F

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V. SHELF LIFEOne year as packaged.

VI. RECOMMENDED APPLICATION PROCEDURE
PRO-ACT (aka, OILCLEAN w/ACTIVATOR) consists of two parts: liquid microbes and activator (i.e., nutrient additive). As part of the Product Schedule, training on the proper use of PRO-ACT (aka, OILCLEAN w/ACTIVATOR) will be provided by Pro-Act Microbial, Inc. certified personnel.
1. Application Method: Site (water and/or soil) testing is highly recommended prior to product application. The testing is designed to assess the nutrient status of the contaminated site. The desired nitrogen and phosphorus concentrations are in the range of 0.5 to 2.5 mg N/L for nitrogen and 0.05 to 0.3 mg P/L for phosphorus. If there are inadequate nutrients in the water/soil, the activator portion will be needed to bring the nutrients in line with product specification. The activator portion can be applied directly to the site for treatment or it can be mixed in with the diluted liquid microbes first. Nutrient levels need to be maintained for optimal microbial action. Thus, depending on the nature of water/soil and the results of on site monitoring, activator may need to be applied more than once. It is recommended that physical methods such as skimming should be employed to recover as much oil as possible. PRO-ACT (aka, OILCLEAN w/ACTIVATOR) should be used to breakdown the residual oil after the physical methods have been used.
2. Concentration/Application Rate: Liquid microbes are to be diluted with the non-chlorinated, non-ozonated water or with the water to be treated (1:10 liquid microbe/water ratio) and applied with a sprayer, either pump or pneumatic. The amount of PRO-ACT (aka, OILCLEAN w/ACTIVATOR) needed depends on the amount of oil to be treated. One gallon undiluted liquid microbes can treat up to 1000 square feet, assuming there is less than ¼ inch of oil on surface. For example, one gallon undiluted liquid microbes is good for up to 5 gallons of spilled oil. A second application of Pro-Act (aka OilClean w/Activator) is beneficial to speed up the bioremediation process.
3. Conditions for Use: Monitoring of dissolved oxygen levels is recommended. If needed, a mechanical aeration device should be deployed to maintain DO levels above 3 mg/L. PRO-ACT (aka, OILCLEAN w/ACTIVATOR) works with fresh oil as well as weathered oil. Oil toxicity (especially from easily dissolved shorter chain hydrocarbons in the fresh oil) should not be a problem as long as physical methods are used first following a spill. The product is ideal for salt water, brackish water and fresh water, with no limitations as to usage within optimum temperature range of 20 to 400°C.

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VII. TOXICITY AND EFFECTIVENESS

a. Effectiveness:

Bioremediation Agent Effectiveness Test (40 CFR 300.900), Federal Register September 15, 1994:

Summary Data Table

DAYS	PRODUCT	TOTAL MEAN	RED%	TOTAL MEAN	RED%
	3 REPS/PROD	ALKANES (ppm)	28 DAYS	AROMATICS (ppm)	28 DAYS
0	CONTROL	41277	0	6100	0
	NUTRIENT	41670	0	6140	0
	PRO-ACT	43193	0	6460	0
7	CONTROL	41393	0	5705	0
	NUTRIENT	26370	0	3640	0
	PRO-ACT	302	0	1979	0
28	CONTROL	42451	-2.766	4546	25.475
	NUTRIENT	3654	91.231	1968	67.948
	PRO-ACT	59	99.863	378	94.149

Results of Gravimetric Analysis:

Percentage (%) Decrease in Weight of Oil on Day 28

Control	Nutrient	Product
12.624%	55.670%	65.516%

b. Toxicity:

NA

VIII. MICROBIOLOGICAL ANALYSIS

1. Listing of all microorganisms by species and percentages in the composition:

CONFIDENTIAL

2. Optimum pH, temperature, and salinity ranges for use of the additive:

pH: 7.0

Temperature: 30°C

Salinity: 0.2 to 4%

3. Minimum and maximum pH, temperature, and salinity levels below or above which the effectiveness of the additive is reduced to half its optimum capacity:

pH: <6.0 or >9.0

Temperature: <15°C or >45°C

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Salinity: <0.02% or >5%
4. Special nutrient requirements: PRO-ACT (aka, OILCLEAN w/ACTIVATOR)
5. Test results regarding the determination of the presence of the following:
Salmonella: Negative
Fecal coliform: Negative
Shigella: Negative
Staphylococcus Coagulase positive: Negative
Beta hemolytic Streptococci: Negative

IX. PHYSICAL PROPERTIES
NA

X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS
NA

ED_001324_00005599-00315

TECHNICAL PRODUCT BULLETIN: B-63
USEPA, OEM REGULATIONS IMPLEMENTATION DIVISION
LISTING DATE: DECEMBER 15, 2010
"BIOREM-2000 OIL DIGESTER™"
(aka, BIOREM-2000 SC)

I. NAME, BRAND, OR TRADEMARK
BIOREM-2000 OIL DIGESTER™
(aka, BIOREM-2000 SC)
Type of Product: Bioremediation Agent (Biological Additive: Microbiological Culture)

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT
Clift Industries, Inc.
P.O. Box 67153
Charlotte, NC 28226
Customer Service:
Phone: (800) 996-9901
Product Management:
Phone: (704) 752-0031
Fax: (704) 544-2532
E-mail: matt@cliftindustries.com
(Mr. Matt Barnhill)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS
Clift Industries, Inc.
P.O. Box 67153
Charlotte, NC 28226
Customer Service:
Phone: (800) 996-9901
Product Management:
Phone: (704) 752-0031
Fax: (704) 544-2532
E-mail: matt@cliftindustries.com
(Mr. Matt Barnhill)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION
1. Flammability: Non-flammable
2. Ventilation: No special requirements.
3. Skin and eye contact; protective clothing; treatment in case of contact: No special equipment or clothing is required in the handling, storage and field application of this product. For skin and eye contact, wear gloves and goggles.
4.a. Maximum storage temperature: 140°F
4.b. Minimum storage temperature: 35°F
4.c. Optimum storage temperature range: 85°F

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V. SHELF LIFE
The shelf life of the product is two (2) years when stored within the storage temperature range in the original container.

VI. RECOMMENDED APPLICATION PROCEDURE
1. Application Method: Spray from boats, aircraft, fire eductor systems on boats, helicopter buckets, hand-held or backpack sprayers, or from hoses attached to small pumps, water trucks and aerial spray, including typical spreading systems.
2. Concentration/Application Rate:
Shoreline Treatment:
To treat beaches, coarse sand, rocks, rip rap, sea walls, cobble shorelines and rocky shores, oiled pilings and piers use one (1) part BIOREM-2000 OIL DIGESTER™ diluted with five (5) parts water. Use one (1) gallon per 1,500 square feet of contaminated area.
Treating Marine Vegetation/Wetlands:
Dilute one (1) part BIOREM-2000 OIL DIGESTER™ with five (5) parts water and apply with non-pressure, non-impact spraying equipment onto reeds, grasses, trees, and rocks in marsh areas and vegetated wetlands. Use one (1) gallon per 1,500 square feet of contaminated area.
For Treating Water:
Do no dilute BIOREM-2000 OIL DIGESTER™ and apply directly spraying onto the surface of oil.
Small Applications:
BIOREM-2000 OIL DIGESTER™ may be applied with hand sprayers or portable pumps to spray the product directly onto oiled surfaces. Dose rates will vary with the type and amount of petroleum spilled, the extent of weathering, and other site-specific conditions, including temperature, porosity of surface, and residence time available to let the product contact the oil.
3. Conditions for Use: Effective at temperatures above 40°F.

VII. TOXICITY AND EFFECTIVENESS
a. Effectiveness:
Bioremediation Agent Effectiveness Test (40 CFR 300.900), Federal Register September 15, 1994:
Summary Data Table

DAYS	PRODUCT	TOTAL MEAN	RED%	TOTAL MEAN	RED%
	3 REPS/PROD	ALKANES (ppm)	28 DAYS	AROMATICS (ppm)	28 DAYS
0	CONTROL	43163	0	6001	0
	NUTRIENT	36643	0	4813	0

	BIOREM-2000 OIL DIGESTER ™	36492	0	4634	0
7	CONTROL	39249	9.0	5067	15.5
	NUTRIENT	2946	91.9	3832	20.0
	BIOREM-2000 OIL DIGESTER ™	5390	85.2	4114	11.0
28	CONTROL	33961	21.0	3812	36.0
	NUTRIENT	106	99.7	729	84.0
	BIOREM-2000 OIL DIGESTER ™	64	99.8	1324	71.0

Results of Gravimetric Analysis:
Percentage (%) Decrease in Weight of Oil on Day 28

Control	Nutrient	Product
10.7%	68.9%	67.0%

b. Toxicity:
NA

VIII. MICROBIOLOGICAL ANALYSIS
1. Listing of all microorganisms by species and percentages in the composition:
CONFIDENTIAL
2. Optimum pH, temperature, and salinity ranges for use of the additive:
pH: 7.0
Temperature: 85°F
Salinity: <10%
3. Minimum and maximum pH, temperature, and salinity levels below or above which the effectiveness of the additive is reduced to half its optimum capacity:
pH: 3.0 or 11.5
Temperature: <35°F or >125°F
Salinity: >40%
4. Special nutrient requirements: None
5. Test results regarding the determination of the presence of the following:
Salmonella: Negative
Fecal coliform: Negative
Shigella: Negative
Staphylococcus Coagulase positive: Negative
Beta hemolytic Streptococci: Negative

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IX. PHYSICAL PROPERTIES
NA

X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS
NA

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TECHNICAL PRODUCT BULLETIN: B-64
USEPA, OEM REGULATIONS IMPLEMENTATION DIVISION
LISTING DATE: FEBRUARY 22, 2011
"DRYLET™ MB BIOREMEDIATION"

I. NAME, BRAND, OR TRADEMARK
DRYLET™ MB BIOREMEDIATION
Type of Product: Bioremediation Agent (Biological Additive: Microbiological Culture)

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT
DryLet Technologies, Inc.
P.O. Box 730
601 North Coleman
Prosper, TX 75078
Phone: (972) 347-2341
Fax: (972) 347-2816
E-mail: sellis@drylet.com
(Mr. Steve Ellis)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS
DryLet Technologies, Inc.
P.O. Box 730
601 North Coleman
Prosper, TX 75078
Phone: (972) 347-2341
Fax: (972) 347-2816
E-mail: sellis@drylet.com
(Mr. Steve Ellis)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION
1. Flammability: Non-flammable (DOT: Non-hazardous)
2. Ventilation: No special requirements. In closed spaces, uses dust protective measures.
3. Skin and eye contact; protective clothing; treatment in case of contact: No special equipment or clothing is required; however, goggles and dust mask are recommended. Applying dry powder may cause irritation to membranes. If eye or skin irritation occurs, flush with plenty of water.
4.a. Maximum storage temperature: 120°F continuous
4.b. Minimum storage temperature: 35°F
4.c. Optimum storage temperature range: 40°F to 120°F

V. SHELF LIFE
Minimum 5 years, with proper storage, in original packaging. Freezing does not harm shelf life; however, extreme heat (over 180°F) for long periods of time can shorten shelf life.

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VI. RECOMMENDED APPLICATION PROCEDURE1. Application Method: Apply DRYLET ™ MB BIOREMEDIATION directly to oil contamination. DRYLET™ MB BIOREMEDIATION may be applied by the usual methods of aerial or manual broadcast spreading. For smaller spills, manual broadcast will deliver the best results. Larger spills in open water, marsh, wetlands, or estuary areas should be treated by aerial powder dusting or dusting with mechanical powder pumps.
2. Concentration/Application Rate: Apply DRYLET™ MB BIOREMEDIATION directly on the spill. Apply 0.4 pounds of product per cubic yard of soil, or 50 pounds per acre of open water slick. In marsh, wetlands, and estuaries application rates may be up to 75 pounds per acre depending on the oil type and contamination level.
3. Conditions for Use: Water salinity: can be used in fresh or salt water. pH: 4 to 11.5. Temperature: 32°F – 120°F. Water Temperature: 35°F - 170°F. Nutrient Requirements: Nutrients are included with the product. However, for longer term project, additional nutrients may be added to increase microbial activity. Types and Ages of Contamination: For use on organic and hydrocarbon-based contamination. Tar like contamination may require mechanically breaking the structure to obtain timely results.

VII. TOXICITY AND EFFECTIVENESS
a. Effectiveness:
Bioremediation Agent Effectiveness Test (40 CFR 300.900), Federal Register September 15, 1994:
Summary Data Table

DAYS	**PRODUCT**	**TOTAL MEAN**	**RED%**	**TOTAL MEAN**	**RED%**
	3 REPS/PROD	**ALKANES (ppm)**	**28 DAYS**	**AROMATICS (ppm)**	**28 DAYS**
0	CONTROL	60871	0	8729	0
	NUTRIENT	61995	0	8170	0
	PRODUCT	61459	0	8790	0
7	CONTROL	56197	0	6224	0
	NUTRIENT	42501	0	4833	0
	PRODUCT	12303	0	4140	0
28	CONTROL	27314	55.0	5030	42.4
	NUTRIENT	47	99.9	533	93.5
	PRODUCT	820	98.6	1305	85.1

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Results of Gravimetric Analysis:
Percentage (%) Decrease in Weight of Oil on Day 28

Control	Nutrient	Product
0.30%	50.0%	84.8%

b. Toxicity:
NA

VIII. MICROBIOLOGICAL ANALYSIS
1. Listing of all microorganisms by species and percentages in the composition:
CONFIDENTIAL
2. Optimum pH, temperature, and salinity ranges for use of the additive:
pH: 6.0-8.0
Temperature: 85°F to 110°F
Salinity: 0.5-4.0
3. Minimum and maximum pH, temperature, and salinity levels below or above which the effectiveness of the additive is reduced to half its optimum capacity:
pH: 4.0 or 11.5
Temperature: 35°F or 180°F
Salinity: 0.5 or 5.0 (above 4.5 reduces effectiveness by half)
4. Special nutrient requirements: None
5. Test results regarding the determination of the presence of the following:
Salmonella: Negative
Fecal coliform: Negative
Shigella: Negative
Staphylococcus Coagulase positive: Negative
Beta hemolytic Streptococci: Negative

IX. PHYSICAL PROPERTIES
NA

X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS
NA

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TECHNICAL PRODUCT BULLETIN: B-65
USEPA, OEM REGULATIONS IMPLEMENTATION DIVISION
LISTING DATE: MAY 18, 2011
"DUALZORB®"
(aka, TRAILZORB, WHITZORB)

I. NAME, BRAND, OR TRADEMARK
DUALZORB®
(aka, TRAILZORB, WHITZORB)
Type of Product: Bioremediation Agent (Biological Additive: Microbiological Culture)

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT
LBI Renewable
P.O. Box 637
22 Plains Drive
Buffalo, WY 82834
CUSTOMER SERVICE:
Phone: (307) 684-9340
Fax: (307) 684-5815
E-mail: info@lbirenewable.com
(Mr. Dale Lee)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS

DUALZORB® and TRAILZORB:
LBI Renewable
P.O. Box 637
22 Plains Drive
Buffalo, WY 82834
CUSTOMER SERVICE:
Phone: (307) 684-9340
Fax: (307) 684-5815
E-mail: info@lbirenewable.com
(Mr. Dale Lee)

WHITZORB:
Whitmore Manufacturing Co.
930 Whitmore Drive
Rockwall, TX 75032
CUSTOMER SERVICE:
Phone: (972) 771-1000, ext. 241
Fax: (972) 722-4561
E-mail: mkellis@whitmores.com
(Ms. Mary Kathryn Ellis)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION
1. Flammability: DUALZORB® is classified as non-flammable by DOT regulations (49 CFR 173. 124)
2. Ventilation: DUALZORB® is not volatile and does not require ventilation.
3. Skin and eye contact; protective clothing; treatment in case of contact: Avoid eye contact due to mechanical abrasion. In case of eye contact, immediately flush eyes with large amounts of water until particles are evacuated. Goggles are recommended during use.
4.a. Maximum storage temperature: 200°F continuous
4.b. Minimum storage temperature: NA

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4.c. Optimum storage temperature range: 32°F to 100°F
4.d. Temperatures of phase separation and chemical changes: DUALZORB® should be stored out of the weather and should not be exposed to direct sun light for extended periods of time.

V. SHELF LIFE
Guaranteed shelf life of unopened product is 5 years if not exposed to weather or direct sunlight.

VI. RECOMMENDED APPLICATION PROCEDURE
DUALZORB® is a dehydrated product that must be hydrated for maximum effectiveness to bioremediate hydrocarbons in soil and water. Hydration can be accomplished with fresh or sea water. Additionally, it can be applied on a surface and hydrated with natural precipitation.
1. Application Method: This product can be applied by hand, mechanical spreaders, portable mixer or blown onto a surface using an air conveyor. Mix hydrated DualZorb® with oil contaminated soil, sand, or rocks by either hand, shovel or till into the soil with power equipment. DUALZORB® will absorb approximately 80% of the oil from soil and sand in the first 2 hours of application, with continued bioremediation of oil. The bioremediation effect of this product is not affected by water salinity, temperature, or oil type and age. However, the oil absorption capacity is reduced in the presence of salt water as it will also absorb salts. For hard surface stains and cleanup, hydrated product can be rubbed by hand over the surface until it will no longer absorb oil. Place the spent product in an approved, labeled container in accordance with local, state, federal, international, or country specific regulations. Depending upon the compound(s) absorbed, this product may be disposed in a landfill, incinerated, or land farmed. This product has a heat value of 8421Btu/pound and an ash content of 0.35%. For in situ applications, the hydrated DUALZORB® can be tilled into the contaminated soil.
2. Concentration/Application Rate: DUALZORB® is packaged in a dehydrated form and expands three times its original volume when rehydrated with either fresh or 1.5 times with salt water. This product should be mixed on a 1:1 volume basis with hydration water. For every 1 gallon of oil, 4 pounds of DUALZORB® is recommended. For in situ applications, 50 pounds of hydrated DUALZORB® is recommended per cubic yard of soil.
3. Conditions for Use: DUALZORB® is manufactured for land use and will absorb hydrocarbon, waste oil, and fuel spills. DUALZORB® is not affected by cold water but may require additional contact time.

VII. TOXICITY AND EFFECTIVENESS
a. Effectiveness:
Bioremediation Agent Effectiveness Test (40 CFR 300.900), Federal Register September 15, 1994:
Summary Data Table

DAYS	PRODUCT	TOTAL MEAN	RED%	TOTAL MEAN	RED%
	3 REPS/PROD	ALKANES (ppm)	28 DAYS	AROMATICS (ppm)	28 DAYS

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0	CONTROL	255,568	0	10,816	0
	NUTRIENT	255,414	0	10,821	0
	PRODUCT	248,869	0	12,738	0
	CONTROL	244,841	0	10,290	0
7	NUTRIENT	79,688	0	9,963	0
	PRODUCT	14,254	0	11,168	0
28	CONTROL	215,169	15.8	7,908	26.9
	NUTRIENT	2,407	99.1	9,393	13.2
	PRODUCT	1,545	99.4	950	92.5

Results of Gravimetric Analysis:
Percentage (%) Decrease in Weight of Oil on Day 28

Control	Nutrient	Product
0.4%	15.4%	30.0%

b. Toxicity:

Materials Tested	Species	LC50 (ppm)	
DUALZORB®	Menidia beryllina	1,414.21	96-hr
	Mysidopsis bahia	1,096.05	48-hr
No. 2 Fuel Oil	Menidia beryllina	7.08	96-hr
	Mysidopsis bahia	1.13	48-hr
DUALZORB® &	Menidia beryllina	8.43	96-hr
No. 2 Fuel Oil (1:10)	Mysidopsis bahia	2.70	48-hr
Reference Toxicant (SLS)	Menidia beryllina	12.25	96-hr
	Mysidopsis bahia	11.71	48-hr

VIII. MICROBIOLOGICAL ANALYSIS
1. Listing of all microorganisms by species and percentages in the composition:
CONFIDENTIAL
2. Optimum pH, temperature, and salinity ranges for use of the additive:
pH: 6.5-7.5
Temperature: 60°F to 100°F
Salinity: 0-10%
3. Minimum and maximum pH, temperature, and salinity levels below or above which the effectiveness of the additive is reduced to half its optimum capacity:
pH: 5.5-9.0
Temperature: 45°F and 105°F
Salinity: 0-10%
4. Special nutrient requirements: LBI Renewable recommends nutrient supplement s of

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maximum performance for bioremediation or in-situ applications. Contact LSI Renewable for project specific nutrient dosing.
5. Test results regarding the determination of the presence of the following:
Salmonella: Negative
Fecal coliform: Negative
Shigella: Negative
Staphylococcus Coagulase positive: Negative
Beta hemolytic Streptococci: Negative

IX. PHYSICAL PROPERTIES
1. Flash Point: NA
2. Pour Point: NA
3. Viscosity: NA
4. Specific Gravity: 2.25 g/mL
5. pH: NA
6. Surface Washing Agents: NA
7. Solvents: NA
8. Additives: None
9. Solubility: NA

X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

Compound	Concentration (ppm)
Arsenic	0.185
Cadmium	0.185
Chromium	0.500
Copper	0.537
Lead	<0.185
Mercury	<0.00303
Nickel	<0.463
Zinc	9.35
Cyanide	<0.060
Chlorinated Hydrocarbons	<0.024

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TECHNICAL PRODUCT BULLETIN: B-66
USEPA, OEM REGULATIONS IMPLEMENTATION DIVISION
LISTING DATE: JUNE 08, 2011
"REMEDIADE™"
(aka, SP 7010)

I. NAME, BRAND, OR TRADEMARK
REMEDIADE™
(aka, SP 7010)
Type of Product: Bioremediation Agent (Nutrient Additive)

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT
JDMV Holdings, LP
15995 N. Barkers Landing, Suite 143
Houston, TX 77079
Phone: (281) 558-3433
Fax: (281) 870-1200
E-mail: msuttle@jdmvholdings.com
Website: www.jdmvholdingslp.com
(Mr. Michael Suttle)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS

JDMV Holdings, LP
15995 N. Barkers Landing, Suite 143
Houston, TX 77079
Phone: (281) 558-3433
Fax: (281) 870-1200
E-mail: msuttle@jdmvholdings.com
Website: www.jdmvholdingslp.com
(Mr. Michael Suttle)

VariChem International, Inc.
78330 HiWay 35 North
Bay City, TX 77414
Phone: (979) 245-7278
Fax: (979) 245-0612
E-mail: Gordon@varichemusa.com
Website: www.varichemusa.com
(Mr. Gordon Winfrey)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION
1. Flammability: Non-flammable (DOT: Non-hazardous)
2. Ventilation: No special requirements
3. Skin and eye contact; protective clothing; treatment in case of contact: As defined by OSHA's Hazard Communication Standard, this product is non-hazardous with no evidence of adverse effects. Use safety glasses when handling for eye protection. Store in a cool dry place. Flush eyes and wash skin if contacted. In the event of contact with skin, wash with water. In the event of contact with eyes, rinse with water. In the event of contact with clothing or surfaces such as floors or counter tops, rinse with water and dry. In the event of spilling onto land or water, no handling or rinsing requirements are needed. No other safety or handling precautions need to be adhered to in the event of contact or spills.
4.a. Maximum storage temperature: 115°F continuous

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4.b. Minimum storage temperature: 32°F
4.c. Optimum storage temperature range: 40°F to 98°F
4.d. Temperatures of phase separation and chemical changes: NA

V. SHELF LIFE
Shelf life of product unopened is 2 years. If the container has been opened, but uncontaminated and is resealed properly, the shelf life is 1 year after initial opening.

VI. RECOMMENDED APPLICATION PROCEDURE
1. Application Method: Product may be applied to any surface for removal of hydrocarbons. For treatment of large areas, properly diluted product may be applied by spraying with a pressure washer, portable fire pump or any other suitable pump with non-chlorinated fresh water or salt water. Application can also be made with normal spray equipment via a 1" or larger hose and a spray nozzle, similar to a fire nozzle. Eductor setups, water trucks as well as fire or other emergency response equipment may be used. Aircraft application is also effective in covering large areas or contaminated water.
2. Concentration/Application Rate: For in-situ soils, till the REMEDIADE™/water mixture onto the contaminated area. Soil treatment rate guidelines are 1 gallon of concentrate for 30 cubic yards of soil for each 20,000 TPH contamination level. Example: 40,000 TPH level would be 2 gallons per 30 cubic yards. Clay soils may take more product and sandy soils may take less. After the treatment rate is established, apply 1/3rd of the product mixture on the first day, wait 5 to 7 days and apply the second 1/3rd of the product mixture, wait another 5 to 7 days and apply the final 1/3rd of the product mixture. During each of the three applications apply ½ of the product mixture to the affected soil. Till or blade in this application before applying the second ½ of the product mixture. This will help the product get good coverage and disperse well into the soil.
In the event of oil spills on water, treatment guidelines are 1 gallon of concentrate per 30 square foot of surface area. After the treatment rate is established, apply 1/3rd over the area and wait 5 to 7 days and apply the second treatment. Then wait 2 to 5 days and apply the third treatment. Light gravity oils may take more. When spraying the product over oil, good agitation of the contaminant with the product can only help. This helps add to surface contact and aids in the bioremediation process. Salinity of the water will not make a difference in the effectiveness of the product.
3. Conditions for Use: Product must be mixed with non-chlorinated water, but it can be used with fresh, salt or brackish water. Reapplication may be necessary in severely contaminated areas. Be sure to apply the product on three separate days, allowing time in between the days, this helps keep bacteria counts up at a more consistent level through the process. Adding all the product in one treatment will only prove to waste product and slow the effectiveness of the overall remediation process.

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VII. TOXICITY AND EFFECTIVENESS

a. Effectiveness:

Bioremediation Agent Effectiveness Test (40 CFR 300.900), Federal Register September 15, 1994:

Summary Data Table

DAYS	PRODUCT	TOTAL MEAN	RED%	TOTAL MEAN	RED%
	3 REPS/PROD	ALKANES (ppm)	28 DAYS	AROMATICS (ppm)	28 DAYS
0	CONTROL	255,568	0	10,822	0
	NUTRIENT	255,414	0	10,821	0
	PRODUCT	245,168	0	10,816	0
7	CONTROL	244,841	0	10,920	0
	NUTRIENT	215,169	0	9,963	0
	PRODUCT	79,688	0	9,393	0
28	CONTROL	21,469	91.6	9,067	16.2
	NUTRIENT	4,198	98.4	7,908	26.9
	PRODUCT	2,404	99.0	607	94.4

Results of Gravimetric Analysis:

Percentage (%) Decrease in Weight of Oil on Day 28

Control	Nutrient	Product
0.0%	17.8%	36.0%

b. Toxicity:

NA

VIII. MICROBIOLOGICAL ANALYSIS

The product is a nutrient additive and does not contain microbiological cultures or enzyme additives.

1. Listing of each component of the formulation by chemical name and percentage by weight:

CONFIDENTIAL

2. Optimum storage conditions:

Temperature: 40°F to 98°F

IX. PHYSICAL PROPERTIES

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NA

X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS
NA

TECHNICAL PRODUCT BULLETIN: B-67
USEPA, OEM REGULATIONS IMPLEMENTATION DIVISION
LISTING DATE: JULY 27, 2011
"ERGOFIT MICROMIX AQUA"

I. NAME, BRAND, OR TRADEMARK
ERGOFIT MICROMIX AQUA
Type of Product: Bioremediation Agent (Microbiological Culture, Enzyme Additive, Nutrient Additive)

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT
ERGOFIT USA LLC
40 E. Main Street #379
Newark, DE 19711
Phone: (302) 235-3085
Fax: (801) 846-8043
E-mail: info@micromix-usa.com
Website: www.micromix-usa.com
(Mr. Warren Russell, Factory Representative)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS
ERGOFIT USA LLC
40 E. Main Street #379
Newark, DE 19711
Phone: (302) 235-3085
Fax: (801) 846-8043
E-mail: info@micromix-usa.com
Website: www.micromix-usa.com
(Mr. Warren Russell, Factory Representative)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION
1. Flammability: Water-based, Non-flammable
2. Ventilation: Needs no ventilation; aqueous-based organic product; does not emit hazardous vapors. Some CO_2 may build up.
3. Skin and eye contact; protective clothing; treatment in case of contact: ERGOFIT MICRO MIX AQUA is not a dermal irritant. Avoid eye contact, and wear goggles when using product. Eyewash for quick and copious eye flushing should be available on site. Seek prompt medical attention should contact occur and if irritation persists. Protective rubber gloves are suggested during handling. ERGOFIT MICRO MIX AQUA has a smell of fermentation and yeast. The product does not give off harmful vapors. Long storage will cause build up of CO_2 in water vapor.
4.a. Maximum storage temperature: 104°F
4.b. Minimum storage temperature: 32°F

4.c. Optimum storage temperature range: 57°F to 97°F
4.d. Temperatures of phase separation and chemical changes: above 113°F

V. SHELF LIFE
ERGOFIT MICROMIX AQUA has a recommended shelf life of 5 years. After 5 years at optimum storage in cool temperature there is an approximate 10% decrease per year in product effectiveness. Shelter from direct sunlight or extreme cold or heat source. In the event of fire, wash with water.

VI. RECOMMENDED APPLICATION PROCEDURE
1. Application Method: ERGOFIT MICROMIX AQUA can be applied with any commercially available spray apparatus, such as small hand held tanks, back packs, large mixing tanks with mechanical pumping devices, vessels with booms for spraying wide paths, or liquid spray devices on crop duster airplanes or helicopters. ERGOFIT MICROMIX AQUA can also be applied by eductor systems from vessels, fire trucks, or any other outfitted vehicle.
2. Concentration/Application Rate: **General.** ERGOFIT MICROMIX AQUA generally takes 5 to 50 minutes to penetrate the molecular walls of hydrocarbons. Warmer conditions favor faster biological action whereas colder conditions may reduce the speed of decomposition. Once ERGOFIT MICROMIX AQUA is applied to the targeted areas, the microbes will attach themselves to the hydrocarbons and start to attack their carbon structure and metabolize into natural organic substances from the humus family. Aquatic plants and animal life will feed on this nutrient. Within hours odor will be negligent and changes will be noticeable in seven days, depending on the temperature. ERGOFIT MICROMIX AQUA will also break down the adhesive properties of the hydrocarbons, preventing oils from attaching to animals, vegetation, rocks, and earth.

Dilution Rates: ERGOFIT MICROMIX AQUA should always be mixed with the native water of the affected area. **Note:** Do not use city water that has been treated with chlorine with ERGOFIT MICROMIX AQUA. This means that if you are treating an affected saltwater area, then saltwater should be used as your base carrier for the product. Likewise if you are treating a lake or river, then that carrier water would be the freshwater from that source. For general applications and light oil films, dilute each gallon of ERGOFIT MICROMIX AQUA with source water (e.g., fresh, brackish, or saltwater) at a ratio of 1:50. For oil mousse like formation in intertidal zones, use a dilution of 1:30. If the spill is very heavy and the oil layer is thick (more than 1 inch) it is recommended that ERGOFIT MICROMIX AQUA be applied at a lower ratio of 1:20. On land not involving water bodies, it is recommended that an organic absorbent be applied prior to using ERGOFIT MICROMIX AQUA to treat oil spills to remediate the C1 and C35 Petroleum Hydrocarbons. This is to increase the contact surface area for ERGOFIT MICROMIX AQUA to convert spills oil and absorbent to organic humus.

Application on Coastal Water: Apply the mixed solution using hand held sprayers, tank sprayers, booms from vessels, helicopters, or airplanes. First, start by spraying the outer perimeter of the spill and systematically work towards the middle of the affected area, making sure to cover the entire surface area of the spill. Use 1.5 gallons of ERGOFIT MICROMIX AQUA concentrate for every 1000 gallons of hydrocarbons spilled. Dilute it with 30 gallons of

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seawater per gallon of concentrate for spraying. [To calculate gallons of ERGOFIT MICROMIX AQUA required, multiply estimated gallons of hydrocarbons by 0.0015.] For denser hydrocarbons, like in the case of crude oil, multiply barrels of crude oil by 42 to get gallons of crude and apply above ratios. If you do not know gallons of hydrocarbons or barrels of crude oil, estimate size of spill by (1000 square yards x 2 inch average thickness) to arrive at gallons of oil spilled. Use 10 kg/22 lbs of ERGOFIT MICROMIX AQUA diluted to 50 gallons in water to cover this area. As a rule, 2 kg/4.4 lbs ERGOFIT MICROMIX AQUA is required per metric ton of oil spilled. Dilution varies depending on oil thickness or simple sheen floating on water surface.

Application for Intertidal Zones: ERGOFIT MICROMIX AQUA should be applied at low tide, when the affected areas are exposed to the elements, allowing the product to securely attach to the hydrocarbons. Cease application if the tide rises and resume once the water level has receded again. Continue application cycle until the entire affected area has been coated. The recommended mix ratio is 1:30. In areas where a combination of high tide and waves have pushed the contamination beyond the intertidal zone, oil rag layer looking like chocolate mousse, cordon off the area and start spraying ERGOFIT MICROMIX AQUA diluted at a ratio of 1:20 in water. The objective is to get an application rate of between 1 to 2 gallons of concentrated ERGOFIT MICROMIX AQUA sprayed per 1000 gallons of hydrocarbons spilled.
3. Conditions for Use: ERGOFIT MICROMIX AQUA acts on all organic hydrocarbons on sea, fresh water, and land. As the age of spilled hydrocarbons increases, so does the time necessary for bioremediation. In general, fresh crude, gasoline of BTEX takes anywhere from 30 days to 12 months to completely bioremediate depending on weather conditions and density of spill. However, the remediation process will be noticeable throughout the process. Variations in seawater salinity, has no effect, as long as microbial life can exist, then ERGOFIT MICROMIX AQUA will be effective in salt and brackish water with a maximum salinity of 4.9 percent. ERGOFIT MICROMIX AQUA bioremediation slows somewhat at temperatures below 40°F. However, it will continue to work in any water temperatures that will sustain microbial life. Decreasing the amount of ERGOFIT MICROMIX AQUA per square yard from recommended dosage rates lengthens the remediation time. When nitrogen and carbon is added to ERGOFIT MICRO MIXAQUA the initiation of bacterial-enzymatic activity is enhanced many fold to begin bioremediation within 2 hours of application.

VII. TOXICITY AND EFFECTIVENESS
a. Effectiveness:
Bioremediation Agent Effectiveness Test (40 CFR 300.900), Federal Register September 15, 1994:
Summary Data Table

DAYS	PRODUCT	TOTAL MEAN	RED%	TOTAL MEAN	RED%
	3 REPS/PROD	ALKANES (ppm)	28 DAYS	AROMATICS (ppm)	28 DAYS

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0	CONTROL	239,235	0	16,502	0
	PRODUCT	239,686	0	17,431	0
7	CONTROL	217,023	9.30	10,942	33.70
	PRODUCT	17,819	92.6	9,606	44.90
28	CONTROL	188,379	21.3	8,989	45.50
	PRODUCT	2,216	99.10	3,100	82.20

Results of Gravimetric Analysis:
Percentage (%) Decrease in Weight of Oil on Day 28

Control	Product
1.7%	45.6%

b. Toxicity:
NA

VIII. MICROBIOLOGICAL ANALYSIS
Microbiological Culture:
1. Listing of all microorganisms by species and percentage in the composition:
CONFIDENTIAL
2. Optimum pH, temperature, and salinity ranges for use of the additive:
pH: 6.5 to 7.5.
Temperature: 57°F to 97°F.
Salinity: The maximum permissible salinity is up to 4.9% sodium by solution
3. Minimum and maximum pH, temperature, and salinity levels below or above which the effectiveness of the additive is reduced to half its optimum capacity:
pH: Lower than 4.5 or higher than 8.5 reduces the product efficiency by 50 percent.
Temperature: Lower than 32°F or higher than 104°F reduces the product efficiency by 50 percent.
Salinity: The maximum permissible salinity is up to 4.9% sodium by solution
4. Special nutrient requirements: NA
5. Test results regarding the determination of the presence of the following:
Salmonella: Negative
Fecal coliform: Negative
Shigella: Negative
Staphylococcus Coagulase positive: Negative
Beta Hemolytic Streptococci: Negative

Enzyme Additive:
8. Listing of each component of the total formulation, other than enzymes, by chemical name and percentage by weight: CONFIDENTIAL
9. Enzyme Names: CONFIDENTIAL

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10. I.U.B.: CONFIDENTIAL
11. Source of Enzymes: Plant or Fungi/Fermentation process
12. Units: No less than 1% and no more than 50% by weight
13. Specific Gravity: 1.00
14. Optimum Conditions:
    a. pH: 7.0
    b. Temperature: 72°F
    c. Salinity Ranges: Fresh water to salt water up to 4.9%
    d. Minimum and Maximum pH: 4.5 – 8.5
    e. Minimum and Maximum Temperature: 32°F – 104°F
    f. Minimum and Maximum Salinity Levels: Salinity level that will support microbial activity will not adversely a ERGOFIT MICRO MIX AQUA performance
    g. Enzyme Shelf Life: Up to 5 years when properly stored
    h. Enzyme Optimal Storage Conditions: 72°F is optimal, enzyme range is freezing to 104°F, never leave ERGOFIT MICRO MIX AQUA in direct sunlight for more than a couple of hours

Nutrient Additive:
1. Listing of each component of the formulation by chemical name and percentage by weight: CONFIDENTIAL
2. Optimum storage conditions:
Temperature: 32°F to 104°F

IX. PHYSICAL PROPERTIES
NA

X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS
NA

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TECHNICAL PRODUCT BULLETIN: B-68
USEPA, OEM REGULATIONS IMPLEMENTATION DIVISION
LISTING DATE: AUGUST 8, 2011
"SHAMANTRA GREEN"
(aka, SHAMANTRA BIO)

I. NAME, BRAND, OR TRADEMARK
SHAMANTRA GREEN
(aka, SHAMANTRA BIO)
Type of Product: Bioremediation Agent (Nutrient Additive)

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT
Molecular Mediation LLC
3422 Old Capitol Trail
Suite 1627
Wilmington, DE 19808
Phone: (302) 861-0400
Fax: (302) 861-0410
E-mail: info@molecularmediation.com
(Mr. Ronen Hazarika, Director, Molecular Mediation LLC)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS
Molecular Mediation LLC
3422 Old Capitol Trail
Suite 1627
Wilmington, DE 19808
Phone: (302) 861-0400
Fax: (302) 861-0410
E-mail: info@molecularmediation.com
(Mr. Ronen Hazarika, Manager, Molecular Mediation LLC)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION
1. Flammability: Non-flammable (DOT: Non-hazardous)
2. Ventilation: No special requirements
3. Skin and eye contact; protective clothing; treatment in case of contact: No special equipment or clothing required, however goggles are recommended. If eye or skin irritation occurs, flush with plenty of fresh water.
4.a. Maximum storage temperature: 200°F
4.b. Minimum storage temperature: None
4.c. Optimum storage temperature range: 40°F to 140°F
4.d. Temperatures of phase separation and chemical changes: Stable

V. SHELF LIFE
>3 years when stored in sealed silos, polydrums, poly bags or totes.

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VI. RECOMMENDED APPLICATION PROCEDURE

1. Application Method:

Recommended Uses and Product Description

Shamantra Green is recommended for use on water and near shoreline oil spills. Shamantra is a natural product made using humic acid. The product has been processed to have a strong affinity for collecting natural oils. The process makes applying and removing the product to/from the environment easy and safe.

Water Applications

For small scale spills on fresh or salt water, Shamantra Green can be broadcast directly onto the spill by hand or a hand held spreader. Agitation is not necessary when using Shamantra Green on small scale spills.

Shamantra Green can also be used in booms, sacks, and pillows.

For large spills on fresh or salt water, Shamantra Green can be deployed into the spill using an air or water stream.

Shamantra Green will remove oils and other hazardous hydrocarbon based materials from both salt and fresh water very effectively using an encapsulation process on the spilled oil. Once encapsulated into the carbon matrix of Shamantra Green, the spilled oil will not leach out, even under pressure. The humic acid then acts as a nutrient to stimulate microbial activity and enhance the bioremediation of the spilled oil.

Any encapsulated residue can be removed from the water with hand vacuums, vacuum barges, commercial nets, centrifuges, etc. Encapsulated materials can be sent to landfill or used as a fuel source for generating heat ensuring that any material disposed of is in accordance with all applicable federal, state, and local regulations.

Shoreline Applications

For spills on shorelines, Shamantra would be applied in the same manner and ratios as with the water applications. The product can also be applied by sand-blasting equipment, fire hoses or pneumatic spreading equipment. Agitation is not necessary for most applications.

To recover encapsulated oil or hazardous materials from spills on land, the encapsulated product can be collected and removed efficiently and effectively using a variety of manual and mechanical methods including picking up by hand, using brooms, rakes and shovels to remove and pick up encapsulated petroleum waste product. Mechanical means include using hand held vacuums, portable vacuum units, and vacuum vehicles.

Once the Shamantra Green has been saturated with oil or hazardous materials, it will not leach the contaminants, even under pressure, so any encapsulated materials can be disposed of appropriately or used as a fuel source for generating heat ensuring that any material disposed of

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is in accordance with all applicable federal, state, and local regulations.

Proper precautions, including testing as necessary to identify the characteristics of wastes encapsulated by Shamantra Green should be taken to determine the safe and legally required means of recovering, handling, storing, transporting, treating, recycling, or disposing of materials on land in accordance with all applicable federal, state, and local regulations.

2. Concentration/Application Rate:
Shamantra Green is usually applied at a ratio of 1:5–1:30 to waste by weight to remediate light, medium, and heavy hydrocarbons. Shamantra Green can also be used very effectively on heavier crudes including Bunker C using the aforementioned application ratios. The specific ratio will depend on many factors including the composition of the waste, the ambient temperatures, pH of the contaminated water and age of the waste spill. Optimum application ratios should be determined on a case by case basis.

3. Conditions for Use:
Shamantra Green initially behaves like a synthetic sorbent, then encapsulates the oil through a chemical and physical process. Once encapsulated, the spilled oil is captured within the pore matrix contained within the carbon structure.

Shamantra Green is effective in all environments and under a broad range of weather conditions. Depending upon the age, viscosity, and composition of the spilled material, varying amounts of Shamantra Green may be required to obtain complete remediation. Any encapsulated residue can be recovered and disposed of in accordance with all applicable federal, state, and local regulations.

VII. TOXICITY AND EFFECTIVENESS
a. Effectiveness:
Bioremediation Agent Effectiveness Test (40 CFR 300.900), Federal Register September 15, 1994:
Summary Data Table

DAYS	PRODUCT	TOTAL MEAN	RED%	TOTAL MEAN	RED%
	3 REPS/PROD	ALKANES (ppm)	28 DAYS	AROMATICS (ppm)	28 DAYS
0	CONTROL	43,457	0	6,451	0
	NUTRIENT	43,047	0	6,263	0
	PRODUCT	43,153	0	6,262	0
	CONTROL	40,943	0	5,283	0
7	NUTRIENT	214	0	2,389	0

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	PRODUCT	9,859	0	1,338	0
28	CONTROL	39,066	10.1	4,429	31.3
	NUTRIENT	76	99.8	685	89.1
	PRODUCT	122	99.7	297	95.3

Results of Gravimetric Analysis:
Percentage (%) Decrease in Weight of Oil on Day 28

Control	Nutrient	Product
14.4%	0.0%	25.4%

b. Toxicity:
NA

VIII. MICROBIOLOGICAL ANALYSIS
Nutrient Additive:
No special requirements are required other than the product can be stored in dry conditions with an optimum storage temperature of 40°F to 140°F and a maximum storage temperature of 200°F.

IX. PHYSICAL PROPERTIES
NA

X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS
NA

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EPA HAS NOT RECEIVED UPDATED CONTACT INFORMATION FOR THIS PRODUCT: 11/19/14

TECHNICAL PRODUCT BULLETIN: B-69
USEPA, OEM REGULATIONS IMPLEMENTATION DIVISION
LISTING DATE: OCTOBER 13, 2011
"SUMP SAFE BIO-RECLAIM"

I. NAME, BRAND, OR TRADEMARK
SUMP SAFE BIO-RECLAIM
Type of Product: Bioremediation Agent (Biological Additive/Microbiological Culture)

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT
Teamwork Distributing
P.O. BOX 2506
Stony Plain, Alberta
T7Z 1X1
Phone: (780) 968-5367 (Plant)
Mobile: (780) 238-2741
Fax: (780) 958-9070
E-mail: marlin@teamwrk.ca
(Mr. Marlin Rudolph)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS
PNE Corporation
55 International Way
Longview, WA 98632
Phone: (360) 423-2245
Fax: (360) 423-2272
E-mail: garyh@pnecorp.com
Website: www.pnecorp.com
(Mr. Gary Healea)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION
1. Flammability: Non-flammable (DOT: Non-hazardous)
2. Ventilation: No special requirements
3. Skin and eye contact; protective clothing; treatment in case of contact: No special equipment or clothing required, however goggles are recommended. If eye or skin irritation occurs, flush with plenty of fresh water.
4.a. Maximum storage temperature: 110°F maximum, must be used within 24 hours from constitution
4.b. Minimum storage temperature: 45°F
4.c. Optimum storage temperature range: 60°F to 90°F
4.d. Temperatures of phase separation and chemical changes: Stable

V. SHELF LIFE

The material must be used within 24-48 hours of constitution of the powdered bacteria portion in water. The dry material must be kept at -20°C and is stable for two years at this temperature. Once sent to the field, the material may be stored on ice for up to two weeks prior to constitution.

VI. RECOMMENDED APPLICATION PROCEDURE

1. Application Method: Product may be applied by the usual methods. For smaller spills a drum pump with sprayer may be used, mixing with fresh water typically. The concentrate is used at 25:1 dilution rate with water and is typically applied at a rate of 6 gallons per cubic meter of soil. It is important that the soil be broken up into small clumps (rototilling is acceptable) to ensure effective application. The soil is left and biodegradation is expected to complete in approximately 12 weeks. Analysis using approved sampling procedures is performed to confirm biodegradation.

For larger volume projects, any auger based soil homogenizer is employed to break up large clumps of soil, which are dug out from the contaminated area using a standard hoe. The broken up soil is taken up a conveyor and has the diluted concentrate (25:1) at a rate of 6 gallons per cubic meter of soil. Piles up to 20 feet high may be formed. The soil is left and biodegradation is expected to be complete in approximately 12-18 weeks. Analysis using approved sampling procedures is performed to confirm biodegradation. Proper safety rules must be employed to ensure that any holes dug out are not accessible to employees or unauthorized personnel.

For oil spills on open water, it is recommended that a 25:1 dilution of the product be applied via spraying. In this way, the bacteria can contact the floating oil and immediately begin to form a bio-film. The spray would also be applied on any soil contaminated on banks, etc. It is important to ensure complete coverage of the water/oily surface and soil during spray application. Degradation will be visible visually and can be confirmed by Fats, Oil and Grease (FOG) analysis.

For smaller, contained volumes of oily water (typically emulsified, white water), it is recommended that sufficient concentrate be added to the contaminated water such that it results in a 2.5% concentration of the concentrate in the contaminated water. Preferably, aeration can be performed, using even a small, fish tank aeration unit. Visual evidence of biodegradation should be apparent within one week or less and can be confirmed by FOG analysis.

2. Concentration/Application Rate: The concentrate is used at 25:1 dilution rate with water and is typically applied at a rate of 6 gallons per cubic meter of soil.

3. Conditions for Use: The product can be used in fresh or salt water and may be applied at temperatures between 40°F and 120°F. However, the product is most effective when applied at water temperatures between 70°F-90°F. Further, the product is effective on fresh spills or aged hydrocarbons. Note for preparation of the product to be applied while in the field: all components listed in the product are packaged as a complete unit and are applied as such. The

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microbial portion of the product is supplied in bags which are either drum (55 gallon) or pail (5 gallon) sizes. Fresh water, if available, is added to fill the bag (bags are placed in pails or open headed drums) to 55 gallon of 5 gallons respectively. Depending upon which of these are being constituted with water, a high-density polyethylene (HDPE) bottle with the appropriate quantity of surfactant is added into the container (bottles are labeled Bio-Reclaim Surfactant – Drum Size (or Pail Size)). In the same way, HDPE containers with appropriate amounts of sodium nitrite are added and are labeled Bio-Reclaim Salt – Drum Size (or Pail Size)).

VII. TOXICITY AND EFFECTIVENESS

a. Effectiveness:

Bioremediation Agent Effectiveness Test (40 CFR 300.900), Federal Register September 15, 1994:

Summary Data Table

DAYS	PRODUCT	TOTAL MEAN	RED%	TOTAL MEAN	RED%
	3 REPS/PROD	ALKANES (ppm)	28 DAYS	AROMATICS (ppm)	28 DAYS
0	CONTROL	40770	0	5229	0
	NUTRIENT	41329	0	5326	0
	PRODUCT	40609	0	5384	0
7	CONTROL	37530	0	4824	0
	NUTRIENT	21788	0	4634	0
	PRODUCT	38354	0	5298	0
28	CONTROL	31456	22.8	3692	24.2
	NUTRIENT	502	98.8	3052	42.7
	PRODUCT	21356	47.4	3742	49.0

Results of Gravimetric Analysis:

Percentage (%) Decrease in Weight of Oil on Day 28

Control	Nutrient	Product
6.36%	33.00%	3.00%

b. Toxicity:

NA

VIII. MICROBIOLOGICAL ANALYSIS

1. Listing of each component of the total formulation, other than microorganisms, by chemical name and percentage by weight: CONFIDENTIAL

2. Listing of all microorganisms by species and percentages of each species in the composition of the additive: CONFIDENTIAL
3. Optimum pH, temperature, and salinity ranges for use of the additive:
pH: 6-8
Temperature: 90°F
Salinity: Not applicable
3. Minimum and maximum pH, temperature, and salinity levels below or above which the effectiveness of the additive is reduced to half its optimum capacity:
pH: 4.8 – 9
Temperature: 59°F – 104°F
Salinity: Not applicable
4. Special nutrient requirements: A combination of 70 percent live active yeast mixed with 30 percent fine ground corn cob is used as a nutrient. In a 55 gallon drum of concentrate, approximately 1.1 kg of this mix will be found (relative to the 1.1 kg, the actual bacteria represent the negligible mass of several grams). There are no storage requirements for the nutrient portion of the formula; however, as they are in a homogenous mixture with the bacteria, they must be stored as described in Part V of this bulletin.
5. Test results regarding the determination of the presence of the following:
Salmonella: Negative
Fecal coliform: Negative
Shigella: Negative
Staphylococcus Coagulase positive: Negative
Beta hemolytic Streptococci: Negative

IX. PHYSICAL PROPERTIES
NA

X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS
NA

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TECHNICAL PRODUCT BULLETIN: B-70
USEPA, OEM REGULATIONS IMPLEMENTATION DIVISION
LISTING DATE: FEBRUARY 7, 2013
"WASTE AWAY®"

I. NAME, BRAND, OR TRADEMARK
WASTE AWAY®
Type of Product: Bioremediation Agent (Biological Additive/Microbiological Culture)

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT
Chem-X International, LLC (aka, CXI)
1100 East Sandy Lake Road
Coppell, Texas 75019
Phone: (972) 471-7775
Fax: (972) 393-2011
E-mail: david@cxinternational.com
Website: www.cxinternational.com
(Mr. David Howard)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS

Prime-Dirt
20810 Avenue 332
Woodlake, California 93286
Phone: (555) 787-7278
Fax: (555) 787-8560
E-mail: james@prime-dirt.com
Website: www.prime-dirt.com
(Mr. James Henderson)

Back-To-Nature Compost
P.O. Box 190
5407 Slaton Highway
Slaton, Texas 79364
Phone: (888) 282-2000
Phone: (806) 745-1170
E-mail: greg@backtonaturecompost.com or bj@backtonaturecompost.com
Website: www.backtonaturecompost.com
(Mr. Greg Schilling)

Trans-Environmental Services
740 South I-35 Frontage Road
Valley View, Texas 76272
Phone: (214) 620-6166
Phone: (877) 861-0473
E-mail: mtemplin@transenvironmental.com
Website: www.trans-environmental.com
(Mr. Mike Templin)

Microbial Matrix
33935 Highway 99E, Suite B
Tangent, Oregon 97389
Phone: (541) 967-0554
E-mail: lrogers@microbialmatrix.com
Website: www.microbialmatrix.com
(Ms. Lynn Rogers)

Advanced Biologicals
314 N 7th Street
Clear Lake, Iowa 50428
Phone: (641) 357-0706
E-mail: michael@advancedbiologicalsllc.com or josh@advancedbiologicalsllc.com
Website: www.advancedbiologicalsllc.com
(Mr. Michael O'Brien or Josh O'Brien)

Damon Berry
1075 CR 226
Florence, Texas 76527
Phone: (254) 702-3797

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IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION

1. Flammability: Non-flammable (DOT: Non-hazardous)
2. Ventilation: No special requirements
3. Skin and eye contact; protective clothing; treatment in case of contact: No special equipment or clothing required; however, gloves and goggles are recommended. If eye or skin irritation occurs, flush with plenty of fresh water. If ingested, may cause nausea or vomiting, seek medical attention. Do not induce vomiting. In case of spills, disperse with water, treat like a surfactant or soap spill.
4.a. Maximum storage temperature: 100°F continuous, 120°F up to 5 days
4.b. Minimum storage temperature: 35°F
4.c. Optimum storage temperature range: 50°F to 100°F
4.d. Temperatures of phase separation and chemical changes: Stable

V. SHELF LIFE

Two years when product remains in sealed bottles, poly drums, or totes (as delivered).

VI. RECOMMENDED APPLICATION PROCEDURE

1. Application Method: Product may be applied by any type of liquid delivery system (i.e., boom sprayers, spray pumps). For smaller spills a drum pump with sprayer may be used, mixing with fresh or salt water as required depending on the type and viscosity of oil being treated. Typically containment is not necessary.
2. Concentration/Application Rate:
a. On heavy oils: use product directly on the spill, or up to approximately a 1:10 dilution ratio (product:water). Lighter oils will require a 1:10 to 1:30 product to water ratio. Warmer waters (greater than 78 °F) and/or good agitation during application will require less product.
b. Lagoon application: 2 gallons per surface acre of lagoon or 16 ounces per 3,000 cubic feet. Maintain daily at 50 percent initial application. Use spray applicator for even distribution.
c. Shoreline application: 1 gallon per 10 cubic yards of contaminated soil applied at 3 percent concentration. Maintain weekly with 50 percent initial application. Use spray applicator for even distribution. Till soil after application or use gravity fed drip system.
3. Conditions for Use: Effective in salt water or fresh water, with no limitations as to usage within optimum temperature parameters (application may be made at or above 35°F, with optimum above 48°F). Product may be used on any age crude and any type. Optimum salinity range is from fresh water to salt water of 110 ppt.

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VII. TOXICITY AND EFFECTIVENESS

a. Effectiveness:

Bioremediation Agent Effectiveness Test (40 CFR 300.900), Federal Register September 15, 1994:

Summary Data Table

DAYS	PRODUCT	TOTAL MEAN	RED%	TOTAL MEAN	RED%
	3 REPS/PROD	ALKANES (ppm)	28 DAYS	AROMATICS (ppm)	28 DAYS
0	CONTROL	99715	0	11056	0
	NUTRIENT	94558	0	10228	0
	PRODUCT	98187	0	10270	0
7	CONTROL	54816	0	9690	0
	NUTRIENT	48670	0	9329	0
	PRODUCT	51534	0	6019	0
28	CONTROL	46847	53.0	6452	40.8
	NUTRIENT	3581	96.2	6136	40.0
	PRODUCT	776	99.2	4038	60.7

Results of Gravimetric Analysis:

Percentage (%) Decrease in Weight of Oil on Day 28

Control	Nutrient	Product
6.41%	50.91%	49.95%

b. Toxicity:

Material Tested	Species	LC50 (ppm)
WASTE AWAY®	Menidia beryllina	552,762.06 96-hr
	Mysidopsis bahia	353,302.46 48-hr
No. 2 Fuel Oil	Menidia beryllina	10.22 96-hr
	Mysidopsis bahia	2.11 48-hr
WASTE AWAY® & No. 2 Fuel Oil (1:10)	Menidia beryllina	12.54 96-hr
	Mysidopsis bahia	2.11 48-hr
Reference Toxicant (SLS)	Menidia beryllina	11.87 96-hr
	Mysidopsis bahia	13.29 48-hr

VIII. MICROBIOLOGICAL ANALYSIS

1. Listing of each component of the total formulation, other than microorganisms, by chemical name and percentage by weight: CONFIDENTIAL

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2. Listing of all microorganisms by species and percentages of each species in the composition of the additive: CONFIDENTIAL
3. Optimum pH, temperature, and salinity ranges for use of the additive:
pH: 7.5, range 6.0 to 8.0
Temperature: 72°F, range 60°F to 60°F
Salinity: 40 ppt, range 0 to 110 ppt
3. Minimum and maximum pH, temperature, and salinity levels below or above which the effectiveness of the additive is reduced to half its optimum capacity:
pH: 4.0 – 11.0
Temperature: 40°F – 125°F
Salinity: 0 – 110
4. Special nutrient requirements: Not applicable
5. Test results regarding the determination of the presence of the following:
Salmonella: Negative
Fecal coliform: Negative
Shigella: Negative
Staphylococcus Coagulase positive: Negative
Beta hemolytic Streptococci: Negative

IX. PHYSICAL PROPERTIES
NA

X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS
NA

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TECHNICAL PRODUCT BULLETIN: B-71
USEPA, OEM REGULATIONS IMPLEMENTATION DIVISION
LISTING DATE: APRIL 7, 2014
"ACT TERRA FIRMA"
(aka, ACT-TF)

I. NAME, BRAND, OR TRADEMARK
ACT TERRA FIRMA
(aka, ACT-TF)
Type of Product: Bioremediation Agent (Biological Additive/Microbiological Culture)

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT
Franssen Enterprises, Inc.
511 N. McKinley Avenue
Fort Lupton, CO 80621
Phone: (303) 833-5393
Fax: (303) 833-2872
E-mail: actcleaners@comcast.net
Website: www.actcleaners.com
(Mr. Todd Franssen)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS
American Cleaning Technologies, Inc.
(ACT BioRemediation Products)
511 N. McKinley Avenue
Fort Lupton, CO 80621
Phone: (303) 833-5393
Phone: (866) 919-2872
Fax: (303) 833-2872
E-mail: actcleaners@comcast.net
Website: www.actcleaners.com
(Mr. Todd Franssen)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION
1. Flammability: Non-flammable (DOT: Non-hazardous)
2. Ventilation: Standard industrial hygiene ventilation practices should be used to control human exposures to this product. Respiratory protection equivalent to either N100 or the older HEPA filter (APR with a DFM (purple) cartridge) will provide adequate protection.
3. Skin and eye contact; protective clothing; treatment in case of contact: Recommendations are guidelines and may not apply to every situation. To prevent skin contact, standard work clothing and standard work or latex gloves will provide adequate protection. To prevent eye contact, standard safety glasses with side shields are recommended.
4.a. Maximum storage temperature: 48°C continuous, 60°C up to 5 days

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4.b. Minimum storage temperature: -45°C
4.c. Optimum storage temperature range: 4°C to 38°C
4.d. Temperatures of phase separation and chemical changes: Stable

V. SHELF LIFE
Store product in a dry area. If kept in a sealed container with desiccant bag the shelf life is 5 years.

VI. RECOMMENDED APPLICATION PROCEDURE
1. Application Method: Apply ACT TERRA FIRMA directly to surfaces by broadcasting product with a scoop or grass seed drop spreader. DO NOT add fertilizers or nutrients.
2. Concentration/Application Rate:
Hard Surface with Limited Permeability (e.g., concrete, asphalt, stone, etc.): Apply a small amount of ACT TERRA FIRMA with a scoop or grass seed drop spreader to the surface. Using a soft bristle broom spread ACT TERRA FIRMA over the surface. If desired results are not achieved within two weeks repeat application. DO NOT sweep or wash cleaner off. ACT TERRA FIRMA will dissipate over time. One pound covers approximately 100 square feet. DO NOT add fertilizers or nutrients. Prior to application, appropriate containment mechanisms should be used deployed to prevent runoff of the product/oil mixture.

Permeable Surfaces (e.g., packed sand, gravel, or soil; loose, bulk material that may be excavated and stockpiled for treatment): Apply ACT TERRA FIRMA product directly to surfaces by broadcasting product using a scoop or grass seed drop spreader over the contaminated area. Check the contamination levels every 15 days, reapplying as needed. Tilling may be needed for contamination 12 inches or deeper. One pound covers approximately 50 square feet. DO NOT add fertilizers or nutrients. Prior to application, appropriate containment mechanisms should be deployed to prevent runoff of the product/oil mixture.

Applications to Water: ACT TERRA FIRMA is recommended for use in conditions where the water is not actively flowing. Apply to water surface at a rate of one pound over approximately a 200 square foot surface area. Using a scoop or a handheld broadcast spreader to ensure that ACT TERRA FIRMA is dispersed evenly. DO NOT add fertilizers or nutrients.

Conditions for Use: Product usage is not affected by salinity. Water temperature range should be -2°C to 46°C and can be used on frozen water in temperatures as low as -65°C. ACT TERRA FIRMA is best used on contamination levels of 3% to 5% TPH. Contact Act BioRemediation Products for usage on higher contamination levels.

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VII. TOXICITY AND EFFECTIVENESS

a. Effectiveness:

Bioremediation Agent Effectiveness Test (40 CFR 300.900), Federal Register September 15, 1994:

Summary Data Table

DAYS	ACT Terra Firma	TOTAL MEAN	RED%	TOTAL MEAN	RED%
	3 REPS/PROD	ALKANES (ppm)	28 DAYS	AROMATICS (ppm)	28 DAYS
0	CONTROL	29,969	0	9,018	0
	NUTRIENT	29,102	0	8,582	0
	ACT TERRA FIRMA	27,685	0	8,240	0
7	CONTROL	24,289	0	6,974	0
	NUTRIENT	18,132	0	6,377	0
	ACT TERRA FIRMA	2,614	0	3,306	0
28	CONTROL	18,909	36.9	4,426	50.8
	NUTRIENT	1,465	94.9	5,609	34.6
	ACT TERRA FIRMA	113	99.6	475	94.2

Results of Gravimetric Analysis:

Percentage (%) Decrease in Weight of Oil on Day 28

Control	Nutrient	ACT Terra Firma
0.0%	17.0%	9.7%

b. Toxicity:

Material Tested	Species	LC50 (ppm)
ACT TERRA FIRMA	Menidia beryllina	223.60 96-hr
	Mysidopsis bahia	74.10 48-hr
No. 2 Fuel Oil	Menidia beryllina	4.24 96-hr
	Mysidopsis bahia	1.99 48-hr
ACT TERRA FIRMA & No. 2 Fuel Oil (1:10)	Menidia beryllina	2.61 96-hr
	Mysidopsis bahia	1.19 48-hr
Reference Toxicant (SLS)	Menidia beryllina	12.25 96-hr
	Mysidopsis bahia	12.27 48-hr

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VIII. MICROBIOLOGICAL ANALYSIS

1. Listing of each component of the total formulation, other than microorganisms, by chemical name and percentage by weight: CONFIDENTIAL
2. Listing of all microorganisms by species and percentages of each species in the composition of the additive: CONFIDENTIAL
3. Optimum pH, temperature, and salinity ranges for use of the additive:
pH: range 4.0 to 9.0
Temperature: range -20°C to 52°C
Salinity: Freshwater 0 to 500 ppm; Ocean Saltwater 35,000 ppm
3. Minimum and maximum pH, temperature, and salinity levels below or above which the effectiveness of the additive is reduced to half its optimum capacity:
pH: 3.0 and 13.0
Temperature: -50°C and 65°C
Salinity: Freshwater and 45,000 ppm
4. Special nutrient requirements: Not applicable. DO NOT add fertilizers or nutrients.
5. Test results regarding the determination of the presence of the following:
Salmonella: Negative
Fecal coliform: Negative
Shigella: Negative
Staphylococcus Coagulase positive: Negative
Beta hemolytic Streptococci: Negative

IX. PHYSICAL PROPERTIES

1. Flash Point: NA
2. Pour Point: NA
3. Viscosity: NA
4. Specific Gravity: 0.8 g/cm^3
5. pH: 7.0 – 12.0
6. Surface Active Agents: CONFIDENTIAL
7. Solvents: NA
8. Additives: CONFIDENTIAL
9. Solubility: <5% (estimated)

X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

Compound	Concentration (ppm)
Arsenic	<0.13
Barium	1.30
Cadmium	0.077
Chromium	0.17
Copper	NA
Lead	<0.25
Mercury	<0.00010

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Selenium	0.67
Silver	<0.030
Zinc	NA
Cyanide	NA
Chlorinated Hydrocarbons	NA

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TECHNICAL PRODUCT BULLETIN #M-12
USEPA, OEM REGULATIONS IMPLEMENTATION DIVISION
ORIGINAL LISTING DATE: AUGUST 31, 1992
REVISED LISTING DATE: SEPTEMBER 13, 1995
"PES-51"

I. NAME, BRAND, OR TRADEMARK
PES-51
Type of Product: Miscellaneous Oil Spill Control Agent

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT
Practical Environmental Solutions (Formerly known as Petroleum Environmental Services)
P.O. Box 12563
San Antonio, Texas 78212
Phone: (210) 493-7172
Fax: (210) 493-7172
E-mail: simsbi@aol.com
(Mr. Bill Sims)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS
Environmental Services, Inc.
Phone: (206) 378-4100
E-mail: jbhsmith@nrcc.com

North America:
Phone: (866) 644-3677

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION
1. Flammability: 124°F
2. Ventilation: Handle product in a normal well ventilated place.
3. Skin and eye contact; protective clothing; treatment in case of contact: Although PES-51 is expected not to pose any specific health hazard, the following precautions are recommended due to possible irritation from the biological by-products contained in the product: Avoid contact with skin, eyes, and clothing. Avoid prolonged or repeated contact with skin, breathing mist, and do not take internally. Keep product away from heat, sparks, and flames, and store in a cool, dry, well ventilated place, away from incompatible materials. Vent container in warm weather to relieve pressure. Do not cut, grind, weld, or drill on or near product containers. Handle empty containers just as would the full ones.
4.a. Maximum storage temperature: NA.
4.b. Minimum storage temperature: NA
4.c. Optimum storage temperature range: NA
4.d. Temperatures of phase separations and chemical changes: Not applicable, but PES-51 freezes at -142°F.

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V. SHELF LIFE
6 years (unopened drum), 1 year (opened drum).

VI. RECOMMENDED APPLICATION PROCEDURE
1.Application Method: The following PES-51 application methods are applicable for the full range of PES-51 industrial uses, including shoreline and surface treatment, tank cleaning and equipment decontamination. The selection of the method(s) will be dependent on the level and extent of hydrocarbon contamination, type of oil, and its degree of weathering/emulsion and the nature and type of surface to be treated or cleaned. Equipment availability, logistics and manpower requirements should also be considered. Application methods may be combined, if necessary. In addition, for shoreline cleaning, the treatment area will be boomed and contained prior to PES-51 usage. For equipment decontamination, the use of portable de-con pools or secondary containment liners are recommended.

PORTABLE EQUIPMENT
Hand Held Spraying - Spray PES-51 on the contaminated area using a Chapin Steel Sprayer #1729 (or equivalent), 2.5 gallons capacity, or the AU 8000 MicroNair sprayer. After application, allow 3 to 5 minutes for soaking without allowing evaporation of PES-51 (weather dependent). When saturation is attained, hydrocarbon will be seen running off the impacted surface. Rinse the treated surface with available water (fresh or sea water) from the pump until no hydrocarbon remains. The water should be used at ambient temperature. Depending on level and extent of contamination, a pressure washer may also be used for rinsing (ambient may be used). Collect the effluent hydrocarbons with absorbent booms and pads, and squeeze off the oil contaminants from the booms and pads for reuse as process oil.

Airless Sprayer - Depending on the level and extent of the hydrocarbon contamination and the nature of the impacted surface, an airless type sprayer may be used for direct product application. Common types of airless sprayers are: Airlessco, Graeco or equivalents. These airless sprayers can have single or multi-hose attachments and can include wand extensions as required.

Application rate and pressure will vary depending on the equipment type and site specific conditions. After spraying with PES-51, allow to soak for 3 to 5 minutes (weather dependent) avoiding evaporation, rinse/flush surfaces with pumps, fire hoses, deluge headers or pressure washers (ambient).

Pressure Washer with Syphon Feed System - Depending on the level and extent of the hydrocarbon contamination and the nature of the impacted surface proposed for treatment, a pressure washer may be used for direct product application. In most applications, hot water (greater than 120°F) is not necessary. Common types of pressure washers are: Hotsy and Lambda, or equivalents. These pressure washers have a variable rate "detergent syphon feed" system for PES-51 application and can have single or multi-hose attachments which can include wand extensions. Application rate and pressure will vary depending on equipment type and site specific conditions.

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After spraying with PES-51, allow to soak for 3 to 5 minutes (weather dependent) avoiding evaporation, rinse/flush surfaces with pumps, fire hoses, deluge headers or pressure washers (ambient).

Air Knife (Modified for PES-51 Application) - PES has developed a patent-pending modified air knife system for product application. This method was developed primarily for rocky, cobble, bedrock type shorelines with both surface subsurface oil. The modified air knife delivers the PES-51 in both a liquid stream (125 psi) or as an aerosol. Compressed air is used to dilate subsurface sediments and allow for distribution of the PES-51. The air knife method is also applicable for surface treatment of impacted rocks, bulkheads, seawalls, rip-rap jetties, etc. After spraying with PES-51, allow to soak for 3 to 5 minutes (weather dependent) avoiding evaporation, rinse/flush surfaces with pumps, fire hoses, deluge headers or pressure washers (ambient). For subsurface treatment, continue flushing with large quantities of low-pressure seawater at ambient temperatures.

MOBILE EQUIPMENT
Boat Spraying – The recommended application rate is 1 to 5 gallons per 200 sq. ft., from a boat with speed of 1 to 3 knots, depending on the sea conditions and oil film thickness on the rocks. For a boat with a mounted AU-8110 MicroNair sprayer (or equivalent sprayer) and a spray swath of about 20 feet, traveling at approximately two knots, 25 acres/hr will be treated.
After spraying, rinse PES-51 off the rocks with a hard, coarse spray of sea water. Standard size pumps with fire hoses or deluge headers may be used. Higher pressure rinses may be required if oil is thick and weathered. The shoreline may also be sprayed from the beach side, which will force the oil into the containment boom.

Helicopter Deployed Spraying – Aerial spraying can be utilized for shore treatments and pretreatment with the AU 5000 atomizer (MicroNair) or equivalent sprayer.
The recommended aerial application of PES-51 is 14 to 23 liters/minute. The AU 5000 (or equivalent) can be used with fixed-wing aircraft and helicopters operating at speeds of 90 MPH (145 km/hr) and more. The smaller AU 7000 sprayer (or equivalent) is recommended for use at airspeeds below 90 MPH. After spraying, the hydrocarbons can be rinsed off the shore rocks as described above with hand held pumps, deluge headers or boat spraying.

Vehicular Spraying – The recommended vehicular spraying is 50 to 150 ft^2/gallon depending on climatic conditions. A MicroNair vehicle-mounted sprayer is recommended. This unit is a self-contained sprayer kit that combines the AU 8000 sprayhead (or equivalent) with a powerful 4-stroke engine and a 60 liter chemical tank to give complete product coverage. After spraying, the hydrocarbons can then be rinsed off the shore rocks as described above with hand held pumps, deluge headers or boat spraying.
2. Concentration/Application Rate: The product comes already mixed, and ready for use.
For specific application, see rate of application as indicated above.
3. Conditions for Use: Water temperature and salinity do not affect the product performance.
PES-51 is effective against hydrocarbons only, and the age of the hydrocarbon is not relevant.

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VII. TOXICITY AND EFFECTIVENESS

a. Toxicity:

Material Tested	Species	LC50 (ppm)
PES-51	Menidia beryllina	137.00 96-hr
	Mysidopsis bahia	54.00 48-hr
No. 2 Fuel Oil	Menidia beryllina	200.00 96-hr
	Mysidopsis bahia	11.50 48-hr
PES-51 &	Menidia beryllina	435.00 96-hr
No. 2 Fuel Oil (1:10)	Mysidopsis bahia	14.50 48-hr
Reference Toxicant (DSS)	Menidia beryllina	2.20 96-hr
	Mysidopsis bahia	9.80 48-hr

NOTE: This toxicity data was derived using the concentrated product. See Section VI of this bulletin for information regarding the manufacturer's recommendations for concentrations and application rates for field use.

b. Effectiveness:

NA

VIII. MICROBIOLOGICAL ANALYSIS

NA

IX. PHYSICAL PROPERTIES

1. Flash Point: 124°F
2. Pour Point: -50°F at 30 min.
3. Viscosity: 30 cSt at 28°C
4. Specific Gravity: 0.840 at 25°C
5. pH: 6.7
6. Chemical Name and Percentage by Weight of the Total Formulation: CONFIDENTIAL
7. Surface Active Agents: CONFIDENTIAL
8. Solvents: CONFIDENTIAL
9. Additives: CONFIDENTIAL
10. Solubility: NA

X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

Compound	Concentration (ppm)
Arsenic	< 0.005
Cadmium	< 0.01
Chromium	< 0.05
Copper	< 0.05
Lead	< 0.05
Mercury	< 0.005
Nickel	< 0.01
Zinc	< 0.05
Cyanide	< 1.00
Chlorinated Hydrocarbons	< 0.01

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TECHNICAL PRODUCT BULLETIN #M-17USEPA, OEM REGULATIONS IMPLEMENTATION DIVISION
ORIGINAL LISTING DATE: FEBRUARY 25, 1994
REVISED LISTING DATE: JUNE 14, 1995
"CIAGENT"
(formerly CI AGENT, CHEAP INSURANCE, & PETRO-CAPTURE)

I. NAME, BRAND, OR TRADEMARK
CIAGENT (formerly CI AGENT, CHEAP INSURANCE, & PETRO-CAPTURE)
Type of Product: Miscellaneous Oil Spill Control Agent – Solidifier

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT
CIAGENT Solutions, LLC
11760 Commonwealth Dr.
Louisville, KY 40299
Phone: (502) 267-0101
(800) 255-6073
Fax: (502) 267-0181
E-mail: dan@ciagent.com
(Mr. Dan Parker)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS
CIAGENT Solutions, LLC
11760 Commonwealth Dr.
Louisville, KY 40299
Phone: (502) 267-0101
(800) 255-6073
Fax: (502) 267-0181
E-mail: dan@ciagent.com
(Mr. Dan Parker)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION
1. Flammability: Flammable solid at >210°F.
2. Ventilation: Normal ventilation is adequate.
3. Skin and eye contact; protective clothing; treatment in case of contact: Product may cause slight eye irritation if in contact with eyes. Use protective eye goggles when handling the product. In case of eye contact, flush eyes with water. In an enclosed environment, workers should wear a dust mask for personal comfort. In case of a confined space fire, do not enter without full bunker gear and positive pressure NIOSH approved self-contained breathing apparatus. Maintain fire watch at 450°F.
4.a. Maximum storage temperature: 190°F
4.b. Minimum storage temperature: None
4.c. Optimum storage temperature range: 50°F - 80°F

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4.d. Temperatures of phase separations and chemical changes: None. Avoid contact with strong oxidizing agents due to possible oxidation reaction with the product.

V. SHELF LIFE

> 5 years, if stored in cool dry area, away from direct sunlight.

VI. RECOMMENDED APPLICATION PROCEDURES

1. Application Method: For small scale spills on water (salt or fresh), CIAGENT can be broadcast directly onto the spill, spreading a thin layer from the outer edge into the middle of the spill. Agitation is not necessary. The product is also available in oil absorbent, water repellant booms and pillows. For large spills on water (fresh or salt), CIAGENT may be deployed with an air or water stream directed at the leading edge of the spill. Because of its fine particulate nature, static buildup may occur if the product is applied in dry form at a high rate of delivery. Dispensing material should be properly grounded to prevent this. The product is relatively non-abrasive and should not harm machinery or pumping systems. Agitation is not necessary.
The polymer has a specific gravity of less than one and will tend to separate and move to the surface when mixed with water. Therefore, in the case of water carrying media, the product should be introduced "just in time" as the media is sprayed, or agitation will be needed to keep the product suspended. The product will remove oils and other hazardous hydrocarbon based materials from fresh or salt water. CIAGENT may be used in a flow-through filter to remediate contaminated water. CIAGENT encapsulates and solidifies the oil, while continuing to float even after saturation. The solidified oil or hazardous material may be removed from water using a vacuum pump or fish net. The material should be put into appropriate containers and disposed of in accordance with federal, state and local regulations. For spills on land, the product would be applied in the same manner as in the water-based spill situation. Agitation is not necessary. To recover solidified oil or hazardous materials from spills on land, the spent material may be collected and swept up using an industrial vacuum cleaner, broom, or shovel. The material should be put into appropriate containers and disposed of in accordance with federal, state and local regulations.
2. Concentration/Application Rate: In general, a 10% to 30% by weight application is required to solidify light, medium, and heavy oils. Solidification may occur faster if additional CIAGENT is applied.
3. Conditions for Use: CIAGENT is equally effective in fresh or salt water, and under any weather conditions; however, colder temperatures may slow the solidification process. The product is most effective on water temperatures between 32°F and 120°F. Depending on the age and/or viscosity of the material, varying amounts of CIAGENT may be required to obtain complete solidification. The recovered solidified oil or hazardous materials may be landfilled, incinerated, used as a secondary fuel, or otherwise disposed of according to federal, state and local regulations.

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VII. TOXICITY AND EFFECTIVENESS

a. Toxicity

Material Tested	Species	LC50 (ppm)
CIAGENT	Menidia beryllina	2227.00 96-hr
	Mysidopsis bahia	2617.00 48-hr
No. 2 Fuel Oil	Menidia beryllina	4.36 96-hr
	Mysidopsis bahia	1.45 48-hr
CIAGENT &	Menidia beryllina	5.93 96-hr
No. 2 Fuel (1:10)	Mysidopsis bahia	1.73 48-hr
Reference Toxicant (DSS)	Menidia beryllina	3.68 96-hr
	Mysidopsis bahia	6.82 48-hr

NOTE: This toxicity data was derived using the concentrated product. See Section VI of this bulletin for information regarding the manufacturer's recommendations for concentrations and application rates for field use.

b. Effectiveness:

NA

IX. PHYSICAL PROPERTIES AND COMPONENTS

1. Flash Point: No flash observed at 210EF.
2. Pour Point: Not applicable; solid samples
3. Viscosity: Not applicable; solid samples
4. Specific Gravity: 0.94 g/cm3
5. pH: 7.81
6. Chemical Name and Percentage by Weight of the Total Formulation: CONFIDENTIAL
7. Surface Active Agents: None
8. Solvents: None
9. Additives: None
10. Solubility: Negligible

X. ANALYSIS FOR HEAVY METALS AND CHLORINATED HYDROCARBONS

Compound	Concentration (ppm)
Arsenic	<1.0
Cadmium	<2.5
Chromium	<2.0
Copper	<2.5
Lead	<5.0
Mercury	<0.050
Nickel	<5.0
Zinc	<2.5
Cyanide	<0.50
Chlorinated Hydrocarbons	ND

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TECHNICAL PRODUCT BULLETIN #M-18USEPA, OEM REGULATIONS IMPLEMENTATION DIVISION
ORIGINAL LISTING DATE: MARCH 29, 1994
REVISED LISTING DATE: MARCH 12, 1997
"ZYME-FLOW"
(aka, ZYME-TREAT, MARI-ZYME, UNITED 658 PETRO-ZYME)

I. NAME, BRAND, OR TRADEMARK
ZYME-FLOW
(aka, ZYME-TREAT, MARI-ZYME, UNITED 658 PETRO-ZYME)Type of Product: Miscellaneous Oil Spill Control Agent

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT
United Laboratories, Inc.
320 37th Avenue
St. Charles, IL 60174
Phone: (630) 377-0900 or (800) 323-2594
Fax: (630) 377-0960
E-mail: nsherrel@unitedlabsinc.com
(Ms. Nancy Sherrel)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS
United Laboratories, Inc.
320 37th Avenue
St. Charles, IL 60174
Phone: (630) 377-0900 or (800) 323-2594
Fax: (630) 377-0960
E-mail: nsherrel@unitedlabsinc.com
(Ms. Nancy Sherrel)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION
1. Flammability: Non-flammable
2. Ventilation: No mechanical ventilation required
3. Skin and eye contact; protective clothing; treatment in case of contact: Avoid eye contact due to possible mild eye irritation. In case of eye contact, flush eyes with water. Protective clothing is normally not required.
4.a. Maximum storage temperature: 120°F
4.b. Minimum storage temperature: 0°F
4.c. Optimum storage temperature range: 0°F - 120°F
4.d. Temperatures of phase separations and chemical changes: > 3 freeze-thaw cycles.

V. SHELF LIFE
1 year minimum.

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VI. RECOMMENDED APPLICATION PROCEDURE

1.Application Method: United's ZYME-FLOW is a chemically designed product that will make heavy crudes more pumpable, and break the adhesion between oils and soil, rock or sand. ZYME-FLOW can be applied where the contaminated soil or sand is temporarily removed and placed into a device that can provide mechanical agitation (e.g., a cement mixer or a fractionating tank). Unagitated tanks may also be used, but more time will be required to achieve the goal.

Add ZYME-FLOW solution to the tank. As agitation continues, oils with a specific gravity of less than one will float, while oils with a specific gravity of greater than one will settle.
The floating or settled oil can then be removed from the soil or sand. As ZYME-FLOW will not emulsify oils, the recovered oils are almost anhydrous, and the water can be collected and reused.
Another method is to physically isolate a small area that is to be cleaned with damming collars, sand bags or other means on the sides and a none permeable layer on the bottom (if possible). Then wash the contaminated area with ZYME-FLOW solution using a pressurized water stream. Keep the area super-saturated with water for several hours to allow oil residues to float to the surface for collection.

ZYME-FLOW can be used to wash the inside or outside of a ship or barge that has been contaminated with oil, using a high pressure sprayer. Bilges of a ship, or barge can also be cleaned using a 1% ZYME-FLOW solution, and allowing the natural movement of the ship to provide the agitation.

2. Concentration/Application Rate: The exact dilution of ZYME-FLOW will vary between 50:1 and 200:1 depending on temperature, viscosity and type of petroleum product.

3. Conditions for Use: ZYME-FLOW is effective in all non-frozen waters with greater efficacy as the temperature increases. The product efficiency is not affected by salinity, but it will be affected by tar sand.

VII. TOXICITY AND EFFECTIVENESS

a. Toxicity:

Material Tested	Species	LC50 (ppm)
ZYME-FLOW	Menidia beryllina	35.00 96-hr
	Mysidopsis bahia	26.00 48-hr
No. 2 Fuel Oil	Menidia beryllina	6.90 96-hr
	Mysidopsis bahia	3.70 48-hr
ZYME-FLOW &	Menidia beryllina	8.70 96-hr
No. 2 Fuel Oil (1:10)	Mysidopsis bahia	1.60 48-hr
Reference Toxicant (SDS)	Menidia beryllina	7.07 96-hr
	Mysidopsis Bahia	18.60 48-hr

NOTE: This toxicity data was derived using the concentrated product. See Section VI of this bulletin for information regarding the manufacturer's recommendations for concentrations and application rates for field use.

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b. Effectiveness:
NA

IX. PHYSICAL PROPERTIES
1. Flash Point: None
2. Pour Point: 32°F
3. Viscosity: <10 cps
4. Specific Gravity: 0.99
5. pH: 7.0 - 8.0
6. Chemical Name and Percentage by Weight of the Total Formulation: CONFIDENTIAL
7. Surface Active Agents: CONFIDENTIAL
8. Solvents: NA
9. Additives: CONFIDENTIAL
10. Solubility: Soluble

X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

Compound	Concentration (ppm)
Arsenic	0.005
Cadmium	0.002
Chromium	0.002
Copper	0.020
Lead	0.007
Mercury	0.0004
Nickel	0.070
Zinc	0.040
Cyanide	0.300
Chlorinated Hydrocarbons	<1.00

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EPA HAS NOT RECEIVED UPDATED CONTACT INFORMATION FOR THIS PRODUCT: 11/19/14

TECHNICAL PRODUCT BULLETIN #M-19
USEPA, OEM REGULATIONS IMPLEMENTATION DIVISION
LISTING DATE: APRIL 22, 1996
"WASTE-SET #3200®"

I. NAME, BRAND, OR TRADEMARK
WASTE-SET #3200®
Type of Product: Miscellaneous Oil Spill Control Agent – Oil Spill Solidifying Agent

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER
Environmental & Fire Technology, LLC
3374 West River Dr. NW
Grand Rapids, MI 49544
(Mr. Cal Blystra)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS
Environmental & Fire Technology, LLC
3374 West River Dr. NW
Grand Rapids, MI 49544
(Mr. Cal Blystra)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION
1. Flammability: Product will not burn unless preheated. Avoid elevated temperatures (>200°F) for extended periods (>5 days).
Product has a tendency to accumulate a static charge during transport, which is a potential fire hazard if used near flammables.
2. Ventilation: Avoid generating dust clouds.
3. Skin and eye contact; protective clothing; treatment in case of contact: May cause mild mechanical irritation to eyes, skin and respiratory tract. Dust may cause coughing and watery eyes. Pre-existing eye, skin and respiratory disorders may be aggravated by this product. Wear NIOSH-approved respirator to prevent overexposure. Refer to transitional occupational exposure limits established by OSHA in 29CFR 1910.1000. Flush eyes with water; wash skin with soap and water; if molten, treat as for burns. Remove person(s) to fresh air if excessive amounts of dust have been inhaled. Protective gloves and safety glasses should be worn.
If material is released or spilled, sweep up or vacuum and place in an approved container.
4.a. Maximum storage temperature: 200°F
4.b. Minimum storage temperature: None
4.c. Optimum storage temperature range: <200°F
4.d. Temperatures of phase separations and chemical changes: >450°F

V. SHELF LIFE
Unlimited.

VI. RECOMMENDED APPLICATION PROCEDURE
1.Application Method:
Spills on Water - For spills on water, surround the spill with WASTE-SET® 3200 to prevent migration. Reinforce containment line with a boom or sweep if necessary. WASTE-SET® and the resulting reacted material will float.

If the interior of the diked spill is not to be reclaimed, fill in the remaining surface area of the spill by broadcasting additional WASTE-SET® 3200 evenly over the spill until the WASTE-SET® no longer reacts with the spill. Alternatively, the product may be introduced under the surface of the spill to rise and react with oils in the suspension layer.
WASTE-SET® can then be swept or netted from the surface of the water.
Spills on Hard Surfaces - For spills on hard surfaces, apply WASTE-SET 3200® heavily to perimeter of spill to prevent migration. After surrounding the spill, reinforcement of the containment line thus formed with a boom or sweep may be advisable depending on the volume and flow rate.

If the interior of the diked spill is not to be reclaimed, fill in the remaining surface of the spilled material by evenly distributing additional WASTE-SET 3200® until the WASTE-SET® no longer reacts with the spill and remains white and on the surface.

Disposal - Dispose of reacted material in accordance with local, state, and federal regulation. Under the EPA Toxicity Characteristic Leaching Procedures (TCLP), WASTE-SET encapsulated material may be eligible for disposal in landfills. Incineration results in extremely low ash content. Dependent upon the nature of the encapsulated material, it may also be disposed of by incorporation into synthetic surfaces such as asphalt.

WASTE-SET® will effectively "encapsulate" crude oil and petroleum-based products, such as gasoline, kerosene, and diesel fuel; in addition to the various following liquid and vapor-phase contaminants:

Aliphatic hydrocarbons	Esters
Aromatic hydrocarbons	Ethers
Chlorinated hydrocarbons	Ketones
Alcohols	Other hydrocarbons

2. Concentration/Application Rate: One pound WASTE-SET® per five pounds of oil (May vary with viscosity and temperature).
3. Conditions for Use: No limitations.

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VII. TOXICITY AND EFFECTIVENESS

a. Toxicity

Material Tested	Species	LC50 (ppm)	
WASTE-SET 3200®	Menidia beryllina	>10000.0	96-hr
	Mysidopsis bahia	5431.0	48-hr
No. 2 Fuel Oil	Menidia beryllina	274.0	96-hr
	Mysidopsis bahia	29.0	48-hr
WASTE-SET 3200® &	Menidia beryllina	552.0	96-hr
No. 2 Fuel Oil	Mysidopsis bahia	58.0	48-hr
Reference Toxicant (SDS)	Menidia beryllina	1.8	96-hr
	Mysidopsis bahia	4.9	48-hr

NOTE: This toxicity data was derived using the concentrated product. See Section VI of this bulletin for information regarding the manufacturer's recommendations for concentrations and application rates for field use.

b. Effectiveness:

NA

VIII. MICROBIOLOGICAL ANALYSIS

NA

IX. PHYSICAL PROPERTIES

1. Flash Point: No flash observed at 310°F
2. Pour Point: NA
3. Viscosity: NA
4. Specific Gravity: 0.94
5. pH: NA
6. Chemical Name and Percentage by Weight of the Total Formulation: CONFIDENTIAL
7. Surface Active Agents: NA
8. Solvents: None
9. Additives: None
10. Solubility: Insoluble

X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

Compound	Concentration (ppm)
Arsenic	ND
Cadmium	ND
Chromium	0.44
Copper	0.98
Lead	0.08
Mercury	ND
Nickel	0.38
Zinc	3.1
Cyanide	ND

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Chlorinated Hydrocarbons	ND

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EPA HAS NOT RECEIVED UPDATED CONTACT INFORMATION FOR THIS PRODUCT: 11/19/14

TECHNICAL PRODUCT BULLETIN #M-20
USEPA, OEM REGULATIONS IMPLEMENTATION DIVISION
LISTING DATE: APRIL 22, 1996
"WASTE-SET #3400®"

I. NAME, BRAND, OR TRADEMARK
WASTE-SET #3400®
Type of Product: Miscellaneous Oil Spill Control Agent – Oil Spill Solidifying Agent

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER
Environmental & Fire Technology, LLC
3374 West River Dr. NW
Grand Rapids, MI 49544
(Mr. Cal Blystra)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS
Environmental & Fire Technology, LLC
3374 West River Dr. NW
Grand Rapids, MI 49544
(Mr. Cal Blystra)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION
1. Flammability: Product will not burn unless preheated. Avoid elevated temperatures (>200°F) for extended periods (>5 days). Product has a tendency to accumulate a static charge during transport, which is a potential fire hazard if used near flammables.
2. Ventilation: Avoid generating dust clouds.
3. Skin and eye contact; protective clothing; treatment in case of contact: May cause mild mechanical irritation to eyes, skin and respiratory tract. Dust may cause coughing and watery eyes. Pre-existing eye, skin and respiratory disorders may be aggravated by this product. Wear NIOSH-approved respirator to prevent overexposure. Refer to transitional occupational exposure limits established by OSHA in 29CFR 1910.1000. Flush eyes with water; wash skin with soap and water; if molten, treat as for burns. Remove person(s) to fresh air if excessive amounts of dust have been inhaled. Protective gloves and safety glasses should be worn.
If material is released or spilled, sweep up or vacuum and place in an approved container.
4.a. Maximum storage temperature: 200°F
4.b. Minimum storage temperature: None
4.c. Optimum storage temperature range: <200°F
4.d. Temperatures of phase separations and chemical changes: >450°F

V. SHELF LIFE

Unlimited.

VI. RECOMMENDED APPLICATION PROCEDURE

1. Application Method:

Spills on Water – For spills on water, surround the spill with WASTE-SET® 3400 to prevent migration. Reinforce containment line with a boom or sweep if necessary. WASTE-SET® and the resulting reacted material will float. If the interior of the diked spill is not to be reclaimed, fill in the remaining surface area of the spill by broadcasting additional WASTE-SET 3400® evenly over the spill until the WASTE-SET® no longer reacts with the spill. Alternatively, the product may be introduced under the surface of the spill to rise and react with oils in the suspension layer. WASTE-SET® can then be swept or netted from the surface of the water.

Spills on Hard Surfaces – For spills on hard surfaces, apply WASTE-SET® 3400 heavily to perimeter of spill to prevent migration. After surrounding the spill, reinforcement of the containment line thus formed with a boom or sweep may be advisable depending on the volume and flow rate. If the interior of the diked spill is not to be reclaimed, fill in the remaining surface of the spilled material by evenly distributing additional WASTE-SET® 3400 until the WASTE-SET® no longer reacts with the spill and remains white and on the surface.

Disposal – Dispose of reacted material in accordance with local, state, and federal regulation. Under the EPA Toxicity Characteristic Leaching Procedures (TCLP), WASTE-SET® encapsulated material may be eligible for disposal in landfills. Incineration results in extremely low ash content. Dependent upon the nature of the encapsulated material, it may also be disposed of by incorporation into synthetic surfaces such as asphalt.

WASTE-SET® will effectively "encapsulate" crude oil and petroleum-based products, such as gasoline, kerosene, and diesel fuel; in addition to the various following liquid and vapor-phase contaminants:

Aliphatic hydrocarbons	Esters
Aromatic hydrocarbons	Ethers
Chlorinated hydrocarbons	Ketones
Alcohols	Other hydrocarbons

2. Concentration/Application Rate: One pound WASTE-SET® per five pounds of oil (May vary with viscosity and temperature).

3. Conditions for Use: No limitations.

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VII. TOXICITY AND EFFECTIVENESSa. Toxicity

Material Tested	Species	LC50 (ppm)	
WASTE-SET 3400®	Menidia beryllina	>10000.0	96-hr
	Mysidopsis bahia	>10000.0	48-hr
No. 2 Fuel Oil	Menidia beryllina	274.0	96-hr
	Mysidopsis bahia	29.0	48-hr
WASTE-SET 3400® &	Menidia beryllina	442.0	96-hr
No. 2 Fuel Oil	Mysidopsis bahia	36.0	48-hr
Reference Toxicant (SDS)	Menidia beryllina	1.8	96-hr
	Mysidopsis bahia	4.9	48-hr

NOTE: This toxicity data was derived using the concentrated product. See Section VI of this bulletin for information regarding the manufacturer's recommendations for concentrations and application rates for field use.

b. Effectiveness:

NA

VIII. MICROBIOLOGICAL ANALYSIS

NA

IX. PHYSICAL PROPERTIES

1. Flash Point: No flash observed at 350°F
2. Pour Point: NA
3. Viscosity: NA
4. Specific Gravity: 0.91
5. pH: NA
6. Chemical Name and Percentage by Weight of the Total Formulation: CONFIDENTIAL
7. Surface Active Agents: NA
8. Solvents: None
9. Additives: None
10. Solubility: Insoluble

X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

Compound	Concentration (ppm)
Arsenic	ND
Cadmium	ND
Chromium	0.41
Copper	0.97
Lead	0.08
Mercury	ND
Nickel	3.3
Zinc	4.0
Cyanide	ND
Chlorinated Hydrocarbons	ND

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TECHNICAL PRODUCT BULLETIN #M-22
USEPA, OEM REGULATIONS IMPLEMENTATION DIVISION
ORIGINAL LISTING DATE: FEBRUARY 27, 1998
REVISED LISTING DATE: OCTOBER 5, 1998
"PX-700™"

I. NAME, BRAND, OR TRADEMARK
PX-700™
Type of Product: Miscellaneous Oil Spill Control Agent

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT
Enviro-Tech
1907 Southwest 47th Street
Cape Coral, FL 33914
Phone: (239) 997-6300
Fax: (239) 549-8550
Website: www.px700.com
E-mail: info@envirotechofamerica.com
(Mr. Charlie Jones)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS
Enviro-Tech
1907 Southwest 47th Street
Cape Coral, FL 33914
Phone: (239) 997-6300
Fax: (239) 549-8550
Website: www.px700.com
E-mail: info@envirotechofamerica.com
(Mr. Charlie Jones)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION
1. Flammability: Not flammable; no special precautions necessary.
2. Ventilation: None required; no vapor emissions at normal temperatures, summer and winter.
3. Skin and eye contact; protective clothing; treatment in case of contact: Product contains a surfactant; avoid prolonged skin contact. Mild eye irritant; in case of eye contact, flush with copious amounts of water. No protective clothing required. Contact treatment is to flush with water. Product is acidic (pH 3.5-4.0). Eye protection is recommended as a precaution against splashing.
4.a. Maximum storage temperature: 120°F
4.b. Minimum storage temperature: 30°F
4.c. Optimum storage temperature range: 65°F - 85°F
4.d. Temperatures of phase separations and chemical changes: Separation may occur after 3 months. Separation will not affect product performance.

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V. SHELF LIFE
Two years.

VI. RECOMMENDED APPLICATION PROCEDURE
1. Application Method: To remove oily sheen from areas surrounding an oil spill, spray undiluted PX-700™ directly over area at an application rate of one gallon for every 900 to 1200 square feet of surface area. Dilute PX-700™ 25:1 for cleaning equipment and other surfaces. Either spray or immerse equipment, as applicable. Dilute PX-700™ 50:1 for immersing wildlife to remove oil.
2. Concentration/Application Rate: At normal temperatures product is free flowing and applied full strength to remove oily sheen from aquatic environments, soils, and wastewater.
3. Conditions for Use: Water salinity, water temperature, types and ages of pollutants. Do not allow product to freeze, as separation may occur. Product may work more slowly at low temperatures. At full strength or diluted with fresh water, product will have a specific gravity lower than sea water and should float. Use of PX-700™ should aid skimming and other conventional oil recovery operations.

VII. TOXICITY AND EFFECTIVENESS
a. Toxicity

Material Tested	Species	LC50 (ppm)
PX-700™	Menidia beryllina	380.00 96-hr
	Mysidopsis bahia	297.00 48-hr
No. 2 Fuel Oil	Menidia beryllina	7.07 96-hr
	Mysidopsis bahia	1.89 48-hr
PX-700™	Menidia beryllina	5.65 96-hr
& No. 2 Fuel Oil (1:10)	Mysidopsis bahia	2.77 48-hr
Reference Toxicant (DDS)	Menidia beryllina	6.16 96-hr
	Mysidopsis bahia	23.00 48-hr

NOTE: This toxicity data was derived using the concentrated product. See Section VI of this bulletin for information regarding the manufacturer's recommendations for concentrations and application rates for field use.
b. Effectiveness
NA

VIII. MICROBIOLOGICAL ANALYSIS
NA

IX. PHYSICAL PROPERTIES
1. Flash Point: Not flammable
2. Pour Point: 30°F
3. Viscosity: Equivalent to water
4. Specific Gravity: 1.0
5. pH: 3.5 to 4.0 standard units

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6. Chemical Name and Percentage by Weight of the Total Formulation: CONFIDENTIAL
7. Surface Active Agents: Less than 5% Cocamide
8. Solvents: None
9. Additives: Citric acid for pH control
10. Solubility: 100% soluble

X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

Compound	Concentration (ppm)
Arsenic	0.47
Cadmium	ND
Chromium	ND
Copper	0.14
Lead	ND
Mercury	ND
Nickel	ND
Zinc	0.77
Cyanide	ND
Chlorinated Hydrocarbons	CONFIDENTIAL

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TECHNICAL PRODUCT BULLETIN #M-23
USEPA, OEM REGULATIONS IMPLEMENTATION DIVISION
LISTING DATE: NOVEMBER 23, 1998
"ALSOCUP"

I. NAME, BRAND, OR TRADEMARK
ALSOCUP
Type of Product: Miscellaneous Oil Spill Control Agent – Solidifier

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT
REVCOM Associates
1550 Rimpau Avenue #53
Corona, CA 92881
Phone: (951) 737-0104
E-mail: revcom@sbcglobal.net
(Mr. Dave Naylor, President)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS
Marketed under trade name:
"Oil Lift Super Absorbent"

Environmental Building Science, Inc.
100-9200 Van Horne Way
Richmond, British Columbia
V6Z 1W3 Canada
Website: www.oillift.net
Phone: (866) 543-8645
Phone: (604) 279-9994
Fax: (604) 279-9934
(Mr. Kevin Daum)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION
1. Flammability: NA
2. Ventilation: NA
3. Skin and eye contact; protective clothing; treatment in case of contact: ALSOCUP is practically non-irritating to the eyes and is non-irritating to the skin. Safety glasses and protective clothing should be worn when applying the material. The product is not expected to cause irritation to the nose, throat, or respiratory tract.
4.a. Maximum storage temperature: 163°F
4.b. Minimum storage temperature: 0°F
4.c. Optimum storage temperature range: 0°F to 163°F
4.d. Temperatures of phase separations and chemical changes: NA

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V. SHELF LIFE
ALSOCUP has a shelf life of five years.

VI. RECOMMENDED APPLICATION PROCEDURE
1. Application Method: ALSOCUP is used to collect petroleum-based products spilled on water or land. When ALSOCUP comes into contact with a petroleum product it chemically bonds and traps the petroleum. Once captured, spilled product cannot be released from ALSOCUP. ALSOCUP does not absorb water and will not sink. The product can be collected by skimming with pumps or mechanical devices.
2. Concentration/Application Rate: ALSOCUP is used by applying one pound of product to each 10 pounds of spilled petroleum products.
3. Conditions for Use: Water temperature does not appear to affect the ability of ALSOCUP to collect petroleum products. Heavy seas may prevent containment of an oil spill, and the product would lose efficiency if the oil product dispersed. Booms and dams that contain the petroleum product into an area are most effective when using ALSOCUP. In water the motion of the sea will mix the product with oil. On land a mechanical means is necessary to combine the oil with ALSOCUP. ALSOCUP will collect petroleum products at any stage; however, it is most effective early in the spill before dispersion.

VII. TOXICITY AND EFFECTIVENESS
a. Toxicity:
ALSOCUP is a non-toxic substance. The product is generally considered to have a low order of acute oral toxicity.

Material Tested	Species	LC50 (ppm)	
ALSOCUP	Menidia beryllina	>100	96-hr
	Mysidopsis bahia	>100	48-hr
No. 2 Fuel Oil	Menidia beryllina	8.1	96-hr
	Mysidopsis bahia	3.9	48-hr
ALSOCUP & No. 2 Fuel Oil (1:10)	Menidia beryllina	14.0	96-hr
	Mysidopsis bahia	10.0	48-hr
Reference Toxicant (DSS)	Menidia beryllina	NA	
	Mysidopsis bahia	NA	

VIII. MICROBIOLOGICAL ANALYSIS
NA

IX. PHYSICAL PROPERTIES
1. Flash Point: NA
2. Pour Point: NA
3. Viscosity: NA
4. Specific Gravity: NA
5. pH: NA
6. Surface Active Agents: NA
7. Solvents: NA

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8. Additives: NA
9. Solubility in Water: NA

X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

Compound	Concentration (ppm)
Arsenic	0.0211
Cadmium	0.090
Chromium	0.456
Copper	0.445
Lead	0.454
Mercury	0.00492
Nickel	0.474
Zinc	0.433
Cyanide	ND
Chlorinated Hydrocarbons	NA

ED_001324_00005599-00375

TECHNICAL PRODUCT BULLETIN #M-24
USEPA, OEM REGULATIONS IMPLEMENTATION DIVISION
LISTING DATE: JANUARY 26, 2001
"RAPIDGRAB 2000™"

I. NAME, BRAND, OR TRADEMARK
RAPIDGRAB 2000™
Type of Product: Miscellaneous Oil Spill Control Agent – Solidifier

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT
GlobeMark Resources Ltd.
1312 Mill Creek Drive
Salado, TX 76517
Mobile: (254) 231-2251
E-mail: joannie@globemarkresources.com or fiddler656@gmail.com
Website: www.globemarkresources.com
(Ms. Joannie Docter)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS
GlobeMark Resources Ltd.
1312 Mill Creek Drive
Salado, TX 76517
Mobile: (254) 231-2251
E-mail: joannie@globemarkresources.com or fiddler656@gmail.com
Website: www.globemarkresources.com
(Ms. Joannie Docter)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION
1. Flammability: IMO - Non-flammable; DOT - Non-hazardous
2. Ventilation: Use with ventilation equal to unobstructed outdoors in a moderate breeze.
3. Skin and eye contact; protective covering; treatment in case of contact: Avoid skin and clothing contact. If skin contact occurs, immediately wash with large amounts of water and soap (if possible). Remove any contaminated clothing or shoes. Launder before reusing. If irritation persists, seek medical assistance. For areas where contact is likely, wear long sleeve shirt, chemical resistant gloves, and chemical resistant goggles.
4.a. Maximum storage temperature: 120°F
4.b. Minimum storage temperature: 0°F
4.c. Optimum storage temperature range: 32°F to 90°F
4.d. Temperatures of phase separations and chemical changes: None

V. SHELF LIFE
The shelf life of unopened drums of RAPIDGRAB 2000™ is unlimited. Containers should be capped when not being used to prevent contamination and evaporation.

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VI. RECOMMENDED APPLICATION PROCEDURE

1.Application Method: RAPIDGRAB 2000™ is a non-ionic liquid formulation that may be effectively applied by mist spraying onto floating oil slicks and sheens that are often found in harbors and at sea as the result of oil leakage and spills from ships. It instantly reduces and confines floating oils by the oleophitic synergistic effect of contraction and congealment into a physical state that greatly simplifies cleanup operations. Oil slicks and sheens may be reduced by up to 1,000 percent or more. The broad temperature range for RAPIDGRAB 2000™ sprays are from 32°F to 120°F.

Aerial Spraying - Typical application altitudes of 30 to 50 feet are advised although higher altitudes may be used if condition warrant. Spray nozzle should be about ¼ inches in diameter at 104 knots or more to create enough air shear sufficient to break the RAPIDGRAB 2000™ into proper sized droplets. A ½-inch diameter nozzle may be needed for temperatures below 50°F.

Boat Spraying - Mist sprays may be applied from shipboard by power "foggers."

2. Concentration/Application Rate: RAPIDGRAB 2000™ should be mist sprayed full strength on surface oil until sufficient herding results are achieved. Results will vary depending on oil type, temperature, wave action, and viscosity.

3. Conditions for Use: RAPIDGRAB 2000™ is designed to be used after oil has been contained by booms or other similar apparatus. Timely treatment with RAPIDGRAB 2000™, even at low application rates, can help to contain the sheen/spreading effect of the oil slick.

VII. TOXICITY AND EFFECTIVENESS

a. Toxicity

Material Tested	Species	LC50 (ppm)
RAPIDGRAB 2000™	Menidia beryllina	5.13 96-hr
	Mysidopsis bahia	2.29 48-hr
No. 2 Fuel Oil	Menidia beryllina	9.34 96-hr
	Mysidopsis bahia	3.12 48-hr
RAPIDGRAB 2000™ &	Menidia beryllina	4.07 96-hr
No. 2 Fuel Oil (1:10)	Mysidopsis bahia	2.60 48-hr
Reference Toxicant (SRTT)	Menidia beryllina	2.97 96-hr
	Mysidopsis bahia	6.71 48-hr

b. Effectiveness:

NA

VIII. MICROBIOLOGICAL ANALYSIS

NA

IX. PHYSICAL PROPERTIES

1. Flash Point: 110°C
2. Pour Point: 30°F
3. Viscosity: 20.2

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4. Specific Gravity: 0.84
5. pH: 6.95
6. Surface Active Agents: Oleophitic surfactant
7.Solvents: Proprietary formulation oleophitic surfactants
8. Additives: None
9.Solubility in Water: Miscible in oil and solvents

X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

Compound	Concentration (ppm)
Arsenic	ND
Cadmium	ND
Chromium	ND
Copper	ND
Lead	ND
Mercury	<0.1
Nickel	ND
Zinc	ND
Cyanide	2.8
Chlorinated Hydrocarbons	ND

ED_001324_00005599-00378

TECHNICAL PRODUCT BULLETIN #M-25
USEPA, OEM REGULATIONS IMPLEMENTATION DIVISION
LISTING DATE: NOVEMBER 9, 2006
"OIL SOLUTIONS POWDER"
(aka, AQUA N-CAP™ POLYMER)

I. NAME, BRAND, OR TRADEMARK
OIL SOLUTIONS POWDER
(aka, AQUA N-CAP™ POLYMER)
Type of Product: Miscellaneous Oil Spill Control Agent – Solidifier

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT
Oil Solutions International
35 Mill Street
Amityville, NY 11701
Phone: (631) 608-8889
Fax: (631) 789-1676
E-mail: 4oilgreen@gmail.com
Website: www.cleaningupoil.com
(Mr. Dennis J. Traina, President)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS
Oil Solutions International
35 Mill Street
Amityville, NY 11701
Phone: (631) 608-8889
Fax: (631) 789-1676
E-mail: 4oilgreen@gmail.com
Website: www.cleaningupoil.com
(Mr. Dennis J. Traina, President)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION
1. Flammability: Non-flammable
2. Ventilation: Work in a well-ventilated area. Avoid excessive inhalation of dust.
3. Skin and eye contact; protective covering; treatment in case of contact: Skin contact – No recommendation is made specifying the need for personal protective clothing to prevent skin contact. Person(s) should wash daily at the end of each work shift. Exposed areas should be thoroughly washed with water. Eye contact – Product may cause irritation as any normal dust. Wear appropriate eye protection, compliant with ANSI Standard Z87.1, to prevent eye contact. If eye irritation or redness is experienced, promptly wash eyes with large amounts of water, for at least 15 minutes, occasionally lifting the lower and upper lids. Should eye irritation persist, seek medical attention immediately. Contact lenses should not be worn when working with this product. Inhalation – Wear appropriate respiratory protection, compliant with OSHA standard 29

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CFR 1910.134, to prevent inhalation. If a respiratory disorder is observed, remove person(s) from the work area immediately. Should respiratory disorder persist, seek medical attention immediately. Ingestion – Rinse mouth with water and seek medical attention immediately.
4.a. Maximum storage temperature: 185°F
4.b. Minimum storage temperature: NA
4.c. Optimum storage temperature range: 185°F
4.d. Temperatures of phase separations and chemical changes: None. Polymer may accumulate static charge during transport, handling, and processing. Static charge can be a potential fire hazard in the presence of volatile or flammable materials or in high airborne dust conditions.

V. SHELF LIFE
Not limited.

VI. RECOMMENDED APPLICATION PROCEDURE
1. Application Method: Apply OIL SOLUTIONS POWDER along the outer edges of spill area to prevent spill migration. Proceed by applying product onto remaining spill area, until a light white excess of product is observed. OIL SOLUTIONS POWDER may be broadcast onto the spill by hand or with a mechanical blower. Lighter hydrocarbons and synthetic oils will clump into a soft cluster like material easily recoverable with a net or other means as appropriate.
2. Concentration/Application Rate: Apply OIL SOLUTIONS POWDER at a rate of 0.5 to 2 lbs per gallon of spilled hydrocarbon. Depending on the type of hydrocarbon and recovery operations employed, more or less product may be used to achieve recoverable solid mat/residue. Allow approximately 30 – 60 minutes of contact time, product will form an elastic or rubber-like mat material. Mat like material may be removed whole or segmented as appropriate.
3. Conditions for Use: OIL SOLUTIONS POWDER differs from traditional sorbents in that it initially behaves like a synthetic sorbent, then as a solidifier as the molecular microencapsulating process occurs. Once encapsulated, the spilled oil is captured within the polymer matrix. OIL SOLUTIONS POWDER is designed to cleanup a wide variety of crude oil, refined hydrocarbon products (i.e., fuels, oils, hydraulic fluids), and synthetic fluids spilled on water and surfaces.

VII. TOXICITY AND EFFECTIVENESS
a. Toxicity

Material Tested	Species	LC50 (ppm)	
OIL SOLUTIONS POWDER	Menidia beryllina	484,000	96-hr
	Mysidopsis bahia	104,000	48-hr
No. 2 Fuel Oil	Menidia beryllina	15.80	96-hr
	Mysidopsis bahia	1.45	48-hr
OIL SOLUTIONS POWDER &	Menidia beryllina	22.50	96-hr
No. 2 Fuel Oil (1:10)	Mysidopsis bahia	2.13	48-hr
Reference Toxicant (SRTT)	Menidia beryllina	3.65	96-hr
	Mysidopsis bahia	9.55	48-hr

b. Effectiveness:
NA

VIII. MICROBIOLOGICAL ANALYSIS

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NA

IX. PHYSICAL PROPERTIES
1. Flash Point: 230°F
2. Pour Point: NA
3. Viscosity: NA
4. Specific Gravity: 0.91
5. pH: 4.08
6. Surface Active Agents: NA
7. Solvents: NA
8. Additives: None
9. Solubility in Water: Negligible

X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

Compound	Concentration (ppm)
Arsenic	<1.0
Cadmium	<0.05
Chromium	<0.325
Copper	17.25
Lead	<0.08
Mercury	0.02
Nickel	<0.225
Zinc	<0.45
Cyanide	<0.1
Chlorinated Hydrocarbons	ND

ED_001324_00005599-00381

TECHNICAL PRODUCT BULLETIN #M-26USEPA, OEM REGULATIONS IMPLEMENTATION DIVISION
LISTING DATE: JUNE 30, 2008
"ELASTOL"
(aka, SEPARATE, LIQUID ELASTOL)

I. NAME, BRAND, OR TRADEMARK
ELASTOL
(aka, SEPARATE, LIQUID ELASTOL)
Type of Product: Miscellaneous Oil Spill Control Agent

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT
Action Additives, Inc.
205 Industrial Road
P.O. Box 965
Ducktown, TN 37326
Phone: (423) 496-5000
Phone: (800) 496-5110
(Mr. Tim Kaylor)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS
Design Engineering Systems Analysis
P.O. Box 293
Alexandria, VA 22313
Phone: (703) 4613912
E-mail: escambos@actionadditivesinc.com
(Mr. Ernest T. Scambos)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION
1. Flammability: Autoignition temperature for product is 392°F. Product is combustible in liquid form and can form combustible mixtures and possibly explosive mixtures above the flash point. Use water spray to cool fire exposed surfaces and to protect personnel. Isolate "fuel" supple from fire. Use foam, dry chemical, or water spray to extinguish fire. Avoid spraying water directly into storage containers due to danger of boil over. Product is volatile and gives off invisible vapors. Either the liquid or vapor may settle in low areas or travel some distance along the ground or surface to ignition source where they may ignite.
2. Ventilation: Product is moderately volatile. Ensure proper ventilation. Avoid formation and inhalation of spray mist and vapors. Do not wear contaminated clothing. Keep away from fire and heated objects. Avoid formation of aerosols. Avoid squirting and use dosage pump when transferring.
3. Skin and eye contact; protective covering; treatment in case of contact: Protection depends on use and condition of work environment. Ensure good personal hygiene, wash hands regularly with soap and water. Avoid contact with skin and eyes and inhalation of fumes/aerosols. All new protective gear must be of CE standard. There must be an eye rinsing kit available at the

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work place. Where there is danger of inhalation, use mask with brown filter. If the product is sprayed and there is a risk of aerosol formation, use mask with combination filter A2-P2. When used regularly, measuring routines for solvent measurement should be implemented. Level of contamination should be kept as low as possible.
4.a. Maximum storage temperature: ~160°F
4.b. Minimum storage temperature: -100°F
4.c. Optimum storage temperature range: 40-70°F
4.d. Temperatures of phase separations and chemical changes: None

V. SHELF LIFE
At least 5 years when stored at temperatures below 150°F.

VI. RECOMMENDED APPLICATION PROCEDURE
1. Application Method: ELASTOL can be applied to the surface of an oil/water separator tank or added to a waste stream before it enters a separation tank. ELASTOL floats on water, dissolving when it comes in contact with petroleum products (e.g., gasoline, diesel, jet fuel, fuel oil, crude, etc.). It remains effective for long periods, but naturally degrades when exposed to the atmosphere over longer periods. ELASTOL treated oil may increase the performance of containment and recovery equipment:

- Containment booms – may have higher current and tow speed capability
- Mechanical skimming equipment – may be improved 2 to 10 times its normal recovery rates
- Drum skimmers – may recover little or no water with the oil

When applied early to a spill, ELASTOL may reduce emulsification and dispersion of oil. In addition, it may reduce the penetration of oil into porous soils and sandy beaches.
2. Concentration/Application Rate: ELASTOL can be used at very low concentrations from 100-1,500 ppm (0.01% to 0.15%). The amount of ELASTOL to be used is dependent upon the viscosity of the oil being removed. For example, one gallon of ELASTOL will remove:

- 13 gallons of gasoline
- 34 gallons of diesel
- 84 gallons of medium oil
- 150 gallons of heavy oil

3. Conditions for Use: ELASTOL may be used on fresh or salt water (under warm or cold temperatures). Prompt application may maximize effectiveness. The older the pollutants the few light oil elements remain in the oil, which may reduce the effectiveness of recovery.

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VII. TOXICITY AND EFFECTIVENESSa. Toxicity

Material Tested	Species	LC50 (ppm)	
ELASTOL	Menidia beryllina	1,333	96-hr
	Mysidopsis bahia	94	48-hr
No. 2 Fuel Oil	Menidia beryllina	5.4	96-hr
	Mysidopsis bahia	3.3	48-hr
ELASTOL &	Menidia beryllina	8.2	96-hr
No. 2 Fuel Oil (1:10)	Mysidopsis bahia	3.7	48-hr
Reference Toxicant (SDS)	Menidia beryllina	7.4	96-hr
	Mysidopsis bahia	10.7	48-hr

b. Effectiveness:
NA

VIII. MICROBIOLOGICAL ANALYSIS
NA

IX. PHYSICAL PROPERTIES
1. Flash Point: 176°F
2. Pour Point: -71°F
3. Viscosity: 3.46 cSt @ 77°F
4. Specific Gravity: 0.83@t 60°F
5. pH: 6.8 – 7.0
6. Surface Active Agents: CONFIDENTIAL
7. Solvents: CONFIDENTIAL
8. Additives: CONFIDENTIAL
9. Solubility in Water: Insoluble

X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

Compound	Concentration (ppm)
Arsenic	ND
Cadmium	ND
Chromium	ND
Copper	ND
Lead	ND
Mercury	ND
Nickel	ND
Zinc	1.4
Cyanide	ND
Chlorinated Hydrocarbons	ND

ED_001324_00005599-00384

TECHNICAL PRODUCT BULLETIN #M-27
USEPA, OEM REGULATIONS IMPLEMENTATION DIVISION
LISTING DATE: JUNE 03, 2010
"OIL BOND®"

I. NAME, BRAND, OR TRADEMARK
OIL BOND®
Type of Product: Miscellaneous Oil Spill Control Agent - Solidifier

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT
Solidification Products International, Inc.
P.O. Box 35
524 Forrest Road
Northford, CT 06472
Phone: (203) 484-9494
Toll Free: (800) 758-3634
Fax: (203) 484-9492
E-mail: dgannon@oilbarriers.com
(Ms. Donna Gannon)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS
Solidification Products International, Inc.
P.O. Box 35
524 Forrest Road
Northford, CT 06472
Phone: (203) 484-9494
Toll Free: (800) 758-3634
Fax: (203) 484-9492
E-mail: dgannon@oilbarriers.com
(Ms. Donna Gannon)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION
1. Flammability: Not classified as flammable, but will burn. Maintain a fire watch if OIL BOND® is heated above 450°F.
2. Ventilation: Normal ventilation is adequate. For confined space entry or lack of exhaust in a contained area, avoid generating dust. Dust in excessive concentration can result in an explosive mixture in air. Wear approved NIOSH respirator with particulate pre-filter for dust.
3. Skin and eye contact; protective covering; treatment in case of contact: Product dust may be mildly irritating to eyes and respiratory tract. Wear approved standard issue work clothes, gloves, dust mask, and dust tight goggles as needed. In case of contact with eyes, flush with water. If prolonged skin contact, wash with soap and water. For inhalation of dust, remove to fresh air.
4.a. Maximum storage temperature: 180°F

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4.b. Minimum storage temperature: None
4.c. Optimum storage temperature range: Ambient. Avoid elevated temperatures >200°F for extended periods of time.
4.d. Temperatures of phase separations and chemical changes: >450°F chance of auto-combustion. Avoid strong oxidizing agents.

V. SHELF LIFE
5 years. Store OIL BOND® in cool, dry area away from direct sunlight to prolong shelf life.

VI. RECOMMENDED APPLICATION PROCEDURE
1. Application Method: OIL BOND® will absorb and solidify hydrocarbon spills on freshwater and saltwater or land applications. For small spills, OIL BOND® may be broadcast by hand, and booms and pillows may be used to ring the spill. For large spills, OIL BOND® may be distributed by equipment with an air or water stream. Ground all dispensing equipment if deploying dry OIL BOND® at a high rate of speed to prevent static discharge. Introduce OIL BOND® with dispensing water spray just before final discharge to allow mixing of OIL BOND® with the water stream. Allow OIL BOND® contact time with the spilled fuel or hydrocarbon waste for 10 minutes to 1 hour before collection to allow absorption and solidification. Lighter fuels require less solidification time than heavier viscosity fuels such as No. 6 fuel oil or heavy crude. OIL BOND® is non-toxic and biologically inactive, and will remain floating on the surface of the water before and after solidification.

Collect solidified materials with a net or vacuum equipment from the surface of the water. For land spills shovel, sweep, or vacuum solidified material. Place the solidified debris in approved, labeled, and sealed containers as required by local, state, federal, international, or country-specific regulations.

Depending on the inherent nature of the spilled liquid that was solidified, disposal options include landfilling, incineration, waste to energy incineration, or use as a secondary fuel.
2. Concentration/Application Rate: OIL BOND® should be applied at a rate of 15% to 30% by weight to a spilled hydrocarbon liquid. Lighter viscosity hydrocarbon waste and oils require less OIL BOND® than heavier fuels. Conditions for use on spills may be highly variable, degraded product or extremely heavy viscosity fuels may require additional OIL BOND® to obtain complete solidification.
3. Conditions for Use: OIL BOND® may be used on any hydrocarbon waste, oil or fuel on freshwater, saltwater, or land applications. During rough weather with high winds or seas a conventional containment collection boom is recommended to corral the spill allowing easier retrieval and contact time with OIL BOND®. Cold water temperatures may require longer contact time to fully solidify a spill.

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VII. TOXICITY AND EFFECTIVENESSa. Toxicity

Material Tested	Species	LC50 (ppm)	
OIL BOND®	Menidia beryllina	>10000	96-hr
	Mysidopsis bahia	>10000	48-hr
No. 2 Fuel Oil	Menidia beryllina	3.0	96-hr
	Mysidopsis bahia	7.1	48-hr
OIL BOND® &	Menidia beryllina	3.8	96-hr
No. 2 Fuel Oil (1:10)	Mysidopsis bahia	9.6	48-hr
Reference Toxicant (SDS)	Menidia beryllina	8.0	96-hr
	Mysidopsis bahia	11.3	48-hr

b. Effectiveness:
NA

VIII. MICROBIOLOGICAL ANALYSIS
NA

IX. PHYSICAL PROPERTIES
1. Flash Point: >200ºF
2. Pour Point: NA, solid product
3. Viscosity: NA, solid product
4. Specific Gravity: 0.21
5. pH: 8.8
6. Surface Active Agents: CONFIDENTIAL
7. Solvents: None
8. Additives: Pigment/Antioxidant
9. Solubility in Water: Insoluble

X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

Compound	Concentration (ppm)
Arsenic	<0.6
Cadmium	<0.32
Chromium	<0.32
Copper	0.71
Lead	<0.32
Mercury	<0.07
Nickel	0.97
Zinc	0.32
Cyanide	<0.50
Chlorinated Hydrocarbons	ND

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TECHNICAL PRODUCT BULLETIN #M-28
USEPA, OEM REGULATIONS IMPLEMENTATION DIVISION
LISTING DATE: AUGUST 17, 2010
"OPFLEX®"

I. NAME, BRAND, OR TRADEMARK
OPFLEX® (Open-Celled Elastomeric Sorbents)
Type of Product: Miscellaneous Oil Spill Control Agent

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT

Opflex Solutions
P.O. Box 355
West Hyannisport, MA 02672
Phone: (508) 776-2995
Fax: (508) 425-2990
E-mail: ssmith@opflex.com
Website: www.opflex.com
(Mr. Scott Smith)

Manufacturing Plant:

12 New Street
St. Johnsville, NY 13452
Phone: (518) 568-7036
Fax: (518) 568-2614
E-mail: ssmith@opflex.com
Website: www.opflex.com
(Mr. Scott Smith)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS
Opflex Solutions
P.O. Box 355
West Hyannisport, MA 02672
Phone: (508) 776-2995
Fax: (508) 425-2990
E-mail: ssmith@opflex.com
Website: www.opflex.com
(Mr. Scott Smith)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION
1. Flammability: Non-flammable (DOT: Non-hazardous)
2. Ventilation: No special requirements. No special handling is required.
3. Skin and eye contact; protective covering; treatment in case of contact: No special equipment or clothing required. If eye or skin irritation occurs, flush with plenty of fresh water.
4.a. Maximum storage temperature: 120°F continuous
4.b. Minimum storage temperature: No minimum
4.c. Optimum storage temperature range: 40°F to 120°F
4.d. Temperatures of phase separations and chemical changes: Stable

V. SHELF LIFE
Shelf life is unlimited when stored in plastic bags.

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VI. RECOMMENDED APPLICATION PROCEDURE

1. Example – Opflex foam is fabricated into 40 6-foot strips that are in mesh netting. These booms can be connected end-to-end and positioned behind containment booms to absorb oil that has breached the containment.
2. Example – Opflex foam is fabricated into 1/4" x 16" x 18" pads that can be deployed by placing on an oil patch to absorb the oil from the water surface.
3. Example – Opflex foam can be cut into small cubes such as 1 cubes and contained in a net or mesh tube to create a very high surface area absorbent boom.
4. Example – Opflex foam can be fabricated into mega pads of 1/4" x 1 foot x 6 foot sections to be connected on the back of a containment boom system to absorb oil which flows over the boom, especially in marsh areas.
5. Example – Opflex foam can be fabricated into multiple mops that are strung between support posts at the shoreline to remove oil from the surf.

VII. TOXICITY AND EFFECTIVENESS

a. Toxicity

Material Tested	Species	LC50 (ppm)	
OPFLEX®	Menidia beryllina	>35640	96-hr
	Mysidopsis bahia	8630	48-hr
No. 2 Fuel Oil	Menidia beryllina	3.35	96-hr
	Mysidopsis bahia	2.24	48-hr
OPFLEX® &	Menidia beryllina	5.49	96-hr
No. 2 Fuel Oil (1:10)	Mysidopsis bahia	1.67	48-hr
Reference Toxicant (SLS)	Menidia beryllina	12.19	96-hr
	Mysidopsis bahia	10.53	48-hr

b. Effectiveness:

NA

VIII. MICROBIOLOGICAL ANALYSIS

NA

IX. PHYSICAL PROPERTIES

1. Flash Point: NA
2. Pour Point: NA, solid product
3. Viscosity: NA, solid product
4. Specific Gravity: 0.0415 g/mL
5. pH: NA
6. Surface Active Agents: NA
7. Solvents: CONFIDENTIAL
8. Additives: CONFIDENTIAL
9. Solubility in Water: Insoluble

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X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

Compound	Concentration (ppm)
Arsenic	<0.179 (brl)
Cadmium	<0.089 (brl)
Chromium	<0.268 (brl)
Copper	1.74
Lead	0.286
Mercury	<0.0031 (brl)
Nickel	<0.446 (brl)
Zinc	139
Cyanide	0.498
Chlorinated Hydrocarbons	<2.43 (brl)

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TECHNICAL PRODUCT BULLETIN #M-29USEPA, OEM REGULATIONS IMPLEMENTATION DIVISION
LISTING DATE: AUGUST 17, 2010
"GELCO 200"

I. NAME, BRAND, OR TRADEMARK
GELCO 200
Type of Product: Miscellaneous Oil Spill Control Agent - Solidifier

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT
UESS, Ltd.
Box 6088
Drayton Valley, AB, Canada
T7A 1R6
Phone: (780) 621-6870
E-mail: hmorrison@uess.ca
(Mr. Hugh Morrison)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS
UESS, Ltd.
Box 6088
Drayton Valley, AB, Canada
T7A 1R6
Phone: (780) 621-6870
E-mail: hmorrison@uess.ca
(Mr. Hugh Morrison)
*Currently only one distributor, which serves as a point of contact.

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION
1. Flammability: >150°F
2. Ventilation: Store in well-ventilated location. Where local exhaust ventilation is not practical and odors are detected, use a negative pressure half face respirator with a cartridge designed to protect against organic vapors and dust if also present, a particulate pre-filter should be used. For high airborne dust concentrations, use a cartridge to be used against nuisance dust.
3. Skin and eye contact; protective covering; treatment in case of contact: Use cloth gloves if desired. Dust-tight mono-glasses and standard issue work-wear. In case of contact with eyes or skin, flush with water.
4.a. Maximum storage temperature: 200°F
4.b. Minimum storage temperature: None
4.c. Optimum storage temperature range: 40-90°F
4.d. Temperatures of phase separations and chemical changes: Begins to oxidize exothermically at high temperatures (230°F).
4.e. Store in a cool, dry location. Away from direct sunlight or sources of intense heat.
4.f. Maintain fire watch if material temperature reaches 536°F (280°C).

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4.g. Product may accumulate static charge during processing, handling, and transport. Earth/ground all equipment used in handling and applying this product.
4.h. Avoid contact with strong oxidizing agents.
4.i. Do not stack Flexible Intermediate Bulk Containers or palletized bags.

V. SHELF LIFE
>10 years when stored in dry, cool area out of sunlight.

VI. RECOMMENDED APPLICATION PROCEDURE
1. Application Method: For small scale spills on water (fresh or salt), GELCO 200 can be broadcast directly onto the spill by hand or small hand held spreader from the outer edge back into the middle of the spill. Agitation is not necessary for GELCO 200 to be effective. The product can also be used and is available in booms, socks, and pillows.

For large spills on water (fresh or salt), GELCO 200 may be deployed with an air or water stream directed at the leading edge of the spill. Dispensing equipment should be properly grounded to prevent static electricity build-up if pumping GELCO 200 in dry form at high rates of delivery. If used with a water carrying media, product will require agitation to keep product suspended if there is a delay or travel time associated between batching and delivering product upon spill.

GELCO 200 will remove oils and other hazardous hydrocarbon based materials from both salt and fresh water. GELCO 200 encapsulates and solidifies the oil, and remains buoyant even after total saturation. The solidified products can be removed from the water with hand vacs, vacuum barges, commercial fishing nets, and conveyors. Solidified materials should be placed into appropriate containers and disposed of in accordance with all applicable federal, state, and local regulations.

Land Application
For spills on land, the product would be applied in the same manner. The product can also be applied by sand-blasting equipment/hopper or pneumatic air seeders. Agitation is not necessary in most scenarios. Some fine agitation may be necessary to remove contaminated materials from native grasses and marsh areas.

Many factors are taken into consideration before determining the best method(s) of application. They include weather, geography, access, land use, and habitat of affected spill area.

When removing contaminants from land, it should be a priority to minimize the volume of land taken to preserve the integrity of the land and to minimize the volume of waste requiring disposal.

To recover solidified oil or hazardous materials from spills on land, the solidified product can be collected and removed efficiently and effectively using a variety of manual and mechanical means.

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Manual methods include picking up by hand, using brooms, rakes, shovels, and squeegees to remove and pick up solidified petroleum waste product.

Mechanical means include using hand held vacuums, portable vac units, vac-trucks, or commercial shop vacs. Once the spilled product is solidified by GELCO 200, it will not leach. GELCO 200 is extremely hydrophobic and will not take on water, which may help to keep the volume of waste produced down, depending on the characterization of any non-solidified oil and water remaining in the area treated. Pressure flushing the solidified product or raw into a containment area where it can be solidified – a boomed area, containment dike, bell hole, etc. for removal by vacuum – is also a very practical method for removal.

Land spill cleanup of solidified oil/product
Collection and disposal of materials generated from application to oil spilled on land involve greater variation in waste composition, and appropriate disposal techniques have to be selected for the particular circumstances. Proper precautions, including testing as necessary to identify the characteristics of wastes generated from the application of GELCO 200, should be taken to determine the safe and legally required means of recovering, handling, storing, transporting, treating, recycling, or disposing of materials produced from the application of GELCO 200 to oil spilled on land.

All materials should be placed into appropriate containers, characterized by knowledge or testing as to waste type, and handled, stored, transported, treated, or disposed of in accordance with all applicable federal, state, and local regulations. Professional advice should be obtained where needed.

2. Concentration/Application Rate: GELCO 200 is usually applied at a ratio of 5-20% of GELCO 200 to waste by weight to solidify light, medium, and heavy hydrocarbons. Solidification typically occurs 1-3 minutes for most oils. GELCO 200 has been used effectively on heavier crudes including Bunker C within the application rates noted above.

3. Conditions for Use: GECLO 200 is effective in all environments and under a broad range of weather conditions. The product is most effective on water temperatures between 32°F and 120°F. Depending upon the age and/or viscosity of the material, varying amounts of GELCO 200 may be required to obtain complete solidification. The recovered solidified product can be disposed of in landfills, incinerated, or disposed of in accordance with all applicable federal, state, and local regulations. Some products can be recovered from the solidified mass through a heat process that would allow the solidified product to release itself from the GELCO 200.

UESS, Ltd. has had TCLP tests completed on several occasions and have not had any field instances of product being released in our methods of recovery and disposal to date due to pressure related issues.

VII. TOXICITY AND EFFECTIVENESS
a. Toxicity

Material Tested	Species	LC50 (ppm)

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GELCO 200	Menidia beryllina	>10000	96-hr
	Mysidopsis bahia	>1000	48-hr
No. 2 Fuel Oil	Menidia beryllina	9.26	96-hr
	Mysidopsis bahia	6.58	48-hr
GELCO 200 &	Menidia beryllina	3.15	96-hr
No. 2 Fuel Oil (1:10)	Mysidopsis bahia	3.51	48-hr
Reference Toxicant (SDS)	Menidia beryllina	8.03	96-hr
	Mysidopsis bahia	14.5	48-hr

b. Effectiveness:
NA

VIII. MICROBIOLOGICAL ANALYSIS
NA

IX. PHYSICAL PROPERTIES
1. Flash Point: >150ºF
2. Pour Point: NA, solid product
3. Viscosity: NA, solid product
4. Specific Gravity: 0.25 g/cm^3 at 4ºC
5. pH: 4.75
6. Surface Active Agents: NA
7. Solvents: NA
8. Additives: CONFIDENTIAL
9. Solubility in Water: Insoluble

X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

Compound	Concentration (ppm)
Arsenic	<0.577
Cadmium	<0.289
Chromium	<0.577
Copper	<0.577
Lead	<0.577
Mercury	<0.100
Nickel	5.91
Zinc	0.788
Cyanide	ND
Chlorinated Hydrocarbons	ND

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TECHNICAL PRODUCT BULLETIN #M-30USEPA, OEM REGULATIONS IMPLEMENTATION DIVISION
LISTING DATE: APRIL 26, 2012
"NORSOREX® APX"

I. NAME, BRAND, OR TRADEMARK
NORSOREX® APX
Type of Product: Miscellaneous Oil Spill Control Agent – Solidifier

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT
ASTROTECH Advanced Elastomerproducts GmbH.
Perfektastrasse 86
A-1230 Vienna
Austria, Europe
Office: 43-1-869-07-60-0
Phone: 43-664-100-8567
Fax: 43-1-869-07-60-10
E-mail: office@astrotech.at
Website: www.norsorex.at or www.astrotech.at
(Mr. Gerhard Karall, CEO)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS
ASTROTECH Advanced Elastomerproducts GmbH.
Perfektastrasse 86
A-1230 Vienna
Austria, Europe
Office: 43-1-869-07-60-0
Phone: 43-664-100-8567
Fax: 43-1-869-07-60-10
E-mail: office@astrotech.at
Website: www.norsorex.at or www.astrotech.at
(Mr. Gerhard Karall, CEO)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION
1. Flammability: >174°F
2. Ventilation: Dust explosions are possible while handling organic powders at high concentrations; therefore, provide proper air ventilation with fresh air or other methods to avoid dust formation. General dust limits (DE-TRGS 900): 3 mg/m^3 (respirable dust fraction), 10 mg/m^3 (inhalable dust fraction), short-term exposure value (TRGS 900, 2.3) – excess factor 4. For short-term exposure wear dust masks.
3. Skin and eye contact; protective covering; treatment in case of contact: Avoid contact to skin and eyes. Do not breathe dust. Wear protective goggles, gloves, and clothing. Following skin contact, wash with plenty of water and pH-neutral soap. Obtain medical attention if irradiation symptoms persist. Following eye contact, remove contact lenses immediately and rinse with

plenty of water (also under the eyelids) for at least 15 minutes. Obtain medical attention. Following ingestion, remove all of product from the respiratory system and wash oral cavity. Drink 200-300 ml of water. Do not induce vomiting without medical advice. Obtain medical attention.
4.a. Maximum storage temperature: 45°C/113°F
4.b. Minimum storage temperature: -5°C/23°F
4.c. Optimum storage temperature range: -5°C to 30°C/23°F to 86°F
4.d. Temperatures of phase separations and chemical changes: The material composition does not change with the temperature (no phase separation). Chemical changes occur at temperatures >45°C/113°F with oxygen. The material changes from white to yellow and the absorption behavior decreases.

V. SHELF LIFE
Shelf life is 3 years from date of production. Keep material stored in original containers in a dark, dry area until use. The product should be used within 6 months after opening the original container.

VI. RECOMMENDED APPLICATION PROCEDURE
1. Application Method: NORSOREX® APX is a special polymer with very high affinity for hydrocarbons and, since it is hydrophobic, it is also insoluble in water. NORSOREX® APX can be used in free powder or pad form (sealed bags containing the powder). NORSOREX® APX powder can bond to a variety of liquid hydrocarbons in two stages. First, due to the fast absorption process further oil spreading is prevented (forming of a gel). Second, the oil solidifies to a non-leaching inert, firm cohesive "rubber-like" mass within a few hours, which can be easily collected and burned, disposed of or used for other purposes (e.g., rubber industry in a full green recycle process). It is a combination of an adsorption and absorption process.

Use NORSOREX® APX powder or pads by estimating the hydrocarbon quantity and checking with the application chart to individuate the necessary quantity. The suggestion to optimize the usage is to keep ratio values of NORSOREX® APX to hydrocarbon as close as possible to the application chart. If possible, use pretests to test the process. Deploy NORSOREX® APX in the environment where there is hydrocarbon to be removed or recovered. NORSOREX® APX can be applied by hand or through mechanical spreading. According to the desired performance, wait the necessary reaction time. Reaction takes place within minutes and it reaches 80 percent of its efficiency after only a few hours. Maximum efficiency (100 percent) can be reached in less than 24 hours. Once NORSOREX® APX has reacted, it is possible to recover the hydrocarbon in solid form.

2. Concentration/Application Rate:

Type of Hydrocarbon (HC)	**kg_{HC}/kg_{APX}**	**kg_{APX}/kg_{HC}**	**kg_{APX}/m^3_{HC}**	**L_{HC}/L_{APX}**	**L_{APX}/L_{HC}**
Benzene	23.0	0.043	38.1	9.189	0.109
Toluene	18.0	0.056	48.2	7.267	0.138

Hexane	4.2	0.238	155.9	2.245	0.445
Heptane	5.0	0.200	135.9	2.575	0.388
Cyclorhexane	6.8	0.147	114.6	3.055	0.327
Dichloromethane/Methylene chloride	18.0	0.056	73.9	4.737	0.211
Chloroform	26.0	0.038	57.0	6.136	0.163
Trichloroethane/Trichloroethylene	31.8	0.031	45.9	7.623	0.131
Tetrachloroethene/Trichloroethylene	31.0	0.032	52.3	6.689	0.149
1,2-Dichlorobenze	27.4	0.036	47.4	7.377	0.136
Pyralene 60 (60% PCB/40%TCB)	36.4	0.027	39.3	8.909	0.112
Pyralene 78 (78% PCB/22% TCB)	28.8	0.035	52.4	6.675	0.150
Diethyl glycol	2.7	0.370	3.11.1	1.125	0.889
Diocytlphthalate	2.8	0.357	353.9	0.990	1.010
Heavy Crude Oil A	12.0	0.083	75.0	4.667	0.214
Heavy Crude Oil B	9.0	0.111	88.9	3.938	0.254
Light Crude Oil	9.5	0.105	88.4	3.958	0.253
Kerosene	10.2	0.098	79.4	4.407	0.227
Diesel	10.0	0.100	82.3	4.253	0.235
Aromatic Process Oils	8.3	0.120	120.5	2.905	0.344
Naphthenic Process Oils	8.3	0.120	108.4	3.228	0.310
Paraffinic Process Oils	4.0	0.250	217.5	1.609	0.621
Refrigerator Oils	10.7	0.093	81.3	4.305	0.232
Turbine Oils	4.3	0.233	209.3	1.672	0.598
Machine Oils	4.5	0.222	200.0	1.750	0.571
Motor Oils	3.8	0.263	228.9	1.529	0.654
Vegetable Oils	2.7	0.370	337.0	1.038	0.963
HC – Hydrocarbon APX – NORSOREX® APX kg_{xx} – Kilogram of xx M^3_{xx} – Cubic meters of xx L_{xx} – Liter of xx kg_{APX}/m^3_{HC} – Kilograms of NORSOREX® APX per cubic meter of hydrocarbon			Bulk density of NORSOREX® APX powder: 0.35 g/cm^3 The results are tested at room temperature (23°C/73°F) and most substrates show an improvement of 10 until 15% at 40°C. The best performance is achieved at 60°C with an improvement of about 30%. At higher temperatures the effect of improvement falls and over 100°C significant.		

3. Conditions for Use:

To recover the solidified NORSOREX® APX from the environment, mechanically collect the material and transport it to the nearest designated disposal location. NORSOREX® APX has the capability of 3.5 bar of pressure before it will start leaking. Do not discharge into drains, surface waters, or ground waters. NORSOREX® APX is not biodegradable. The resulting "rubber-like" material could still be hazardous so extreme caution should be exercised when handling these materials. Very polar substances such as organic acids, alcohols or glycols show a reduced absorption efficiency of the product. The water temperature has an influence on the reaction time. Cold water slows down the solidification process. The ages of pollutants only have an influence on the absorption performance if their viscosity or polarity are increased to the typical values for the "fresh" pollutant.

Avoid damage to NORSOREX® APX pads if the application environment is characterized by rough water. This will ensure the easiest deployment and recovery procedure. If allowed by current regulations and if properly contained, the free powder form is recommended to optimize the contact interface between NORSOREX® APX and the liquid hydrocarbon.

VII. TOXICITY AND EFFECTIVENESS

a. Toxicity

Material Tested	Species	LC50 (ppm)
NORSOREX® APX	Menidia beryllina	>100,000.00 96-hr
	Mysidopsis bahia	>100,000.00 48-hr
No. 2 Fuel Oil	Menidia beryllina	15.10 96-hr
	Mysidopsis bahia	2.41 48-hr
NORSOREX® APX & No. 2	Menidia beryllina	39.80 96-hr
Fuel Oil (1:10)	Mysidopsis bahia	3.06 48-hr
Reference Toxicant (SDS)	Menidia beryllina	2.01 96-hr
	Mysidopsis bahia	6.63 48-hr

b. Effectiveness:

NA

VIII. MICROBIOLOGICAL ANALYSIS

NA

IX. PHYSICAL PROPERTIES

1. Flash Point: 174°F
2. Pour Point: NA
3. Viscosity: NA
4. Specific Gravity: 0.91047 at 60°F
5. pH: 7.10
6. Surface Active Agents: Polynorbornene
7. Solvents: NA
8. Additives: Phenolic antioxidant, flow agent
9. Solubility in Water: Insoluble in water

ED_001324_00005599-00399

ED_001324_00005599-00400

X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

Compound	Concentration (ppm)
Arsenic	ND
Cadmium	ND
Chromium	0.40
Copper	0.14
Lead	ND
Mercury	0.011
Nickel	ND
Zinc	55.40
Cyanide	0.222
Chlorinated Hydrocarbons	ND

ED_001324_00005599-00401

NEW PRODUCT LISTING

TECHNICAL PRODUCT BULLETIN #M-31
USEPA, OEM REGULATIONS IMPLEMENTATION DIVISION
LISTING DATE: NOVEMBER 9, 2015
"CAS 100©"

I. NAME, BRAND, OR TRADEMARK
CAS 100©
Type of Product: Miscellaneous Oil Spill Control Agent – Solidifier

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT
Tradewinds Environmental Safety Services SA de CV
Calle 1 "E" No. 245 por 30 y 36
Col. Campestre
Merida, Mexico C.P 97120
Phone: 52-999-200-9075
E-mail: mharper@tessmexico.com
(Mr. Michael Harper)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS
EPC Evolved Products, Inc.
5889 Greenwood Plaza Boulevard, Suite 201
Greenwood Village, CO 80111
Phone: 720-496-0023
E-mail: dave.washington@epces.com
(Mr. Dave Washington)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION
1. Flammability: Non-Flammable
2. Ventilation: Work in well ventilated area. Avoid excessive inhalation of fine particles.
3. Skin and eye contact; protective covering; treatment in case of contact: Avoid contact to eyes. Do not breathe. Wear protective goggles, gloves and clothing. Following skin contact, wash with plenty of soap and water. Remove exposed or contaminated clothing, taking care not to contaminate the eyes. Please seek medical attention if adverse effects continue after flushing. Following eye contact, remove contact lenses (if necessary) and rinse with gently running water for at least 15 minutes. Obtain medical attention. Following ingestion, call physician or poison control center for most current information. If professional advice is not available, do not induce vomiting. Drink large quantities of water. Following inhalation, move to fresh air location. Seek medical attention if adverse symptoms continue after removal to fresh air.
4.a. Maximum storage temperature: 140°F
4.b. Minimum storage temperature: -40°F
4.c. Optimum storage temperature range: -40°F to 140°F
4.d. Temperatures of phase separations and chemical changes: None

ED_001324_00005599-00402

V. SHELF LIFE
The shelf life of CAS 100© is 1 year from date of production if stored in a dry dark location. Keep material stored in original containers in a dark, dry area until use. If the product is exposed to UV rays consistently, it will degrade over time.

VI. RECOMMENDED APPLICATION PROCEDURE
1. Application Method: In powder form, apply CAS 100© along the outer edges of spill area to prevent migration. Continue to apply CAS 100© inside spill area until the area is saturated with product. Depending on type of hydrocarbon, the resulting oil/CAS 100© mixture can be rolled up like a carpet or clumps of the solid can be removed with a net. In pad form, booms can be used to prevent migration of oil spill. Pads can be used to clean up the spill area by placing them on the oil spill itself. Once the pad is saturated, it can be easily removed by simply picking up the pad.

2. Concentration/Application Rate: CAS 100© is used by applying 1 pound of product to each 10 pounds of spilled hydrocarbon. The contact time varies from just a few seconds to several hours depending upon the quantity of the spill. Hydrocarbon viscosities decrease as temperatures increase causing an increase in the time required for the gelling process of hydrocarbon to CAS 100©.

3. Conditions for Use: CAS 100© can be used on any concentration of water salinity and water temperature. There is no restriction of the types of ages of the hydrocarbon being processed. Depending upon the types of the hydrocarbon, the CAS 100©/oil solid can be in the form of a carpet, rubber ball or crumb like material. CAS 100© has a fast gelling characteristic, which prevents the hydrocarbon from spreading further. Once the hydrocarbon comes in contact with CAS 100©, the result is a non-leaching solid within a few minutes (or hours) depending on the size of the spill. The resulting solid should be collected at the spill site and disposed of according to federal, state and local regulations. Collecting the solid at the spill site will prevent the CAS 100©/oil solid from reaching open water.

VII. TOXICITY AND EFFECTIVENESS
a. Toxicity

Material Tested	Species	LC50 (ppm)
CAS 100©	Menidia beryllina	>1000 96-hr
	Mysidopsis bahia	>1000 48-hr
No. 2 Fuel Oil	Menidia beryllina	4.81 96-hr
	Mysidopsis bahia	1.93 48-hr
CAS 100© & No. 2 Fuel Oil	Menidia beryllina	5.94 96-hr
(1:10)	Mysidopsis bahia	1.41 48-hr
Reference Toxicant (SDS)	Menidia beryllina	8.84 96-hr
	Mysidopsis bahia	23.00 48-hr

b. Effectiveness:

ED_001324_00005599-00403

NA

VIII. MICROBIOLOGICAL ANALYSIS
NA

IX. PHYSICAL PROPERTIES
1. Flash Point: >200ºF
2. Pour Point: NA (solid material)
3. Viscosity: NA (solid material)
4. Specific Gravity: 0.51
5. pH: 6.94
6. Surface Active Agents: NA
7. Solvents: NA
8. Additives: NA
9. Solubility in Water: Insoluble

X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

Compound	Concentration (ppm)
Arsenic	<2.0
Cadmium	<0.5
Chromium	<1.0
Copper	<2.5
Lead	<2.0
Mercury	<0.029
Nickel	<4.0
Zinc	<5.0
Cyanide	<0.22
Chlorinated Hydrocarbons	ND

ED_001324_00005599-00404

To: DeHaven, Leigh[DeHaven.Leigh@epa.gov]
Cc: Durbin, Luke[Luke_Durbin@sra.com]
From: Tirrell, Rebecca
Sent: Fri 6/26/2015 12:51:37 AM
Subject: Reference Toxicant - A new twist
Procleans_SRT and CuSO4.pdf

Leigh

Stillmeadow received a waiver for the toxicity test because they presented a 20-month period of performance history with consistent results for LC50's using CuSO4 as the Reference Toxicant (see attached example). Stillmeadow was the testing lab for Nokomis 3-AA (D-14) and Procleans (SW-35), both were listed in 2008. These are the only two products that have used a Reference Toxicant other than DSS or its variants (e.g., SLS, SDS). I did a quick look through the archives; listings and key pending submissions since January 2013, when Bio-Aquatic changed their protocol, include the following products:

Product	**Listing Date**	**Testing Lab**	**Reference Toxicant**
D-19 COREXIT EC9500B	8/1/2013	Bio-Aquatic Testing	SLS (Testing 2010)
SW-64 NONTOX	1/23/2014	Bio-Aquatic Testing	SLS (Testing 2010)
SW-65 SIMPLE GREEN	7/9/2013	Pacific EcoRisk	DSS
SW-66 Formula 206 1-x	5/7/2015	CBI	SDS
B-70 Waste Away	2/7/2013	Bonner Analytical	SLS
B-71 ACT TERRA FIRMA	6/7/2014	Bio-Aquatic Testing	SLS (Testing 2012)
Pending File			
NKS		Pacific EcoRisk	DSS
WATER WORKS		Bio-Aquatic Testing	KCl (Testing 2014)
RHAMNOWASH 10		Bio-Aquatic Testing	KCl (Testing 2015)

It looks like Water Works and RhamnoWash are the first two NEW application packages we have received that included Bio-Aquatic Testing, Inc. toxicity testing results using Potassium Chloride as a Reference Toxicant.

Rebecca

To: DeHaven, Leigh[DeHaven.Leigh@epa.gov]
Cc: Tirrell, Rebecca[Rebecca.Tirrell@csra.com]
From: Durbin, Luke
Sent: Thur 7/21/2016 6:01:34 PM
Subject: TD96 attached
TD79 Item 1_PS Maintenance POC Verification_3-23-2016_v4_Update needed f....docx

Leigh,

Attached please find the updated table for TD 79, as directed in TD 96.

Luke

Luke Durbin

Program Analyst
CSRA Inc.

Science, Policy and Mission Programs

309.275.2419 | Luke.Durbin@csra.com | www.csra.com

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To: Tulis, Dana[Tulis.Dana@epa.gov]; Cheatham, Reggie[cheatham.reggie@epa.gov]; DeHaven, Leigh[DeHaven.Leigh@epa.gov]; Wilson, Gregory[Wilson.Gregory@epa.gov]; Principe, Vanessa[Principe.Vanessa@epa.gov]; Bove, James[Bove.James@epa.gov]
From: Matthiessen, Craig
Sent: Tue 9/29/2015 7:24:18 PM
Subject: FW: Request proactive response to Environment Canada proposal
1509 FINAL LTR to EPA re Canada.doc
FINAL Comments Spill Treating Agents.pdf

See below. This will also likely be coming our way via CMS. Craig

From: Riki Ott [mailto:rikiott@gmail.com]
Sent: Tuesday, September 29, 2015 2:08 PM
To: Mccarthy, Gina
Cc: Matthiessen, Craig; Shanna Devine
Subject: Request proactive response to Environment Canada proposal

Dear Administrator McCarthy,

On April 22, 2015, ALERT, a project of Earth Island Institute, submitted extensive, technical, 300-page comments on the EPA rulemaking for the National Oil and Hazardous Substances Pollution Contingency Plan, 40 CFR Parts 110 and 300 [EPA–HQ–OPA–2006–0090; FRL–9689–9–OSWER] RIN 2050–AE87.

We are now writing to share a concern, if you are not already aware, that may impact the final rulemaking, given the U.S.–Canada efforts to harmonize environmental (and other) laws and policies: In early July 2015 Environment Canada opened a rulemaking on product use in oil spill response and is proposing to allow interim use of two Corexit dispersants – EC9500A and EC9527A – the very same ones that EPA may be restricting or eliminating in the U.S. (Canada Gazette, Vol. 149, No. 27, July 4, 2015. http://gazette.gc.ca/rp-pr/p1/2015/2015-07-04/html/reg1-eng.php)

Specifically, Environment Canada is proposing interim use regulations that would give carte blanche preauthorization for these Corexit dispersants with essentially no guidelines or conditions for use other than stating that it will develop final use criteria within the next five years. In the interim period and in response to a spill, the relevant offshore board's Chief Conservation Officer may decide to use the Corexit dispersants – and any other spill treating

agents that may be listed/preauthorized – based on a determination of "net environmental benefit," for which there are also no conditions or criteria in the proposed interim use regulations.

Meanwhile, the U.S. EPA is now seeking through its rulemaking to increase the likelihood of achieving net environmental benefit of dispersant and other product use, and the overall soundness of the data, by requiring: (1) more detailed – public – information about product ingredients (i.e., no confidential business information); (2) improved and updated efficacy and toxicity testing protocols and new thresholds of performance (i.e., including chronic toxicity tests, minimum efficacy standards, and maximum toxicity standards); (3) testing on both product and oil-product combinations to better simulate environmental conditions and help ensure that products will perform as intended; (4) advanced monitoring during product use and long-term environmental monitoring post use; (5) protection for endangered species; (6) consideration of human health impacts; (7) certain prohibitions on product use; (8) specific protocol to remove products from the list or to stop use of products once initiated; and (9) specific protocol to transition from the old rules to the new rules. Further, the U.S. EPA also grants authority in area response plans to develop area-specific conditions of product use, including dispersants. The proposed Canadian interim use regulations lack most of this detail, as we describe in our comments to Environment Canada (enclosed).

In its rulemaking, Environment Canada states that it is striving to list products that are compatible with products that are likely to be used in the United States. However, its proposed regulations may have the opposite effect and could create very awkward situations in cross-border oil spill incidents. It is clearly desirable to use products that are listed for use in both countries.

We therefore request that U.S. EPA take proactive measures – at its earliest convenience – to encourage the Canadian Prime Minister of the Environment and Environment Canada to propose that no specific spill treating agent products be included in the interim use regulations. Instead product use should be contingent upon development and adoption of final use regulations that establish a set of testing requirements, standards, and conditions to evaluate and determine what products are likely to achieve a net environmental benefit and to minimize harm to human health. Further, conditional use requirements should be developed in conjunction with local governments as part of area response plans, because communities live with the consequences of these policies. (For example, the Union of BC Municipalities unanimously passed Resolution A4, calling for resources and training and a decision-making role to prepare for and manage oil spill impacts on their communities. http://www.ubcm.ca/assets/Resolutions~and~Policy/Resolutions/2015-ResolutionsBook-for-web_lowres.pdf)

We have enclosed the comments submitted to Environment Canada from concerned citizens and public nonprofit organizations in Canada and the U.S. to give you more detail about our specific concerns with the Canadian rulemaking – and the need for proactive measures from the EPA Administrator.

Thank you for your consideration. We would appreciate being informed of any action that is taken.

Sincerely,

Riki Ott, PhD, Director

ALERT Project

www.alertproject.org

Shanna Devine, Investigator

Government Accountability Project

www.whistleblower.org

cc: Craig Matthiessen, Office of Solid Waste & Emergency Response

U.S. Environmental Protection Agency
Office of the Administrator 1101A
1200 Pennsylvania Avenue NW
Washington, DC 20460

September 29, 2015

Via email: McCarthy.Gina@EPA.gov

Dear Administrator McCarthy,

On April 22, 2015, ALERT, a project of Earth Island Institute, submitted extensive, technical, 300-page comments on the EPA rulemaking for the National Oil and Hazardous Substances Pollution Contingency Plan, 40 CFR Parts 110 and 300 [EPA–HQ–OPA–2006–0090; FRL–9689–9–OSWER] RIN 2050–AE87.

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Specifically, Environment Canada is proposing interim use regulations that would give carte blanche preauthorization for these Corexit dispersants with essentially no guidelines or conditions for use other than stating that it will develop *final use criteria within the next five years*. In the interim period and in response to a spill, the relevant offshore board's Chief Conservation Officer may decide to use the Corexit dispersants – and any other spill treating agents that may be listed/preauthorized – based on a determination of "net environmental benefit," *for which there are also no conditions or criteria in the proposed interim use regulations*.

Meanwhile, the U.S. EPA is now seeking through its rulemaking to increase the likelihood of achieving net environmental benefit of dispersant and other product use, and the overall soundness of the data, by requiring: (1) more detailed – public – information about product ingredients (i.e., no confidential business information); (2) improved and updated efficacy and toxicity testing protocols and new thresholds of performance (i.e., including chronic toxicity tests, minimum efficacy standards, and maximum toxicity standards); (3) testing on both product and oil-product combinations to better simulate environmental conditions and help ensure that products will perform as intended; (4) advanced monitoring during product use and long-term environmental monitoring post use; (5) protection for endangered species; (6) consideration of human health impacts; (7) certain prohibitions on product use; (8) specific protocol to remove products from the list or to stop use of products once initiated; and (9) specific protocol to transition from the old rules to the new rules. Further, the U.S. EPA also grants authority in area response plans to develop area-specific conditions of product use, including dispersants. *The proposed Canadian interim use regulations lack most of this detail*, as we describe in our comments to Environment Canada (enclosed).

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Thank you for your consideration. We would appreciate being informed of any action that is taken.

Sincerely,

Riki Ott, Director
ALERT Project
www.alertproject.org

Shanna Devine, Investigator
Government Accountability Project
www.whistleblower.org

cc: Craig Matthiessen, Office of Solid Waste and Emergency Response

To: DeHaven, Leigh[DeHaven.Leigh@epa.gov]
From: Nichols, Nick
Sent: Mon 4/13/2015 3:46:40 PM
Subject: FW: BP dispersant toxic

From: Stroud, Fred
Sent: Friday, April 10, 2015 8:23 PM
Subject: Fwd: BP dispersant toxic

From: Harry Allen <harryallen3@gmail.com>
Date: April 10, 2015 at 3:52:12 PM PDT
To: "Stroud, Fred" <Stroud.Fred@epa.gov>
Cc: Harry Allen <harryalleniv@gmail.com>
Subject: Re: BP dispersant toxic

Not a surprise, See the product schedule. #2 Fuel Oil is 2.5 to 3x more toxic w/ Corexit. See the SMART presentation at

https://www.epaosc.org/site/region_list.aspx?region=98

There is a relevant slide #5.

There are physical constraints to dispersed oil toxicity in the Gulf. The deep oil was so dispersed naturally that they could hardly find it regardless of dispersant addition. I don't think the deep dispersant mixed well with the rising oil and I don't think it did any good.

As you know surface dispersant is temporary. Once it dilutes after several hours the emulsion breaks and the oil either resurfaces or becomes neutrally buoyant. Naturally

floating oil will mix with heavier solids and become neutrally buoyant as well. This is the bad oil for coral. Long after the toxic dispersant is washed away the partially submerged oil can heavily impact coral reefs below the tideline. It would be interesting to know what is the residual toxicity of entrained Corexit where this oil hits the reef.

H3

On Fri, Apr 10, 2015 at 1:43 PM, Stroud, Fred <Stroud.Fred@epa.gov> wrote:

OCEANS:

Gulf spill cleanup dispersant more toxic to coral than oil -- study

Katherine Ling, E&E reporter

Published: Friday, April 10, 2015

The chemical dispersant used to break down the oil spilled in the 2010 Deepwater Horizon accident in the Gulf of Mexico is more toxic to coral than the oil, according to a study released on the eve of the fifth anniversary of the disaster.

The accident marked the first time that a dispersant was used below the ocean surface during an oil spill in addition to the traditional surface use. Almost 2 million gallons of the dispersant Corexit 9500A -- with slightly less than half released underwater -- was used to emulsify the around 5 million barrels of crude oil that poured out due to the rig explosion.

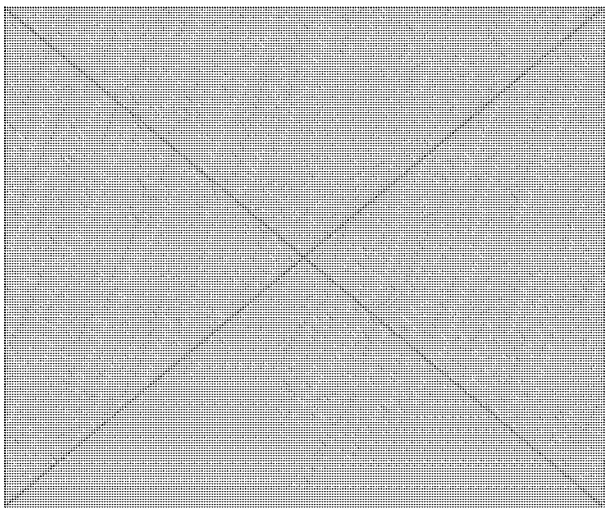
When exposed to the chemical dispersant, three species of cold-water coral showed "more severe health declines" at lower concentrations than the same species exposed to a mixture of oil and dispersant and to just oil, according to findings by scientists from Temple University and Pennsylvania State University. The oil-dispersant mixture was also more toxic than just oil, the team found.

Its study was published online in the journal *Deep-Sea Research II.*

The scientists became interested in the experiment after observing post-spill that several damaged Gulf coral populations were coated with a dark-colored wool-like slime that was found to contain oil from the spill and residues from the dispersants.

"We wanted to know if the damages that had been witnessed could have been caused by the oil, the dispersant itself, or a combination of both," Danielle DeLeo, a Temple doctoral student who was the study's lead author, said in a statement.

Advertisement



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The corals may have a higher tolerance for the oil because they have adapted to natural seeps of oil over time in their environment, the team noted. The study also said that despite the results, "it is unclear whether short-term exposures to oil and dispersant have long-term effects," that the matter would require further study, and that long-term oil exposure could have significant sub-lethal impacts.

"Applying the dispersants at depth was a grand experiment being conducted in real-time," Erik Cordes, an associate professor of biology at Temple, said in a statement. He has been studying Gulf of Mexico coral communities for more than a decade.

He added: "It was a desire to immediately do something about the oil coming out of the well, but they really didn't know what was going to happen as a result."

The team concluded that to improve future oil spill response efforts, "alternative methods of oil cleanup are needed and caution should be used when applying oil dispersants at depth, as it may induce further stress and damage to deep-sea ecosystems."

The study was funded by the Gulf of Mexico Research Initiative, an independent agency BP PLC funded at $500 million for 10 years in the wake of the Deepwater Horizon disaster that explores the impacts of oil spills and dispersants on local ecosystems, as well as developing improved spill mitigation, oil and gas detection, and

other technologies.

Another recent study from the University of Alabama, Birmingham, found that the Corexit 9500A dispersant can damage respiratory cells of humans and animals. But a study by U.S. EPA in 2010 found the dispersant-oil combination isn't worse for shrimp, fish and other sea creatures than oil alone already is.

EPA announced a proposal to update regulations for the use of dispersants earlier this year. The plan would provide a new, well-tested and peer-reviewed laboratory method for gauging the effectiveness of products in different environments and an aquatic toxicity threshold to ensure qualifying products offer "greater performance at less environmental impact" (*Greenwire*, Jan. 13).

Sent from my iPhone

To: Matthiessen, Craig[Matthiessen.Craig@epa.gov]; Oliveira, Beatriz[Oliveira.Beatriz@epa.gov]; DeHaven, Leigh[DeHaven.Leigh@epa.gov]; Gioffre, Patricia[Gioffre.Patricia@epa.gov]; Howard, MarkW[Howard.MarkW@epa.gov]; Swackhammer, J-Troy[Swackhammer.J-Troy@epa.gov]
From: Nichols, Nick
Sent: Mon 4/13/2015 2:16:18 PM
Subject: FYI - : BP dispersant toxic

FYI

OCEANS:

Gulf spill cleanup dispersant more toxic to coral than oil -- study

Katherine Ling, E&E reporter

Published: Friday, April 10, 2015

The chemical dispersant used to break down the oil spilled in the 2010 Deepwater Horizon accident in the Gulf of Mexico is more toxic to coral than the oil, according to a study released on the eve of the fifth anniversary of the disaster.

The accident marked the first time that a dispersant was used below the ocean surface during an oil spill in addition to the traditional surface use. Almost 2 million gallons of the dispersant Corexit 9500A -- with slightly less than half released underwater -- was used to emulsify the around 5 million barrels of crude oil that poured out due to the rig explosion.

When exposed to the chemical dispersant, three species of cold-water coral showed "more severe health declines" at lower concentrations than the same species exposed to a mixture of oil and dispersant and to just oil, according to findings by scientists from Temple University and Pennsylvania State University. The oil-dispersant mixture was also more toxic than just oil, the team found.

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The scientists became interested in the experiment after observing post-spill that several damaged Gulf coral populations were coated with a dark-colored wool-like slime that was found to contain oil from the spill and residues from the dispersants.

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"We know that the corals in the Gulf were exposed to all of these different combinations, so we have been trying to determine the toxicity of the oil and the dispersants, and see what their impact would be on the corals," she said.

The corals may have a higher tolerance for the oil because they have adapted to natural seeps of oil over time in their environment, the team noted. The study also said that despite the results, "it is unclear whether short-term exposures to oil and dispersant have long-term effects," that the matter would require further study, and that long-term oil exposure could have significant sub-lethal impacts.

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From: Stroud, Fred
Sent: Sat 4/11/2015 12:22:52 AM
Subject: Fwd: BP dispersant toxic

From: Harry Allen <harryallen3@gmail.com>
Date: April 10, 2015 at 3:52:12 PM PDT
To: "Stroud, Fred" <Stroud.Fred@epa.gov>
Cc: Harry Allen <harryalleniv@gmail.com>
Subject: Re: BP dispersant toxic

Not a surprise, See the product schedule. #2 Fuel Oil is 2.5 to 3x more toxic w/ Corexit. See the SMART presentation at
https://www.epaosc.org/site/region_list.aspx?region=98

There is a relevant slide #5.

There are physical constraints to dispersed oil toxicity in the Gulf. The deep oil was so dispersed naturally that they could hardly find it regardless of dispersant addition. I don't think the deep dispersant mixed well with the rising oil and I don't think it did any good.

As you know surface dispersant is temporary. Once it dilutes after several hours the emulsion breaks and the oil either resurfaces or becomes neutrally buoyant. Naturally floating oil will mix with heavier solids and become neutrally buoyant as well. This is the bad oil for coral. Long after the toxic dispersant is washed away the partially submerged oil can heavily impact coral reefs below the tideline. It would be interesting to know what is the residual toxicity of entrained Corexit where this oil hits the reef.

H3

On Fri, Apr 10, 2015 at 1:43 PM, Stroud, Fred <Stroud.Fred@epa.gov> wrote:

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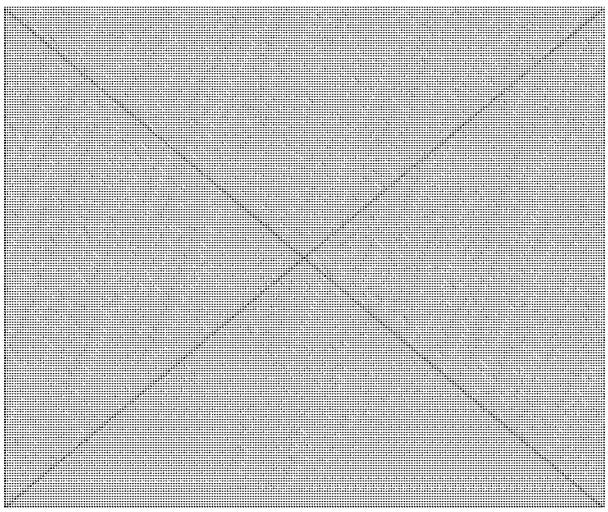
Advertisement



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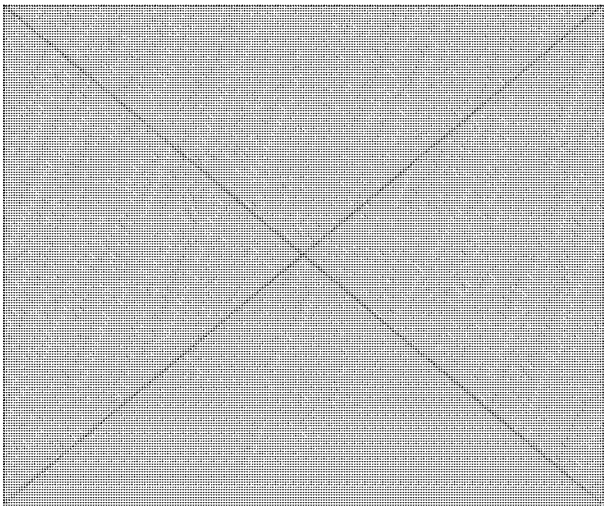

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Sent from my iPhone

To: Adg449@nyu.edu[Adg449@nyu.edu]
Cc: Karrie, Joan[Karrie.Joan@epa.gov]; Cheatham, Reggie[cheatham.reggie@epa.gov]; Wilson, Gregory[Wilson.Gregory@epa.gov]; Principe, Vanessa[Principe.Vanessa@epa.gov]; DeHaven, Leigh[DeHaven.Leigh@epa.gov]; Cogliano, Gerain[Cogliano.Gerain@epa.gov]; Hostage, Barbara[Hostage.Barbara@epa.gov]
From: Matthiessen, Craig
Sent: Wed 4/8/2015 7:34:30 PM
Subject: RE: Question on Revisions to National Oil and Hazardous Substances Proposed Rule File
EO12866_Subpart J_2050-AE87_NPRM_RIA_REDLINED_20141203_REF_20150402.pdf

Dear Andrew Grubin;

I received your voicemail and I hope you received my return message as well. The Regulatory Impacts Analysis (RIA) file that is in the Subpart J proposed rule docket has deleted text shown in side bubbles. For two pages (64 and 81) of the document, the deleted text was more extensive than was able to be accommodated in the side bubbles, thus the entire deletion is not shown.

Attached is a revised redline-strikeout of the RIA which reformats the file with deletions shown within the text as opposed to in editorial side bubbles. After review, we did not identify any similar issues with the redline-strikeout for the proposed rule currently in the docket.

Please contact me if you have any additional questions. Regards – Craig Matthiessen

R. Craig Matthiessen, PE, FAIChE

US EPA - OSWER/OEM/RID

1200 Pennsylvania Ave, NW (5104A)

Washington, DC 20460

202-564-8016

From: Cheatham, Reggie
Sent: Monday, April 06, 2015 2:08 PM
To: Adg449@nyu.edu
Cc: Karrie, Joan
Subject: Question on Revisions to National Oil and Hazardous Substances

Dear Mr. Grebin:

I understand that you are a researcher from the Policy Integrity Institute at New York University and are looking for a copy of docket # EPA-HQ-OPA-2006-0090-0010 (Rule language and regulatory impact analysis) to view the Office of Management and Budget comments on the proposed rule to amend the requirements in Subpart J of the National Oil and Hazardous Substances Pollution Contingency Plan. Your request was passed on to me, as the proposed rule was promulgated out of the Office of Emergency Management.

The documents that you have requested are all available via the internet. Links and explanations are supplied below.

The number that you have cited (EPA-HQ-OPA-2006-0090-0010) is actually the specific document number for the Adobe Acrobat version of the Federal Register Notice itself, published on January 22, 2015 (80 FR 3380). The link for it is http://www.regulations.gov/#!documentDetail;D=EPA-HQ-OPA-2006-0090-0010.

Documents that show OMB review changes for both the Federal Register Notice of Proposed Rulemaking and for the Regulatory Impacts Analysis are available in the public docket via the http://www.regulations.gov website, under "Supporting Documents for Docket # EPA-HQ-OPA-2006-0090." The documents reflect the changes that were made to the proposal and the regulatory impacts analysis based on comments from OMB. Direct links for them are as follow:

National Oil and Hazardous Substances Pollution Contingency Plan Subpart J NPRM Proposed Rule [OMB Redline]:

http://www.regulations.gov/#!documentDetail;D=EPA-HQ-OPA-2006-0090-0002

Regulatory Impact Analysis for Proposed Revisions to the National Oil and Hazardous

Substances Pollution Contingency Plan Regulations (40 CFR Part 300 Subpart J) [OMB Redline]

http://www.regulations.gov/#!documentDetail;D=EPA-HQ-OPA-2006-0090-0008

I hope these links will meet your need. Please let me know if you have any further questions about the OMB comments to the proposed rule.

Sincerely

Reggie Cheatham, Acting Director

Office of Emergency Management, USEPA

202.564.8003 (O); 202.689.9400 (M);

cheatham.reggie@epa.gov

To: DeHaven, Leigh[DeHaven.Leigh@epa.gov]
Cc: Durbin, Luke[Luke_Durbin@sra.com]
From: Tirrell, Rebecca
Sent: Thur 4/2/2015 4:50:49 PM
Subject: Selection Guide Product Review Updates for Technology Category: Dispersants
SG-Dispersant_ACCELL CLEAN DWD_4-1-15 draft.docx
SG-Dispersant_COREXIT EC9500B_4-1-15 draft.docx
SG-Dispersant_FFT-SOLUTION_4-1-15 draft.docx
SG-Dispersant_MARINE D-BLUE CLEAN_4-1-15 draft.docx
SG-Dispersant_SuperSperse_4-1-15 draft.docx

Leigh,

Please find attached the Selection Guide updates for the Technology Category: Dispersants. There is one additional data fields for the Dispersant product reviews: Other Information. This field has been highlighted in yellow to note new data that must be added to existing Dispersant product reviews at a later date; and what needs to be created in the HTML page during production. Products to be added to the Selection Guide include:

- ACCELL CLEAN DWD
- COREXIT EC9500B
- FFT-SOLUTION
- MARINE D-BLUE CLEAN
- SUPERSPERSE WAO2500

Rebecca

Rebecca Tirrell

Senior Project Manager

SRA International, Inc. | www.sra.com

o: 703.284.6643 | c: 703.801.6783

e: Rebecca_Tirrell@sra.com

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Product Review
Product: ACCELL CLEAN® DWD (D-16)
Category: Dispersants

Description

Information not provided

Availability

Advanced BioCatalytics Corporation
18010 Skypark Circle, #130
Irvine, California 92614-6456
Office Phone: (949) 442-0880
General E-mail: info@abiocat.com
Website: www.abiocat.com
Product Management:
Mobile: (949) 981-6510
E-mail: cpodella@abiocat.com
(Mr. Carl Podella)

Link to Product Bulletin in NCP Product List

Product Bulletin-ACCELL CLEAN® DWD

Other Information

Flammability: Combustible as defined by DOT and USCG; pH: 5.8

Solubility in Water

Miscible

Worker Safety (Level of Protection)

Information not provided

Use in Salt Water?

Yes

EPA Dispersant Effectiveness Test (%) – Swirling Flask

Prudhoe Bay Crude: 58.70
S. Louisiana Crude: 96.03
Average of above: 77.37

Temperature Limitations

Application Temperature: Information not provided
Water Temperature: Information not provided
Maximum storage temperature: 130°F/55°C
Minimum storage temperature: 30°F/-1°C
Optimum storage temperature range: 40°F to 100°F/4°C to 38°C
Temperatures of phase separations and chemical changes: None

Application Method

Aircrafts provide the most rapid method of applying dispersants to an oil spill and a variety of aircraft can be used for spraying. Typically application altitudes of 30 to 50 feet are recommended, although higher altitudes may be effective under certain conditions. Actual effective altitudes will depend on the application equipment, weather and aircraft. Careful selection of spray nozzles is critical to achieve desired dose levels, since droplet size must be controlled. A quarter-inch open pipe may be all that is necessary if the aircraft travels at 120 mph (104 knots) or more, since the air shear at these speeds will be sufficient to break the dispersant into the proper sized droplets. Agricultural spray delivery systems may not be suitable because of too fine of spray and too little delivery of ACCELL CLEAN® DWD to the affected area. ACCELL CLEAN® DWD may also be applied from boats equipped with spray booms mounted ahead of the bow wake or as far forward as possible. The most effective method of application from a boat is to apply ACCELL CLEAN® DWD using a low-volume, low-pressure pump so the ACCELL CLEAN® DWD can be applied undiluted. ACCELL CLEAN® DWD should not be fogged or atomized.

Natural wave or boat wake action usually provides adequate mixing energy to disperse the oil. Application at sub-freezing temperatures may require larger nozzle, supply lines and orifices due to higher product viscosity.
Application Rate
For aerial and boat spraying, ACCELL CLEAN® DWD is applied undiluted. A treatment rate of about 10 gallons per acre, or a dispersant to oil ratio of 1:10 is optimal. The rate varies depending on the type of oil, degree of weathering, temperatures, and thickness of the slick. ACCELL CLEAN® DWD can be used on weathered oils.
Application Assistance Information*
Advanced BioCatalytics Corporation 18010 Skypark Circle, #130 Irvine, California 92614-6456 Office Phone: (949) 442-0880 General E-mail: info@abiocat.com Website: www.abiocat.com Product Management: Mobile: (949) 981-6510 E-mail: cpodella@abiocat.com (Mr. Carl Podella)
Toxicity of Product Alone (ppm) – Inland silversides (Menidia) (96h)
5.66
Toxicity of Product Alone (ppm) – Mysid shrimp (Mysidopsis) (48h)
2.07
Toxicity of Product with oil (ppm) – Inland silversides (Menidia) (96h)
8.05
Toxicity of Product with oil (ppm) – Mysid shrimp (Mysidopsis) (48h)
1.32

Product Review
Product: COREXIT® EC9500B (D-19)
Category: Dispersants

Description

Information not provided

Availability

Nalco Environmental Solutions LLC
7705 Highway 90-A
Sugar Land, TX 77478
Product Management:
Office: (281) 263-7709
Mobile: (832) 851-5164
E-mail: debby.theriot@nalco.com
(Ms. Debby Theriot)

Link to Product Bulletin in NCP Product List

Product Bulletin-COREXIT® EC9500B

Other Information

Flammability: DOT HazMat Classification – This product meets the criteria for classification as a Class 3 combustible liquid (49 CFR §173.120(b)(1)). However, it does not contain combustion, and, therefore, is not subject to the requirements for the Hazardous Materials Regulations (49 CFR §173.120(b)(3)); pH:6.29

Solubility in Water

Miscible

Worker Safety (Level of Protection)

Information not provided

Use in Salt Water?

Yes

EPA Dispersant Effectiveness Test (%) – Swirling Flask

Prudhoe Bay Crude: 57.0
S. Louisiana Crude: 50.9
Average of above: 53.9

Temperature Limitations

Application Temperature: Information not provided
Water Temperature: Information not provided
Maximum storage temperature: 170°F
Minimum storage temperature: 40°F
Optimum storage temperature range: 40°F to 100°F
Temperatures of phase separations and chemical changes: No phase changes or chemical reactions are anticipated in the minimum to maximum storage range. Below 40ºF, surfactant may slowly precipitate out of the solution, but it will return back into solution when warmed.

Application Method

Various fixed-wing aircraft or helicopters can be used for spraying over a large area, from an altitude of 30 to 50 feet or even higher, depending on the application equipment and aircraft. Typical application altitudes of 30 to 50 feet have been used, although higher altitudes may be effective under certain conditions. Actual altitudes will depend on the application equipment, weather and aircraft. Careful selection of spray nozzles is critical to achieve desired dose levels, since droplet size must be controlled. Many nozzles used for agricultural spraying are of low capacity and produce too fine a spray. Avoid nozzles that produce a mist or fog. No nozzle may be necessary if the aircraft travels at 120 mph (104 knots) or more, since the air shear at these speeds will be sufficient to break the chemical stream into appropriately-sized droplets. For boat spraying (spray boom), COREXIT® EC9500B may also be applied by workboats equipped with spray booms mounted ahead of the bow

wake or as far forward as possible. The most effective method of application from a workboat could be the use of a low-volume, low-pressure pump. Spray equipment designed to provide a diluted dispersant solution to the spray booms can also be used. COREXIT® EC9500B should be applied as droplets, not fogged or atomized. Natural wave or boat wake action usually provides adequate mixing energy to disperse the oil. Water from a fire hose can also be used for agitation of the treated slick. For boat spraying (fire monitor), a slightly modified fire monitor may be useful for applying dispersant concentrates such as COREXIT® EC9500B from a boat. A screen cap is used on the nozzle of the monitor to obtain a uniform spray pattern with the proper sized droplet. Due to the volume output and the greater reach of the fire monitor, significantly more area can be covered in a shorter period of time than using conventional spray booms. To facilitate successful application and dosage control, calibrate spray systems at the temperatures anticipated. Application at sub-freezing temperatures may require larger nozzle, supply lines and orifices due to higher product viscosity.
Application Rate
For aerial spraying, apply COREXIT® EC9500B undiluted. Dispersant concentrations in the 5 to 10 percent range are recommended; lower concentrations may result in significant fall-off in effectiveness. A treatment rate of about 2 to 10 U.S. gallons per acre, or a dispersant to oil ratio of 1:50 to 1:10 is recommended; lower concentrations may also be used. This rate varies depending on the type of oil, degree of weathering, temperature, and thickness of the slick. COREXIT® EC9500B can be used on oil spills in salt waters and at any water temperature. The product can be used on most oils, weathered spills, and “chocolate mousse” (water-oil emulsions). Viscous oil may require higher dosage rates.
Application Assistance Information*
Nalco Environmental Solutions LLC 7705 Highway 90-A Sugar Land, TX 77478 Product Management: Office: (281) 263-7709 Mobile: (832) 851-5164 E-mail: debby.theriot@nalco.com (Ms. Debby Theriot)
Toxicity of Product Alone (ppm) – Inland silversides (Menidia) (96h)
29.13
Toxicity of Product Alone (ppm) – Mysid shrimp (Mysidopsis) (48h)
10.00
Toxicity of Product with oil (ppm) – Inland silversides (Menidia) (96h)
4.46
Toxicity of Product with oil (ppm) – Mysid shrimp (Mysidopsis) (48h)
2.13

Product Review
Product: FFT-SOLUTION® (D-17)
Category: Dispersants

Description

Information not provided

Availability

Fog Free Technologies, LLC
4365 Dorchester Road
Building 300, Suite 301
North Charleston, SC 29405
Product Management:
Office Phone: (843) 735-6626
Mobile: (478) 697-2588
E-mail: doc@fogfreetechnologies.com
Website: www.fogfreetechnologies.com
(Mr. William Knight)

Link to Product Bulletin in NCP Product List

Product Bulletin-FFT-SOLUTION®

Other Information

Flammability: IMO: Non-Flammable, DOT: Non-Hazardous; pH: 9.96

Solubility in Water

Soluble

Worker Safety (Level of Protection)

Information not provided

Use in Salt Water?

Yes

EPA Dispersant Effectiveness Test (%) – Swirling Flask

Prudhoe Bay Crude: 49.97
S. Louisiana Crude: 48.87
Average of above: 49.42

Temperature Limitations

Application Temperature: 33°F to 105°F
Water Temperature: Information not provided
Maximum storage temperature: 170°F
Minimum storage temperature: 30°F
Optimum storage temperature range: 40°F to 105°F
Temperatures of phase separations and chemical changes: None

Application Method

Aircraft provide the most rapid method of applying dispersants to an oil spill and a variety of aircraft can be used for spraying. For aerial spraying, FFT-Solution® is applied undiluted. Typical application altitudes of 30 to 50 feet have been used, although higher altitudes may be effective under certain conditions. Actual effective altitudes will depend upon application equipment, weather, and aircraft. Careful selection of spray nozzles is critical to achieve desired dose levels, since droplet size must be controlled. Many nozzles used for agricultural spraying are of low capacity and product fine a spray. A quarter-inch open pipe may be all that is necessary if the aircraft travels at 120 mph (104 knots) or more, since the air shear at these speeds will be sufficient to break the dispersant into the proper sized droplets. FFT-Solution® may also be applied by workboats equipped with spray booms mounted on the stern of the vessel. (Mounting boom on the stern prevents any over spray from making contact with boat operators.) The preferred and most effective method of application from a workboat is to use a low-volume, low-pressure pump so the chemical can be applied undiluted. Standard

agriculture spray equipment is designed to make dosage adjustments or provide different spray tips that effect dosage rates. Natural wave or boat wake action usually provides adequate mixing energy to disperse the oil. A typical agriculture spray boom can be mounted to the stern to get wide coverage. The booms on shrimp boats also can be retrofitted to cover a much wider path during applications. The manufacturer also recommends that in lieu of spray tips on the booms, spray tips be changed into solid tubing for injection of FFT-Solution® 3 to 5 feet below the water surface. This will get the thicker crude slicks injected faster and with better results. FFT-Solution® should be applied as droplets, not fogged or atomized.
Application Rate
A treatment rate of about 2 to 10 U.S. gallons per acre, or dispersant to oil ratio of 1:50 to 1:10 is recommended. This rate varies depending on the type of oil, degree of weathering, temperature, and thickness of the slick. FFT-Solution® can be applied to weathered oil as well as light, medium, or heavy oils. Early treatment even at reduced treatment rates, can also counter the foaming tendencies of the spilled oil in turbulent waters. FFT-Solution® can be used on any type oil spills in salt water.
Application Assistance Information*
Fog Free Technologies, LLC 4365 Dorchester Road Building 300, Suite 301 North Charleston, SC 29405 Product Management: Office Phone: (843) 735-6626 Mobile: (478) 697-2588 E-mail: doc@fogfreetechnologies.com Website: www.fogfreetechnologies.com (Mr. William Knight)
Toxicity of Product Alone (ppm) – Inland silversides (Menidia) (96h)
5.34
Toxicity of Product Alone (ppm) – Mysid shrimp (Mysidopsis) (48h)
2.72
Toxicity of Product with oil (ppm) – Inland silversides (Menidia) (96h)
5.14
Toxicity of Product with oil (ppm) – Mysid shrimp (Mysidopsis) (48h)
2.75

Product Review
Product: MARINE D-BLUE CLEAN™ (D-18)
Category: Dispersants

Description

Information not provided

Availability

AGS Solutions, Inc.
5647 Nunn Street
Houston, TX 77087
Phone: (713) 645-4933
Fax: (713) 645-4903
(Mrs. Linda Whiteley)

Link to Product Bulletin in NCP Product List

Product Bulletin-MARINE D-BLUE CLEAN™

Other Information

Flammability: Non-flammable; pH: 11.89

Solubility in Water

Soluble

Worker Safety (Level of Protection)

Information not provided

Use in Salt Water?

Yes

EPA Dispersant Effectiveness Test (%) – Swirling Flask

Prudhoe Bay Crude: 45.00
S. Louisiana Crude: 55.59
Average of above: 50.30

Temperature Limitations

Application Temperature: Information not provided
Water Temperature: Information not provided
Maximum storage temperature: 170°F
Minimum storage temperature: 32°F
Optimum storage temperature range: 40°F to 110°F
Temperatures of phase separations and chemical changes: Marine D-Blue Clean™ has a pour point of 30°F and may cause chemical changes at temperatures >110°F.

Application Method

Marine D-Blue Clean™ is to be used to disperse petroleum-based products in salt water. Marine D-Blue Clean™ can be applied with a variety of spraying equipment, depending upon the type and scale of the water to be cleaned. It may be applied by any conventional methods such as aerial spraying or surface vessel spraying to accommodate weather conditions. Timely application provides optimal results. Spray concentrated on the oil slick in atomized form such as with a manual pump or a pump system using moderately coarse droplets rather than a fine mist.

Application Rate

For heavy concentrations of crude oil spill or temperatures below 40°F, Marine D-Blue Clean™ should be used without dilution in neat form. A dispersant to oil ratio up to 1 part dispersant to 20 parts of oil is suggested. Dose rates may vary depending on type and amount of petroleum spilled, and other site specific conditions such as weather, temperatures and extent of oil slick. The performance of Marine D-Blue Clean™ is not affected by water salinity. It is effective with crude and residual heavy oil spills.

Application Assistance Information*

AGS Solutions, Inc.

5647 Nunn Street Houston, TX 77087 Phone: (713) 645-4933 Fax: (713) 645-4903 (Mrs. Linda Whiteley)
Toxicity of Product Alone (ppm) – Inland silversides (Menidia) (96h)
18.00
Toxicity of Product Alone (ppm) – Mysid shrimp (Mysidopsis) (48h)
56.00
Toxicity of Product with oil (ppm) – Inland silversides (Menidia) (96h)
32.00
Toxicity of Product with oil (ppm) – Mysid shrimp (Mysidopsis) (48h)
18.00

Product Review **Product: SUPERSPERSE™ WAO2500 DISPERSANT (D-15)** **Category: Dispersants**
Description
Information not provided
Availability
Baker Petrolite Corporation 12645 West Airport Boulevard Sugar Land, TX 77478-6120 Customer Services: Phone: (800) 231-3606 E-mail: david.poelker@bakerhuges.com (Mr. David Poelker)
Link to Product Bulletin in NCP Product List
Product Bulletin- SUPERSPERSE™ WAO2500 DISPERSANT
Other Information
Flammability: IMO-Flammable (water based); DOT – Flammable; pH: 8.39
Solubility in Water
Insoluble
Worker Safety (Level of Protection)
Information not provided
Use in Salt Water?
Yes
EPA Dispersant Effectiveness Test (%) – Swirling Flask
Prudhoe Bay Crude: 77.84 S. Louisiana Crude: 87.56 Average of above: 82.70
Temperature Limitations
Water Temperature: 33°F to 96°F Maximum storage temperature: 150°F Minimum storage temperature: 10°F Optimum storage temperature range: 32°F to 96°F Temperatures of phase separations and chemical changes: None
Application Method
The application of WAO2500 is done most effectively by spray type applications. Agitation is necessary and the amount of agitation depends upon the nature of the oil and the thickness of the oil layer to be dispersed. In light oil sheens, only the normal agitation of the water may be necessary, violent agitation is not necessary for controlling crude oil spills. For hand held spraying equipment do not atomize the dispersant. For workboat fitted with spray booms the spray should be as far forward as possible from boats wake. For aerial spraying using airplane or helicopter, spray from a height of 40 -70 feet. Effective altitudes depend on weather, wind and other factors. Spray nozzles used in most agriculture application produce sprays that are too small. A simple quarter inch pipe would suffice in most applications. Regardless of the application method, the chemical should be applied in the form of small droplets never as a fog or mist. This minimizes windage losses and also ensures rapid penetration by the surface active agents to the oil/water interface. The dispersant should be used as early as possible to combat the spill. Wind and weather also dictate the proper effectiveness of the application. Care should be taken to limit overspray conditions. The dispersant would be more efficient if applied before the oil/water mixture forms and emulsion. Use equipment (pipe, hoses, receptacles, etc.) that is resistant to

hydrocarbons. Do not spray at high pressure. A course spray is recommended over fine spray. This product can be used across a wide variety of water temperatures.
Application Rate
WAO2500 can be used as supplied or diluted with water prior to application. The degree of dilution will depend upon the characteristic of the oil and the amount of oil to be controlled. Laboratory tests indicate that as little as 1-4 gallons of WAO2500 will control and disperse a barrel (42 gallons) of light oil. For hand held spraying equipment, use a 2 to 5 percent dilution. For a workboat fitted with spray booms, use a 2 to 5 percent dilution. If applied by air drop methods, usage rates will vary but tend to fall between 1 to 5 US gallons per acre. Dilution ranges from 1:30 to 1:50 could be used. The water temperature should be between 33°F and 96°F. With warmer temperatures less dispersant should be used. This product can be used on a number of hydrocarbon spills. The higher the API gravity of the hydrocarbon the less dispersant is necessary. The salinity of the water will have a slight impact on the performance of the product with a higher salinity needing more dispersant. Older hydrocarbon spills will require more product. The lighter ends of the hydrocarbon spill will evaporate lowering the API gravity of the hydrocarbon. This product should not be used on hydrocarbons that are soluble in water (e.g., alcohols, glycols, water soluble organics).
Application Assistance Information*
Baker Petrolite Corporation 12645 West Airport Boulevard Sugar Land, TX 77478-6120 Customer Services: Phone: (800) 231-3606 E-mail: david.poelker@bakerhuges.com (Mr. David Poelker)
Toxicity of Product Alone (ppm) – Inland silversides (Menidia) (96h)
37.10
Toxicity of Product Alone (ppm) – Mysid shrimp (Mysidopsis) (48h)
17.40
Toxicity of Product with oil (ppm) – Inland silversides (Menidia) (96h)
3.70
Toxicity of Product with oil (ppm) – Mysid shrimp (Mysidopsis) (48h)
2.53

To: DeHaven, Leigh[DeHaven.Leigh@epa.gov]
From: Powell, Greg
Sent: Wed 3/2/2016 8:11:17 PM
Subject: FW: Terra Clean Solutions' 1st Response Remediation Kits
Oil Spill Remediation Kit Presentation.pptx
Concise-Bioremediation-Response-Plan.pdf
TYPES-OF-BIOREMEDIATION-THREE-MODES_OSEI_Updated.pdf

Greg Powell

USEPA-ERT

(513)569-7533 office

(513)607-1572 cell

From: Compton, Harry
Sent: Wednesday, March 02, 2016 3:00 PM
To: Stroud, Fred <Stroud.Fred@epa.gov>; Powell, Greg <Powell.Greg@epa.gov>
Subject: FW: Terra Clean Solutions' 1st Response Remediation Kits

From: Fetzer, Richard
Sent: Wednesday, March 02, 2016 2:50 PM
To: frank.csulak@noaa.gov; Compton, Harry <Compton.Harry@epa.gov>
Cc: Martin, William <Martin.William@epa.gov>; Boyd, Kevin <Boyd.Kevin@epa.gov>; Robin Dermigny <robin.dermigny@westonsolutions.com>; Debbie Scholz <dscholz@seaconsulting.com>
Subject: FW: Terra Clean Solutions' 1st Response Remediation Kits

Frank and Harry,

I am writing in my role as Inland Area Committee Chair. I have been contacted by Deborah Hill, from Terra Clean Solutions. She has been attempting to sell this product called OSE II. She

was put in touch with me to get this "approved" for use in Region III. It is already on the product list maintained by EPA HQ as an enzyme additive bioremediation product. However, if you read the literature closely, it will emulsify petroleum. Billy Martin and I have reviewed the attached information and feel the next step should be for us to have a demonstration of the product to a small group to continue to gather information and be responsive to this "approval" request. I have made it clear to Ms. Hill that even if we "approve" of the product, she will still need to get OSC approval for its specific use.

I discussed this idea with Ms. Hill and she is willing to perform a demonstration. Part of the demonstration involves how the material performs after burning. So the location has to be in a safe place. It just so happens that my office in Snydersville (see address below) is also the location of a fire school. I have no doubt that I will be given access to their burn building or other suitable location on those premises to perform this demo. Billy and I have identified March 29th as a tentative date for the demo. I'd like to request that you or your representative attend this demonstration and provide us with technical review of the material and guidance on how the IAC and RRT should move forward on this company's request. Are you available and willing to participate in this demo on the date suggested?

The goal of the demo is to gather information about this product to better decide whether we need to put the product through a formal ARTES process or what other way we might recommend to the RRT to handle this request. I will make it clear to Ms. Hill that it is possible that another demo for the entire RRT may be necessary. She knows there's a chance of either a short process or a long process and that this demo will help us decide.

Please let me know if you can help us. I'd like to get back to Ms. Hill as soon as possible. I am planning to have START there to support and document the demonstration and also help in determining the path forward. Thanks.

Rich.

Richard M. Fetzer

Federal On-Scene Coordinator

Region III Inland Area Committee OSC Chairman

100 Gypsum Road

Stroudsburg, PA 18430

570 402 7108

From: deborah hill [mailto:debsinfo@comcast.net]
Sent: Tuesday, February 02, 2016 10:38 AM
To: Fetzer, Richard <Fetzer.Richard@epa.gov>
Subject: Terra Clean Solutions' 1st Response Remediation Kits

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Dear Mr. Fetzer,

I can't thank you enough for our conversation last week about our remediation kits which feature the ONLY enzyme additive bioremediation product listed on the EPA NCP list. This is NOT a dispersant product, but is completely non-toxic and the only product that remediates to pre-spill conditions within about 30 days. As we discussed, there are several large companies that travel the Ohio River who want to add our kits to their safety response protocol and we are looking to you for "approval" that this is acceptable to the regional EPA. We also would like the area EPA to add our product to their area contingency response plan. To further that end, I am sending you several documents.

The videos (links below) demonstrate that once our remediation solution (OSE II) is applied, the spill becomes non-flammable within seconds which hugely reduces a serious risk factor. In the demonstration we add gasoline to the water surface, light it to show that it is flammable, then add more gasoline, apply our solution, and try to relight the gasoline. The second video demonstrates use of our product on an "oil spill" on sand, rocks, vegetation and water and you will see how quickly the oil begins to remediate. Upon application, the toxicity of any hydrocarbon spill is immediately and significantly reduced; the flammability is significantly reduced or completely eliminated; the vapors and fumes are significantly reduced and the adhesion properties of the hydrocarbons are eliminated so that the oil, gas, fuel or other hydrocarbon will not stick to animals, vegetation, rocks, boats, sand or any other surface. Additionally the encapsulated spill is made to float on the surface of the water so that further clean -up is much easier and quicker. The remediation process begins immediately and the OSE II is not separated from the hydrocarbon once it is applied so regardless whether there is additional run off or containment breaching, the hydrocarbons are going to continue the remediation process becoming CO2 and water within about 30 days and the toxic

nature of the spill will remain significantly reduced until it is completely and permanently eliminated.

There is also a power point presentation which provides general information and shows the product being used on larger scale spills in Texas and Nigeria (please take note of the amazing changes that you will see with the Mangrove trees, which are a protected species). Our remediation solution has been used nationally and internationally for over 30 years and has been used by all 5 branches of the US military. The product is not a new one but has not been packaged and available to the "small" spill market , which is actually the more environmentally detrimental, until now with Terra Clean Solutions.

The Types of Remediation paper gives an extremely good and complete explanation of the different bioremediation types and why the EA type is superior even among the bioremediation products (it is FAR superior to dispersants from any point of view!!).

Lastly there is a detailed Bioremediation Response Plan for you to look over. As you said on the phone, because our product is completely non-toxic and the most environmentally sound product available, you may not even need to vote on it, but I want to provide you with as much information as you would like to show you both the efficacy and the sensibility of adding our kits (featuring OSE II as our remediation agent) to the area response plan and for allowing it to be used on other response plans in the areas jurisdiction.

We also have a website which I invite you to look at. The address is www.terracleansolutions.com There is a link on the website directly to the EPA NCP listing of OSE II as well.

Thank you so much for your time, consideration and help! I truly look forward to the positive difference we can all make going forward. Please feel free to contact me at 330-383-2252 or 704-802-2409 or debsinfo@comcast.net or 4debhill@gmail.com .

Sincerely,

Deborah Hill

Terra Clean Solutions, LLC

2 videos here: http://1drv.ms/1ZCFf9B

To: AGS[agssolutionsinc@gmail.com]
Cc: DeHaven, Leigh[DeHaven.Leigh@epa.gov]
From: Nichols, Nick
Sent: Wed 2/17/2016 4:55:19 PM
Subject: RE: Question

Hello

Leigh can help....

From: AGS [mailto:agssolutionsinc@gmail.com]
Sent: Wednesday, February 17, 2016 10:40 AM
To: Nichols, Nick <Nichols.Nick@epa.gov>
Subject: AGS: Question

Hi Nick,

How are you? I wanted to ask you if you could point me to the appropriate person (if it is not you) to answer a couple of my questions, please.

Based on recent testing at Ohmsett's facility, AGS has made improvements on the dispersant, Marine D-Blue Clean. As I am about to test it.. do we need to use a new method for the swirling flask test, use the current one? What is the status of any testing protocol changes? I just have some additional general questions about the process regarding an improved product (it will be able to be used in cold water applications, as well). I think a quick phone call with the appropriate person can answer my questions. Thank you for your help and response.

Sincerely,
--

Linda Whiteley, President
AGS Solutions, Inc.-'working towards a cleaner world'™
Office: 713.645.4933

Cell: 832.226.2930
www.agstx.org
5647 Nunn
Houston, TX 77087

To: Hodges, Jennifer[Hodges.Jennifer@epa.gov]
Cc: Wilson, Gregory[Wilson.Gregory@epa.gov]; Principe, Vanessa[Principe.Vanessa@epa.gov]; DeHaven, Leigh[DeHaven.Leigh@epa.gov]
From: Matthiessen, Craig
Sent: Tue 2/16/2016 4:54:32 PM
Subject: RE: Info about Oil Dispersants

Hi, Jenn;

I don't know that anyone 'wants' to talk to this student but I think we could do it sometime.
Thanks - Craig

From: Hodges, Jennifer
Sent: Tuesday, February 16, 2016 10:47 AM
To: Matthiessen, Craig <Matthiessen.Craig@epa.gov>
Subject: FW: Info about Oil Dispersants

Good Morning Craig –

Please let me know if you or anyone from your office wants to talk to this student. I am also reaching out to OPA to see if/how they want to handle.

Thanks,

Jenn

Jennifer R. Hodges (formerly Myers)

(Acting) Special Assistant

Office of Emergency Management

Office of Land and Emergency Management

U.S. Environmental Protection Agency

Hodges.Jennifer@epa.gov

(o) 202-564-2055

From: Hull, George
Sent: Friday, February 05, 2016 2:53 PM
To: Hodges, Jennifer <Hodges.Jennifer@epa.gov>; James, Kennetta <James.Kennetta@epa.gov>
Subject: FW: Info about Oil Dispersants

Jennifer and Kennetta,

An undergrad student from Old Dominion University contacted us to request an interview for a science blog on the oil dispersant, Corexeit 9500. Could we talk about how to respond, when you have a moment. Do we have a web page(s) with relevant information? Thanks,

George Hull, Director

Office of Media Relations

U.S. EPA

Tel. 202-564-0790

From: Ben Maxie [mailto:bmaxi001@odu.edu]
Sent: Friday, February 05, 2016 1:25 PM
To: Press <Press@epa.gov>
Subject: Info about Oil Dispersants

Hi,

I'm an undergraduate researcher and science writer for a graduate school marine science blog. I'm working on an article about oil dispersant toxicity, specifically Corexit 9500A. Could I arrange a brief interview on the subject either by phone or email? I am unsure where to direct this inquiry and thought that the press email would be appropriate, but if not could you refer me to a better contact email?

Thank you,

Ben Maxie

--

Benjamin Maxie

Undergraduate Student, Biological Sciences

Old Dominion University

757-287-6238

To: Matthiessen, Craig[Matthiessen.Craig@epa.gov]
Cc: Wilson, Gregory[Wilson.Gregory@epa.gov]; DeHaven, Leigh[DeHaven.Leigh@epa.gov]
From: Principe, Vanessa
Sent: Fri 2/12/2016 8:34:06 PM
Subject: RE: Meeting with EPA on Dispersants
EPA-HQ-OPA-2006-0090-571_MWCC.pdf

FYI. Food for thought.

Jim forwarded the meeting request to the APA attorney but have yet to get feedback. His understanding is that while we can choose to meet with these types of groups, we need to be very careful about how we structure it and what we say.

Because one of the "Specific current activity topics" they are requesting for discussion is the "NCP Subpart J Proposed Rulemaking [Dispersants]," this can be seen as a forum to submit comments face-to-face to the Agency on the proposed rule, ***after*** the comment period has closed. Even if we say we are not at liberty to discuss, guessing they will take the opportunity to offer comments or bring up those they have already submitted (attached). A slippery slope that will now require us to take any other meeting request on Subpart J, and the added task of documenting in detail the meetings for docketing purposes.

A flavor of the MWCC comments:

"This proposed rulemaking could make MWCC's current stockpile of dispersant unavailable, along with all major dispersant inventories."

"Application of dispersant during Deepwater Horizon was effective in minimizing oil at the surface in the vicinity of well containment operations, allowing work to be safely conducted with minimal exposures to personnel from Volatile Organic Compounds (VOC's) and from risk of fire or explosion from hydrocarbons in the atmosphere."

On Subsea Dispersant Use:

"If dispersant is not applied during this same well control event, the scenario can be impacted in one of two ways:

1. Delays resulting from VOC and LEL (Lower Explosive Limit) thresholds being reached can be

expected to lengthen response times.

2. If VOC's and LEL problems are too significant to allow capping operations to be carried out in proximity to the well, the only remaining option may be to drill a relief well which could take months to complete."

"MWCC maintains that new rules should not discourage, nor impede the FOSC's ability to make an informed, timely decision through the NEBA process."

"Setting arbitrary limits on the quantity and duration of use of dispersant limits the FOSC's ability to take into account specifics of the response scenario, necessarily inhibiting or impeding field commanders from making good sound decisions on the front lines because of prescriptive rules."

"The additional monitoring requirements imposed by this rule do not improve real-time operational decision making."

From: Matthiessen, Craig
Sent: Friday, February 12, 2016 2:47 PM
To: Rozsa, Gabe <Gabe.Rozsa@prime-policy.com>
Cc: Wilson, Gregory <Wilson.Gregory@epa.gov>; Principe, Vanessa <Principe.Vanessa@epa.gov>; DeHaven, Leigh <DeHaven.Leigh@epa.gov>; Irizarry, Gilberto <Irizarry.Gilberto@epa.gov>; Woodyard, Josh <Woodyard.Joshua@epa.gov>
Subject: RE: Meeting with EPA on Dispersants

Gabe;

Interesting and good that you have background in OW and are familiar with OPA. Would it be possible to meet mid-morning (e.g. 10 am) on the 3rd rather than the 2nd? Thanks – Craig Matthiessen

From: Rozsa, Gabe [mailto:Gabe.Rozsa@prime-policy.com]
Sent: Wednesday, February 10, 2016 9:30 AM
To: Matthiessen, Craig <Matthiessen.Craig@epa.gov>
Cc: Sawyers, Andrew <Sawyers.Andrew@epa.gov>; Farris, Erika D. <Farris.Erika@epa.gov>;

Frace, Sheila <Frace.Sheila@epa.gov>; Wilson, Scott <Wilson.Js@epa.gov>; Peck, Gregory <Peck.Gregory@epa.gov>; Zobrist, Marcus <Zobrist.Marcus@epa.gov>; Nagle, Deborah <Nagle.Deborah@epa.gov>; Wilson, Gregory <Wilson.Gregory@epa.gov>; Principe, Vanessa <Principe.Vanessa@epa.gov>; DeHaven, Leigh <DeHaven.Leigh@epa.gov>; Irizarry, Gilberto <Irizarry.Gilberto@epa.gov>; Woodyard, Josh <Woodyard.Joshua@epa.gov>
Subject: RE: Meeting with EPA on Dispersants

Craig,

I appreciate your straightening me out on who has this at EPA. My background was with the Office of Water and I worked on the Oil Pollution Act many years ago and knew that a lot of EPA's authorities in this area are under Section 311 of the Clean Water Act so I reached out to Greg who is an old friend for help. I am glad the request appears to have gotten to the right person. Please let me know if you might have times on the afternoon of the 2nd.

Gabe

From: Matthiessen, Craig [mailto:Matthiessen.Craig@epa.gov]
Sent: Tuesday, February 09, 2016 12:48 PM
To: Rozsa, Gabe <Gabe.Rozsa@prime-policy.com>
Cc: Sawyers, Andrew <Sawyers.Andrew@epa.gov>; Farris, Erika D. <Farris.Erika@epa.gov>; Frace, Sheila <Frace.Sheila@epa.gov>; Wilson, Scott <Wilson.Js@epa.gov>; Peck, Gregory <Peck.Gregory@epa.gov>; Zobrist, Marcus <Zobrist.Marcus@epa.gov>; Nagle, Deborah <Nagle.Deborah@epa.gov>; Wilson, Gregory <Wilson.Gregory@epa.gov>; Principe, Vanessa <Principe.Vanessa@epa.gov>; DeHaven, Leigh <DeHaven.Leigh@epa.gov>; Irizarry, Gilberto <Irizarry.Gilberto@epa.gov>; Woodyard, Josh <Woodyard.Joshua@epa.gov>
Subject: Meeting with EPA on Dispersants

Hello, Mr. Rozsa;

We learned of your interest in a meeting with EPA from our colleagues in the Office of Water. Within the Office of Land and Emergency Management (OLEM, formerly the Office of Solid Waste and Emergency

Response [OSWER]) is the Office of Emergency Management (OEM) which has responsibilities under the National Contingency Plan (NCP) for dispersants and for EPA's functions in oil spill emergency response. You probably also know that the offshore Federal On-Scene Coordinator for oil spill response is the US Coast Guard while EPA provides the FOSC for inland oil spill response.

My Division has responsibility for the rulemaking under Subpart J of the NCP. Another division in OEM is responsible for NCP alignment with NIMS/NRF.

Are you interested in meeting with representatives from OEM instead of OW? Do you plan to reach out to the Coast Guard as well?

Thanks and regards – Craig Matthiessen

R. Craig Matthiessen, PE, FAIChE

Acting Deputy Office Director

US EPA - OLEM/OEM/RID

1200 Pennsylvania Ave, NW (5104A)

Washington, DC 20460

202-564-8016

From: Rozsa, Gabe [mailto:Gabe.Rozsa@prime-policy.com]
Sent: Monday, February 08, 2016 10:53 AM
To: Peck, Gregory <Peck.Gregory@epa.gov>
Subject: Meeting with Acting AA to Discuss Dispersants

Greg,

I hope this finds you well. It has been far too long since we talked.

I am writing to ask if it might be possible to schedule a meeting on the afternoon of March 2nd with Acting AA Beauvais for senior leadership of our clients, the Marine Well Containment Company, a consortium of the ten of the largest companies that drill in the Gulf of Mexico that came together to provide the best possible response capability in the event of another spill in the Gulf. I expect to have the CEO, Don Armijo and the Chief Health, Safety and Environment Officer, Jon Unwin, from MWCC in town for meetings that day and was hoping to schedule time with Joel and or others to discuss the use of dispersants in the event of a spill.

Below is an outline of the meeting objectives and current activity topics for the meeting.

Meeting objectives:

•□□□□□□□□ Provide an overview of MWCC [background, response model, capability, focus areas]

•□□□□□□□□ Understand EPA focus areas for improvement, potential future proposed rulemaking [relative to energy industry and emergency response]

•□□□□□□□□ Explore opportunities to further cooperate/collaborate/connect

Specific current activity topics

•□□□□□□□□ NCP Subpart J Proposed Rulemaking [Dispersants]

•□□□□□□□□ National Contingency Plan alignment with NIMS/NRF Proposed Rulemaking

Let me know if you can suggest at time that might work for a brief meeting. If Joel is not available, can you suggest someone else in the Office of Water for a meeting?

Gabe

The information, and any attachments contained in this email may contain confidential and/or privileged information and is intended solely for the use of the intended named recipient(s). Any disclosure or dissemination in whatever form, by another other than the intended recipient is strictly prohibited. If you have received this transmission in error, please contact the sender and destroy this message and any attachments. Thank you.

To: Cheatham, Reggie[cheatham.reggie@epa.gov]; Clark, Becki[Clark.Becki@epa.gov]; DeHaven, Leigh[DeHaven.Leigh@epa.gov]; Principe, Vanessa[Principe.Vanessa@epa.gov]; Wilson, Gregory[Wilson.Gregory@epa.gov]; Bove, James[Bove.James@epa.gov]; Conmy, Robyn[Conmy.Robyn@epa.gov]; Woodyard, Josh[Woodyard.Joshua@epa.gov]; Irizarry, Gilberto[Irizarry.Gilberto@epa.gov]
Cc: Jennings, Kim[Jennings.Kim@epa.gov]
From: Matthiessen, Craig
Sent: Fri 6/17/2016 11:49:54 AM
Subject: FYI from BNA - Canada Approves Corexit Products for Treating Oil Spills

FYI from BNA Report:

Oil Spills

Canada Approves Corexit Products for Treating Oil Spills

BNA Snapshot

Canada Approves Oil Spill Treatments

Key Development: Canada publishes regulations confirming the use of Corexit EC9500A and Corexit EC9580A to treat major oil spills from offshore production facilities.

Potential Impact: Although most public comment oppose authorization of the Corexit dispersant on the basis that it is toxic to humans and marine life, Environment and Climate Change Canada says it offers "best-in-class" performance.

By Peter Menyasz

June 16 — Canada published regulations confirming the use of two oil-treating agents for major spills from offshore production facilities.

The federal government's conclusion that the products are the best-available alternatives to address major offshore spills did not ease environmental groups' concerns about their potential toxicity, while industry warned that conditions on their use would hinder their effectiveness in emergencies.

Nalco Co.'s Corexit EC9500A dispersant and Corexit EC9580A surface washing agent are acceptable for offshore use because they offer "best-in-class" performance while posing a low risk of environmental harm, Environment and Climate Change Canada said June 15.

The regulations replace a July 2015 Cabinet order to apply an exemption under the Energy Safety and Security Act to existing legal prohibitions against the use of spill-treating agents in Canadian waters, the department said in the June 15 Canada Gazette, Part I. They go into effect immediately.

"The inclusion of spill-treating agents to expand the available response options is necessary to enable a spill to be addressed to the maximum possible extent in order to protect the overall integrity of the environment," it said.

The department acknowledged that the majority of comments it received in July 2015, after publishing draft regulations, opposed authorization of the Corexit dispersant on the basis that it is toxic to humans and marine life and safer alternatives are available. Some comments noted that the product is banned in some jurisdictions and may soon be banned in the U.S., the department said.

But Environment and Climate Change Canada said, based on current evidence, it is satisfied that the product is suitable for Canadian offshore waters because there is no known alternative that is safer, more effective and has undergone rigorous study and real-world testing.

Corexit EC9500A is listed on the U.S. National Contingency Plan, so the possibility of that changing is speculation, and in any event decisions by other jurisdictions do not preclude Canada from taking action it deems appropriate, it said.

Environmental Groups' Opposition

Greenpeace Canada, along with other environmental and aboriginal groups, opposes authorization of Corexit for offshore spills and is unhappy that the government continues to support its use, Greenpeace spokesman Alex Speers-Roesch said June 16. “The concerns basically stand,” he told Bloomberg BNA. “It's a toxic chemical.”

There is significant evidence from the disaster following the explosion of BP Plc's Deepwater Horizon that dispersants add to environmental damage caused by major oil spills, according to Speers-Roesch. “There's no evidence it can produce a positive result,” he said.

The conditions the regulations impose before an approved product can be used set a “fairly low bar” and the regulations overall don't set clear criteria for how the products should be used, he said.

The Canadian Association of Petroleum Producers was unable to respond June 16 to a request from Bloomberg BNA for comment on the regulations, but Environment and Climate Change Canada acknowledged in its regulatory impact analysis the concerns the oil industry raised during the July 2015 public comment period.

Industry questioned the need to rely on regulatory decision-makers to determine the appropriate use of spill-treating agents in emergency situations and to consult with federal and provincial officials before they are used because it could delay decisions and impede optimal spill response, the department said.

Leaving final approval until a spill has occurred and requiring consultation with federal and provincial officials provides flexibility to ensure that decisions are based on the facts at the time, Environment and Climate Change Canada said.

Regulations Impose Conditions

The regulations impose the following conditions:

• authorization by an offshore oil and gas regulator such as the Canada-Nova Scotia Offshore Petroleum Board, Canada-Newfoundland and Labrador Offshore Petroleum Board or the National Energy Board;

• approval by the regulator's chief conservation officer, based on a finding that it will likely provide a net environmental benefit;

• use of the product under conditions imposed by regulations or stipulated by the regulator at the time of the spill; and

• in the period through 2020, during which regulations specifying conditions of use may be developed, consultation at the time of a spill with the federal ministers of environment and natural resources and the appropriate provincial minister.

In addition, monitoring dispersed oil in the environment following the dispersant's use is an obligation of the party responsible for an oil spill, the department said.

Oil dispersant Corexit EC9500A was used in the 2010 Deepwater Horizon well blowout, while Corexit EC9580A, a surface washing agent used on shorelines and manufactured structures, was used in the 1994 Morris J. Berman spill in Puerto Rico, Environment and Climate Change Canada said. No ingredient in either product is listed as toxic under the Canadian Environmental Protection Act, it said.

For More Information

The Regulations Establishing a List of Spill-treating Agents (Canada Oil and Gas Operations

Act) are available at http://src.bna.com/fZj.

To: Principe, Vanessa[Principe.Vanessa@epa.gov]; DeHaven, Leigh[DeHaven.Leigh@epa.gov]; Wilson, Gregory[Wilson.Gregory@epa.gov]
Cc: Jennings, Kim[Jennings.Kim@epa.gov]
From: Matthiessen, Craig
Sent: Tue 2/9/2016 12:44:15 PM
Subject: FW: Info about Oil Dispersants

FYI – see below.

From: Hodges, Jennifer
Sent: Monday, February 08, 2016 4:47 PM
To: Matthiessen, Craig <Matthiessen.Craig@epa.gov>
Subject: RE: Info about Oil Dispersants

Wonderful, there is no due date so I said take until Tuesday!

Jennifer R. Hodges (formerly Myers)

(Acting) Special Assistant

Office of Emergency Management

Office of Land and Emergency Management

U.S. Environmental Protection Agency

Hodges.Jennifer@epa.gov

(o) 202-564-2055

From: Matthiessen, Craig
Sent: Monday, February 08, 2016 4:43 PM
To: Hodges, Jennifer <Hodges.Jennifer@epa.gov>
Subject: Re: Info about Oil Dispersants

Yep. This belongs to my group. We can check it out tomorrow.

R. C. Matthiessen

Sent from my iPhone

On Feb 8, 2016, at 4:34 PM, Hodges, Jennifer <Hodges.Jennifer@epa.gov> wrote:

Good Afternoon Craig –

Does this item belong with your group?

Thank you – adding to the calendar and task bar now.

Jenn

Jennifer R. Hodges (formerly Myers)

(Acting) Special Assistant

Office of Emergency Management

Office of Land and Emergency Management

U.S. Environmental Protection Agency

Hodges.Jennifer@epa.gov

(o) 202-564-2055

From: Hull, George
Sent: Friday, February 05, 2016 2:53 PM
To: Hodges, Jennifer <Hodges.Jennifer@epa.gov>; James, Kennetta <James.Kennetta@epa.gov>
Subject: FW: Info about Oil Dispersants

Jennifer and Kennetta,

An undergrad student from Old Dominion University contacted us to request an interview

for a science blog on the oil dispersant, Corexeit 9500. Could we talk about how to respond, when you have a moment. Do we have a web page(s) with relevant information? Thanks,

George Hull, Director

Office of Media Relations

U.S. EPA

Tel. 202-564-0790

From: Ben Maxie [mailto:bmaxi001@odu.edu]
Sent: Friday, February 05, 2016 1:25 PM
To: Press <Press@epa.gov>
Subject: Info about Oil Dispersants

Hi,

I'm an undergraduate researcher and science writer for a graduate school marine science blog. I'm working on an article about oil dispersant toxicity, specifically Corexit 9500A. Could I arrange a brief interview on the subject either by phone or email? I am unsure where to direct this inquiry and thought that the press email would be appropriate, but if not could you refer me to a better contact email?

Thank you,

Ben Maxie

--

Benjamin Maxie

Undergraduate Student, Biological Sciences

Old Dominion University

757-287-6238

To: Principe, Vanessa[Principe.Vanessa@epa.gov]; DeHaven, Leigh[DeHaven.Leigh@epa.gov]; Wilson, Gregory[Wilson.Gregory@epa.gov]; Bove, James[Bove.James@epa.gov]
Cc: Jennings, Kim[Jennings.Kim@epa.gov]
From: Matthiessen, Craig
Sent: Wed 5/11/2016 2:50:22 PM
Subject: FW: Resources at Risk Document for HWCG Drill - Example for Environmental Tradeoffs (NEBA) Discussion
HCWG Drill Resources at Risk NOAA.docx

Ran across this; forgot to send.

From: Drieu, Mike [mailto:Mike.Drieu@anadarko.com]
Sent: Monday, May 02, 2016 9:46 AM
To: 1145tg@listserve.api.org
Subject: FW: Resources at Risk Document for HWCG Drill - Example for Environmental Tradeoffs (NEBA) Discussion

Thanks to NOAA for sending latest RAR info that could be used for NEBA section in API subsea dispersants document we are using on. It is 15 pages and shows extensive detail and good references.

If this is accepted as baseline for future concurrence packages for subsea dispersant use, we may consider using this entirely and incorporate as another Annex.

Thanks,

Mike Drieu

Anadarko Petroleum Corporation

"Enhance Preparedness; Reduce Risk"

EHS Advisor

(O) 832.636.8493

(F) 832.636.0435

(M)281.844.0813

From: Paige Doelling - NOAA Federal [mailto:paige.doelling@noaa.gov]
Sent: Friday, April 29, 2016 2:58 PM
To: Drieu, Mike; Robert Simmons; Braddock, Mary; aahnell@exponent.com; John Temperilli; Bess, Amanda S; Brandon Klopfenstein; Horace Bussey; Jon Unwin; Nedwed, Tim J; Cramer, Marty:; Roland Goodman; Condon, Michael W; Walker, Samuel; Steve Buschang
Subject: Resources at Risk Document for HWCG Drill - Example for Environmental Tradeoffs (NEBA) Discussion

Hi Mike,

In support of the upcoming HWCG drill, I had NOAA's resources at risk contractor, Research Planning, Inc, develop the attached resources at risk document.

In my opinion, it contains the appropriate level of detail for an incident-specific evaluation of dispersant use. I am forwarding it along to the work group to inform the planned discussions on the NEBA part of the guidance document.

I used the circulation list from the last invitation, so if I've left anybody out, please forward along.

Also, because all SSCs don't think exactly alike, I've asked my fellow SSCs to take a look at it as well.

I plan on attending the work group meeting in May, and hoepfully will be able to attend some of the later ones as well.

See you in May,

Paige

--

Paige Doelling, PhD

NOAA Scientific Support Coordinator

for USCG District 8

Houston, TX

Mobile: 206-549-7819

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DRILL- DRILL- DRILL Resources at Risk for the northern Gulf of Mexico (GOM)

I. Spill Source Information

This report was prepared on 27 April 2016. Information in this report is meant to cover a release of approximately 6,500 barrels per day of Louisiana crude originating on May 10th at 28°40'59.913" N and 88°10'34.391" W. The spilled product is moving north and east, and will impact the shoreline primarily in Mississippi, Alabama, and Florida if it makes landfall.

II. Geographic Region Covered

The resources covered in this report are those expected to be found in the offshore area corresponding to block MC-300, the adjacent continental shelf, and coastal zone extending from lease block MC-300 to the shore from the Chandeleur Islands, LA to Destin, FL.

III. Oil type, behavior and effects to impacted species

Louisiana crude is a light crude that has an API of 37. It has moderate concentrations of toxic compounds and is moderately volatile. Observations during aerial surveys indicate that the crude oil readily emulsifies (both during its 5,000 ft rise to the water surface and by wave action on the sea surface). Thick emulsified oil occurs as large patches (tens of meters in diameter), long streamers, and smaller tarballs. Large areas of sheens are associated with the emulsified oil. The oil could concentrate in convergence zones, in patches of Sargassum (where sea turtles and birds may also concentrate).

Oil that reaches nearshore and coastal areas will mostly be weathered crude oil from the well. These relatively large accumulations of emulsified oil can heavily coat intertidal areas. The emulsified oil could also become mixed with sand, either in the surf zone or after stranding onshore. These oil:sand mixtures are heavier than water and could accumulate as submerged oil mats in nearshore areas off Gulf sand beaches. They can become buried by the movement of offshore bars, be buried within the beaches, and persist for years. The oil can become trapped in and form thick deposits along fringing marsh shorelines. The stability of the emulsions, once stranded on the shoreline and sheltered from wave action, is uncertain. One possibility is that the emulsion could break, releasing liquid oil that could be only moderately weathered (emulsification slows weathering processes such as evaporation and dissolution). The release of liquid oil inside the marsh fringe or on beaches could cause significant additional impacts to benthic, water-column, and water-surface resources in these shallow water habitats. Animals may not avoid the weathered emulsified oil, particularly if it does not provide any indication of hazards (e.g., it might not smell oily, could look like natural debris), and animals could still attempt to feed in the open areas between the patches that would still have some sheen. Further away from the source, tarballs (oil <10 cm in diameter), tar patties (oil >10 cm), and occasional tarmats may strand along the shoreline. These oil deposits could range in texture from soft, emulsified oil to semi-hardened outer layers. The oil may adhere to aquatic vegetation, birds, fur-bearing mammals, and reptiles. Oil coming ashore will be weathered so oil effects are likely to

be a result of coating and smothering of shoreline resources, ingestion of tarballs by sea turtles, and the persistence of oil in sediments.

Background on Potential Effects

The impacts arising from oil spills on aquatic species in open waters likely varies by species and with the rate at which oil partitions and dilutes in the water column, and with the co-occurrence of sensitive life stages and both physically and chemically dispersed oil. Species that may be at increased risk of exposure to chemically dispersed oil are those entrained within and traveling with the water mass containing the chemically dispersed oil (e.g., small species, embryos, larvae, zooplankton), followed by slow-moving species and life stages. Highly mobile species (e.g., adult shrimp, pelagic fish) may be less likely to be exposed to high concentrations of chemically dispersed oil due to dilution and avoidance.

Toxicity Studies

Exposure of aquatic species, and in particular early life stages, to physically and chemically dispersed oil can lead to lethal and non-lethal but ecologically important impacts (Teal and Howarth, 1984; Albers, 1995; NRC, 2005), but the onset of these impacts depends on several factors including oil concentrations and exposure duration. A growing body of literature (e.g., Carls *et al.*, 1999; Heintz *et al.*, 1999; Heintz *et al.*, 2000; Incardona *et al.*, 2004; Incardona *et al.*, 2005; Incardona *et al.*, 2011; Incardona *et al.*, 2013; Mager *et al.*, 2014; Esbaugh *et al.*, 2016) has shown that under controlled laboratory conditions fish embryos exposed for several hours post hatch to low oil concentrations (>1 mg/L oil, dissolved polycyclic aromatic hydrocarbons [PAHs] in the low µg/L range) develop gross abnormalities, with permanent impacts potentially causing reduced survival later in life (Incardona *et al.*, 2013). These impacts have been documented under laboratory conditions on embryos of pelagic species (i.e., yellowfin tuna [*Thunnus albacares*], Southern bluefin tuna [*T. maccoyii*], yellowtail amberjack [*Seriola lalandi*], and mahi mahi [*Coryphaena hippurus*]), some of which occur in the Gulf of Mexico (Incardona *et al.*, 2014; Mager *et al.*, 2014; Esbaugh *et al.*, 2016). However, the impacts arising from oil spills on fish embryos in open waters and their recruitment to the larval stages likely varies with the rate at which oil partitions and dilutes in the water column, as well as with the co-occurrence of fish embryos and the chemically dispersed oil. As a point of reference, a large proportion of water samples (75%) collected during the *Deepwater Horizon* oil had total PAH concentrations <1 µg/L, though water samples in the immediate vicinity of the wellhead had concentrations >1,000 µg/L (Boehm *et al.*, 2016). In contrast to these sensitive life stages, juveniles and adults are generally highly mobile and may only be temporarily exposed to chemically dispersed oil given their ability to move in and out of the water masses containing the entrained oil.

One of the greatest limitations in understanding the potential impacts related to dispersant use in open waters is the lack of data derived using relatively realistic exposure conditions. Even greater uncertainties and data limitations exist on the potential impacts of subsea dispersants.

Despite these limitations, toxicity data from controlled laboratory studies could provide conservative estimates of potential impacts. Toxicity data are commonly reported as lethal or effects median concentrations (LC50 and EC50, respectively[1]). With regards to dispersants alone, data based on spiked exposures[2] show that most data fall within the slightly to practically nontoxic range[3], with most data falling within the practically nontoxic range. Even for sensitive species, most toxicity values for COREXIT 9527 and COREXIT 9500, regardless of exposure conditions, are >20 mg/L, falling within the range of what is considered slightly toxic. Similarly, the reported toxicity of South Louisiana crude oil chemically dispersed with COREXIT 9500 from 96-h (LC50s and EC50s combined) constant static exposure[4] ranges from 4.84 to 18 mg THC/L (n=8 records) (NOAA/ERD, 2015), falling within the moderately to slightly toxic range.

Potential Levels of Concern

Derivation of potential thresholds of concern could be achieved by the use of Species Sensitivity Distributions (SSDs). SSDs are cumulative distributions of toxicity data that allow for comparisons of the relative sensitivities of aquatic species dispersed oil, and they are useful in that they could be used to calculate the 5th percentile Hazard Concentration (HC5), or concentrations assumed to be protective of 95% of all species in the SSD. While HC5 values may not be necessarily protective of all aquatic organisms, and particularly of those known to be most sensitive to oil, their derivation is often conservative enough to a large range of sensitivities. Conservative estimates HC5s for COREXIT 9527 and COREXIT 9500 are 8.38 mg/L and 4.04 mg/L, respectively, falling within the moderately toxic range. However, these concentrations are assumed to be worst case, as exposure concentrations under standard dispersant applications (ASTM, 2010a; ASTM, 2010b) are not expected to remain constant in the water column, and at any given moment are likely below these concentrations. Based on modeled information of toxicity data (96-hr exposures) for South Louisiana crude oil, the conservative HC5 estimate is 0.97 mg THC/L with a 95% confidence interval of 0.63-1.49 mg THC/L (Bejarano and Barron, 2014). These values fall within the upper and lower ends of the highly toxic and the moderately toxic range, respectively. As a point of reference the range of oil concentrations in the chemically dispersed underwater plume range from non-detectable levels to 6,130 mg/L, with a geometric mean of 1.09 µg/L (Boehm *et al.*, 2011). Given that this oil release is smaller in volume (6,500 bbl/d) than the estimated release rate of the *Deepwater Horizon* oil spill (ca. 50,000-60,000 bbl/d[5]), the THC concentrations would be expected to be lower.

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[1] The LC50 is the concentration lethal to 50% of the exposed test population, while the EC50 is the concentration that causes an adverse non-lethal effect to 50% of the exposed test population. As a general rule, the smaller the LC50 or EC50 values, the greater the toxicity.

[2] Spiked or spiked flow-through tests are tests that address the dilution that occurs in open waters by reproducing under laboratory conditions rapid changes in concentrations within the water column.

[3] Toxicity LC50 and EC50 categories for aquatic organisms are as follows: Very highly toxic <0.1 mg/L, Highly toxic 0.1-1 mg/L, Moderately toxic >1-10 mg/L, Slightly toxic >10-100 mg/L and Practically nontoxic >100 mg/L Source: http://www2.epa.gov/pesticide-science-and-assessing-pesticide-risks/technical-overview-ecological-risk-assessment-0

[4] Exposures that do not account for the natural dilution that occurs in open waters.

[5] Source: Oil Budget Calculator Deepwater Horizon

Potential Impacts

As describe above, HC5 values could be used as surrogate for threshold concentration, with the lower confidence value for South Louisiana crude oil (0.63 mg/L; 96-hr exposures) serving as a conservative threshold to assess potential impacts to the most sensitive life stages. While these concentrations may be possible, it is unlikely that these concentrations would remained elevated for a long period given the dilution that may occur within the water column. Although short exposures have the potential to negatively impact embryos, natural mortality of larvae is high, and the projected plume is limited in geography compared to most larval distributions. Therefore, impacts on entire populations are unlikely. However, given that early life stages of several species (**Table 1**) may be present in the area and their spatial distribution overlap with the water mass containing chemically dispersed oil, it is expected that a portion of each species' cohort would be exposed. Because most other aquatic groups (i.e., sea turtles, marine mammals) are able to swim through water mass containing chemically dispersed oil, potential impacts are likely minimal. A greater risk of exposure may result from inhalation of volatile compounds and smothering at the water surface.

(http://www.restorethegulf.gov/sites/default/files/documents/pdf/OilBudgetCalc_Full_HQ-Print_111110.pdf)

Table 1. List of representative species in the offshore area of interest with early life stages at risk of potential exposure to the water mass containing chemically dispersed oil.

Species	Spatial Overlap with Early Life Stages	Potential Impacts
White and brown shrimp	Spawning inshore of the area of interest; eggs and larvae may be present	Early life stages in shelf waters may be exposed and experience mortality. It is not likely that a large proportion of the population is exposed to oil, given the timing and location of the spill relative to these species' habitats.
Blue crab	Spawning inshore of the area of interest; eggs and larvae may be present	
Bluefin tuna, yellowfin tuna	Spawning in the area; eggs and larvae are present	Early life stages may be exposed and larval mortality can occur. Given that natural mortality rates are high, population level impacts are unlikely.
Swordfish	Larvae may be present year-round in the area	Early life stages may be exposed. It is not likely that a large proportion of the population is exposed to oil, given the timing and location of the spill relative to these species' habitats.
Other pelagic species (e.g., dolphinfish, blackfin tuna, blue marlin, dolphinfish, wahoo, whale shark, white marlin, amberjack, mackerel)	Early life stages may be present in the area; spawning mostly in a different geography.	
Red grouper, scamp, and red, lane, gray and vermilion snapper	Spawning in the area; eggs and larvae may be present	

IV. Shoreline Resources at Risk

Shorelines in the area of impact consist of barrier islands (including Breton, Cat, Ship, Horn, Petit Bois, Dauphin, Santa Rosa, Okaloosa Islands) with mainly fine-medium grained sandy beaches. Mainland shorelines are primarily salt marshes with interspersed pockets of fine- to medium-grained sand beaches. Fresh- and brackish-water marshes may be present in some areas depending on localized freshwater input. Manmade shorelines (riprap, seawalls) are also present in developed areas. Some sheltered flats are present and may be exposed dependent on wind conditions. Riprap jetties are present at the mouth of Destin inlet (East pass) and Perdido Pass.

Because of the broken nature of the interior shoreline, the thick emulsified oil patches and tarballs could penetrate deeply beyond the outer "shoreline" depending on wind conditions, into areas that are very shallow, muddy, and difficult to access. The emulsified oil will readily adhere to marsh vegetation and could form thick bands on the vegetation as water levels vary. There is

also the possibility that the emulsions could break after stranding on the marsh and release liquid oil, which could spread over a much larger area than the footprint of the emulsified oil patches.

Emulsified oil deposited on fine-medium grained beaches is unlikely to penetrate deep into the sediment (<4 mm); however, depending on local conditions, accumulation of sand may result in rapid burial of stranded oil. Some of the barrier islands have a low elevation and could be overwashed during high wind conditions. If oil was present at that time, it could be transported across the islands and either buried in the washover fan or deposited in the marshes on the leeward side of the island. On outer sand beaches, the tarballs and tar patties will collect in debris lines near the high tide mark. Depending on the tides and the concentration of tarballs in the water, the collection zone may be from less than a meter to several meters wide. There may also be scattered tarballs across the rest of the beach face, but in much lower concentrations. The outer shell of the tarball may be heavily weathered by the time it reaches these beaches, making it less sticky with less of a tendency to pick up sediments. However, the inside of the tarball may still be relatively fresh, so if pressure is applied, the outer skin will rupture and the tarball may adhere to whatever it is in contact with. Also when stranded out of the water, the daytime heating may melt the tarballs causing them to adhere to whatever surface they are on at the time. Depending on the beach cycle, the tarballs and patties can become buried during depositional cycles. Therefore, rapid removal is important.

Oil may adhere to rough surfaces, such as riprap and seawalls, leaving a band at the high-water line. In the riprap areas, emulsified oil and tarballs may collect in the crevices between the rocks; there is often debris in these crevices, which can also become oiled, which can be a source for chronic reoiling.

V. Biological Resources at Risk

Threatened, Endangered, and Special Concern (T/E) Species

Birds

Louisiana - Brown pelican (LA SE, over 8,500 pairs) are present and nesting on and around the Chandeleur Islands. Red knot (FT) are present on the shores of the Chandeleur Islands.

Mississippi - Brown pelican (MS SE) and snowy plover (MS SE, nesting) are present on Mississippi barrier islands and Mississippi mainland shorelines. Brown pelican are also present on Mississippi nearshore waters.

Alabama - Least bittern (AL State Protected (SP)), white ibis (AL SP, nesting in locations east of Mobile Bay), mottled duck (AL SP, nesting), northern harrier (AL SP) are present on the back sides of AL barrier islands. Reddish egret (AL SP) are present on and around AL barrier islands and in nearshore waters west of Mobile Bay. Snowy plover (AL SP) is present on islands surrounding Dauphin Island Bay, and it is nesting on Pelican Island, a large sandbar south of Dauphin Island. Wilson's plover (AL SP) is present and nesting on islands surrounding Dauphin

Island Bay and Pelican Island. American oystercatcher (AL SP) is present and nesting on Pelican Island and ocean beaches east of the mouth of Mobile Bay. Willet (AL SP) is present and nesting on the west end of the Mobile Point peninsula and is present on islands surrounding Dauphin Island Bay and ocean beaches east of the mouth of Mobile Bay. Black skimmer (AL SP), common tern (AL SP) and gull-billed tern (AL SP) are present and nesting on Pelican Island. Caspian tern (AL SP) are present on the back sides of AL barrier islands, islands surrounds Dauphin Bay, and beaches at the west end of the Mobile Point peninsula. Royal tern (AL SP) is present in nearshore waters west of Mobile Bay and in waters on the back side of barrier islands east of Mobile Bay. Sandwich tern (AL SP) is present on ocean beaches east of the mouth of Mobile Bay. Seaside sparrow (AL SP) is present and nesting on the islands north of Dauphin Island Bay.

Florida - Black skimmer (FL Species of Special Concern (SSC)), brown pelican (FL SSC), and least tern (FL ST) are present throughout the Florida potential impact area. Piping plover (FT, FL ST) are present on ocean beaches and the back sides of barrier islands throughout the Florida potential impact area. Reddish egret (FL SSC, occasional) and snowy egret (FL SSC, occasional) are present in lagoons/ponds? behind the beach east of Destin. Snowy plover (FL ST) are present and nesting on beaches of barrier islands from the FL/AL border to the east end of Santa Rosa Island.

Reptiles

Five species of endangered or threatened sea turtles inhabit the Gulf of Mexico. Of those, Kemp's ridley (FE, LA E, MS E, AL SP) , leatherback (FE, LA E, MS E, AL SP) and loggerhead (FT, LA T, MS E, AL SP) are most likely to be present in offshore waters near the source of the spill. Turtles are most likely to be encountered in offshore waters (> 5.6 km from shore), and less than 100 m in depth, and are more frequently sighted from spring to fall. Loggerhead turtles are known to frequent oil production platforms. Juvenile turtles are often found associated with *Sargassum* mats, where oil can also accumulate. Nearshore, Kemp's ridley are abundant, loggerheads are common, Green (FE in Florida, FT elsewhere; LA T, MS E, AL SP) are occasional visitors, leatherbacks are rare, and hawksbill (FE, LA E, MS E, AL SP) are very rare or rare.

Sea turtle nesting season is in progress. Nesting occurs in the area of impact, and is summarized below:

- Loggerheads nest on beaches east of Ship Island, MS in low-medium concentrations
- Greens nest in low concentrations on beaches in Alabama and Florida
- Kemp's ridley nest in Alabama in low concentrations
- Leatherback nesting has occurred in the Panhandle of Florida but is rare

Diamondback terrapins (AL SP) can be found along the gulf shoreline in the area of impact.

Direct contact with oil may irritate the eyes, mouth, and nostrils of turtles. Turtles may also ingest tarballs while foraging.

Fish

Gulf sturgeon (FT, LA E, MS E, AL SP) and smalltooth sawfish (FE) may be present in the GOM in the area of impact. Most sturgeon are migrating upstream at this time of year; however, some may remain in coastal areas. Juvenile and adult sawfish may be present in coastal areas and on the continental shelf off of the Florida coast. Both species are demersal and are not common around the spill site, so impacts are likely to be limited. Populations of Alabama shad (AL SP) occur in coastal waters likely to be impacted. Adults return to saltwater habitats in Apr-May after spawning upstream.

Marine mammals

Of the 29 species of marine mammals known to occur in the Gulf of Mexico, all are protected and six (sperm, sei, fin, blue, humpback and North Atlantic right whales) are listed as endangered under the ESA. Of these, only the sperm whale is considered to commonly occur, in the northern Gulf of Mexico. Areas beyond the 100 m isobath are important habitat for endangered Sperm whale (FE, LA E). West Indian manatee (FE, LA E, MS E, AL SP), occurs primarily in Florida bays, estuaries and coastal waters but their range appears to be expanding, and could also be present in sheltered waters in Alabama, Mississippi, and Louisiana. The primary risk of oil spills to marine mammals is inhalation of volatile compounds from fresh oil and ingestion of oiled prey.

Terrestrial mammals

The Perdido Key Beach Mouse (FE, AL SP) is present on beaches and in dune habitats on Perdido Key. Alabama Beach Mouse (FE, AL SP) can be found on beaches from Fort Morgan to Gulf State Park in Alabama. Mice can ingest tarballs and encounter subsurface oil while burrowing, exposing them to the toxic components of oil.

<u>Other Birds</u>

Offshore birds

High concentrations of common tern occur offshore in the impact area. Other offshore bird species present in the area include: Audubon's shearwater, band-rumped storm-petrel, black-capped petrel, brown booby, herring gull, laughing gull, Leach's storm-petrel, long-tailed jaeger, magnificent frigatebird, masked booby, pomarine skua, red-billed tropicbird, sooty tern, Wilson's storm-petrel.

Nearshore and shoreline birds

Louisiana - American oystercatcher (26 pairs), least tern (123 pairs), and Wilson's plover (164 pairs) are present and nesting on the Chandeleur Islands. Over 5,000 pairs of terns are present and nesting on the southern Chandeleur Islands. Scaup (100,000s) occur nearshore just east of the Chandeleurs Islands. American white pelican (10s) may be present immediately around the

Chandeleur Islands. "Nearshore" birds present in waters off Louisiana extend to the edge of the continental shelf and include: gulls, magnificent frigatebird, parasitic jaegar, pomarine skua, royal tern, and sandwich tern.

Mississippi - Birds present on and immediately surrounding Mississippi barrier islands include nesting marsh birds (clapper rail, king rail, least bittern), shorebirds (American oystercatcher [nesting], killdeer, sanderling, semipalmated plover [nesting], willet [nesting], Wilson's plover [nesting]), terns (black skimmer, gull-billed tern [nesting], least tern, royal tern, sandwich tern), raptors (bald eagle [nesting], osprey [nesting]), gulls, wading birds (black-crowned night-heron [nesting], cattle egret, great blue heron, great egret, green heron, little blue heron, reddish egret, snowy egret, tricolored heron, yellow-crowned night-heron [nesting]), dabbling ducks, and migratory songbirds. Many of the same species are found along the mainland shoreline of Mississippi, including several species of shorebirds, raptors, and several species of gulls and terns. Birds present in Mississippi salt marshes include the aforementioned wading bird and marsh bird species, marsh-obligate passerines, rails, and several species of waterfowl (including blue-winged teal, Canada goose [nesting], hooded merganser [nesting], mottled duck [nesting], and wood duck [nesting]). Nearshore birds in Mississippi include gulls, terns, waterfowl and sea ducks, common loon, and pied-billed grebe.

Alabama - Birds present on and immediately surrounding Alabama barrier islands include brown pelican, nesting marsh birds (clapper rail, king rail, sora), shorebirds (black-bellied plover, black-necked stilt, killdeer [nesting], least sandpiper, lesser yellowlegs, sanderling, semipalmated plover, solitary sandpiper, stilt sandpiper, western sandpiper), gulls (Bonaparte's gull, herring gull, laughing gull, ring-billed gull), raptors (bald eagle, osprey), wading birds (great blue heron [nesting], great egret [nesting], green-backed heron [nesting], green heron [nesting], snowy egret [nesting], tricolored heron), and waterfowl (mallard, Canada goose [nesting]). Many of the same species are found along the mainland shoreline of Alabama, including raptors, gulls, terns, and marsh birds. Birds present in Alabama salt marshes include the aforementioned wading bird and marsh bird species, rails, and waterfowl. Nearshore birds in Alabama include gulls, terns, raptors, brown pelican, magnificent frigatebird, northern gannet (common), common loon, horned grebe, and pied-billed grebe.

Florida - Birds present on and immediately surrounding Florida barrier islands include shorebirds (black-bellied plover, dunlin, sanderling, semipalmated plover, short-billed dowitcher, willet [nesting], Wilson's plover), terns (Forster's tern, common tern, royal tern), gulls (laughing gull, ring-billed gull), double-crested cormorant, osprey. Many of the same species are found along the mainland shoreline of Florida, including osprey and several species of gulls and terns. Birds present in lagoons behind beaches east of Destin include bald eagle, gull-billed tern, shorebirds (least sandpiper, lesser yellowlegs), and wading birds (great blue heron, great egret, green heron, yellow-crowned night-heron). Nearshore birds in Florida include gulls (laughing gull, ring-billed gull), terns (common tern, royal tern), and osprey.

Oil can adhere to the feathers reducing insulation, water buoyancy, and water repellency, leading

to sickness or death from hypothermia and/or drowning. Diving birds, such as cormorants and loons, are usually at high risk during oil spills because they spend nearly all their time on the water surface. Wading birds, shorebirds, dabbling ducks, gulls, and terns, can also be severely impacted by oil in some cases. Wading birds and some shorebirds may be directly oiled and can become oiled on the upper body and feathers by coming in contact with oiled vegetation or wrack. Direct oiling of birds reduces the buoyancy, water repellency, and insulation provided by feathers, and may result in death by drowning or hypothermia. Preening of oiled feathers may also result in ingestion of oil resulting in irritation, sickness, or death. Bird oiling may continue even after the floating oil slicks have been removed, depending on the extent of oiled habitat. Oil brought back to the nests by adult birds may kill or injure eggs and young birds. All species can potentially ingest oil while feeding. Wading birds and marsh birds (i.e. American bittern) eat small fish, insects, and crustaceans and may be at risk of coming in contact with oil on the water or oiled marsh vegetation while feeding.

Other Marine Mammals

Offshore - A small population of Bryde's whale, the only baleen whale to commonly occur in the Gulf, inhabits the shelf break region in the northeastern Gulf. Pods of transient Killer whales have been sighted with increasing frequency over the past several decades in the Gulf of Mexico, including off the Mississippi Delta. Other species that may be found in the vicinity of the spill site include: Blainville's beaked whale (common), Clymene dolphin (low), Cuvier's beaked whale (common), Dwarf sperm whale (common), False killer whale (rare), Fraser's dolphin (Rare), Gervais' beaked whale (common), Killer whale (low), Melon-headed whale (common), pantropical spotted dolphin (abundant), pygmy killer whale (low), pygmy sperm whale (common), Risso's dolphin (common), Rough-toothed dolphin (low), Short-finned pilot whale (common), spinner dolphin (low), striped dolphin (common). Little information is available on the reproduction and calving of offshore whales and dolphins in the Gulf. However, a number of species do breed and calve in winter through early summer.

Nearshore and inshore - Atlantic spotted dolphins may be present on the shelf. Bottlenose dolphin are abundant and common in bays, estuaries and inter-bay passes in the northern Gulf of Mexico, and have less opportunity to avoid oil than do offshore whales and dolphins. Bottlenose dolphin may breed and calve throughout the year.

The primary risk of oil spills to toothed whales and dolphins is inhalation of volatile compounds from fresh oil. Bottlenose dolphins exposed to oil during the Deepwater Horizon Oil Spill have shown hormonal abnormalities and high incidences of lung disease from inhaling the toxic components of oil. Oil may foul the baleens of baleen whales if they encounter oil while feeding.

Terrestrial mammals

Muskrats, nutria and other small mammals can be found in brackish-freshwater marshes. The Santa Rosa Beach mouse is present on Santa Rosa Island. Unless exposed to the oil for prolonged periods, mortality is not expected. Terrestrial mammals are at risk of oiling of fur and ingestion during attempts to clean themselves.

Habitats

Offshore - The spill source is in an area of high habitat suitability for deepwater coral species. Known deepwater coral ecosystems are in the impact area, including Viosca Knolls. DeSoto Canyon is a large geologic feature in the impact area that harbors many deepwater reefs and other benthic communities. Due to the high habitat suitability, other deepwater coral reef systems that have not yet been discovered may be in the impact area as well. Sargassum is found on the top of the water column, and has higher concentrations in summer months in the GOM.

Inshore - Seagrass is present on the sound side of the Chandeleur Islands, the Mississippi barrier islands and Dauphin Island, and in the lower portion of Perdido Bay. Seagrass may be present at other locations in addition to these.

Deepwater corals exposed to oil suffer mortality of the portions of colonies exposed, and the fauna dependent on the corals are likely impacted as well, though less is known of these impacts. Care should be taken to leave seagrass beds undisturbed during cleanup, so that the grasses can grow back during the summer growing season. It is doubtful that the oil will be mixed into the substrate, unless there is a lot of disturbance during clean up. It is possible that fauna hiding or living in the grass will be exposed to and impacted by the oil.

Invertebrates

Offshore - Deep benthic environments support unique invertebrate communities, including brittle stars, red crab, hermit crabs, red shrimp, squat lobsters, isopods, sea pends, sea cucumbers, anemones and sponges.

Shelf - Commercially valuable invertebrates likely to be impacted by the spill include white shrimp and brown shrimp. Brown shrimp spawning may be occurring in waters between 46-90m deep, Brown shrimp spawn from Sep-May, and the peak months are Sep-Nov and Apr-May. White shrimp are abundant and spawning from May-Nov, and are generally found in waters less than 30m deep. Blue crab spawning is ongoing throughout the summer and larvae may be present. Females are found in high abundance in shallow areas of the Gulf of Mexico during the spawning season as they release their eggs. Squid may be spawning in the water column Mar-Nov. Pink shrimp may be present.

Inshore - Extensive oyster beds occur on the sound side of the barrier islands in the area of impact, particularly in Mississippi Sound. Oyster spawning is triggered by rising temperatures

and salinities, and typically begins in May and runs through Nov. Brown shrimp are abundant in estuarine waters late summer through fall. Larval white shrimp and blue crab will begin moving inshore in May-Jun to estuarine nursery areas. Blue crabs may be present in nearshore and inshore waters.

Early life stages (eggs, larvae) of invertebrates are sensitive to exposure to the toxic components of oil, which could have both immediate and delayed impacts to the populations. Shrimp eggs are pelagic and buoyant; however, later larval stages have the ability to regulate their position vertically throughout the water column.

Fish

Offshore - Bluefin tuna are abundant and spawning in the vicinity of the spill source through May; eggs and larvae may be present in the area of impact. Yellowfin tuna are also spawning in the area from May-November and swordfish larvae may be present year-round, however neither have been observed in high densities in the spring. Dolphinfish may be spawning year round. Pelagic species such as blackfin tuna, blue marlin, bluefin tuna, dolphinfish, swordfish, wahoo, whale shark, white marlin, yellowfin tuna are present in offshore waters. Early life history stages of these species may be present.

Demersal fish species likely present in the vicinity of the release site are likely to include sixgill shark, eels and cusk-eels.

Shelf - Many species of reef fish are present on the continental shelf in the area of impact, including commercially important snapper and grouper species. Larval duration for most of these species is approximately a month, and larvae are pelagic. Grouper species that may be spawning in the area of impact include (spawning months in parentheses): red grouper (May-Jul) and scamp (Mar-May). Snapper species spawning in area of impact include: Red snapper (Mar-Nov), lane snapper (Mar-Aug), gray snapper (Jun-Nov), and vermilion snapper (Apr-Nov). A summary of 17 years of SEAMAP data indicates that higher larval abundances have been observed in fall samples compared to spring (Mar-May) surveys for most snapper species, whereas groupers have only been observed in the spring in low densities.

Several species of coastal sharks can be found in the nearshore and shelf waters of the northern Gulf of Mexico, arriving in May and remaining until the fall. Shallow coastal waters are important pupping grounds for some of these species, including Atlantic sharpnose shark, Blacktip shark, finetooth shark, scalloped hammerhead, and possibly lemon sharks. Other shark species present include whale, bull, great hammerhead, shortfin mako, and spinner sharks.

Many forage species begin spawning in coastal waters in the spring and continue through the fall, including anchovies, sardines, mullet, and herrings.

Other species that may be spawning (and therefore have eggs or larvae present) in nearshore waters include: Atlantic tripletail (May-Sep), White trout (Mar-Oct), Squid (Mar-Nov), Ballyhoo

(Mar-Jul), Atlantic spadefish (Apr-Sep), Great barracuda (Apr-Oct), Kingfishes (Apr-Aug), Florida pompano (larvae present through May), Great barracuda (Apr-Oct), amberjack and Spanish mackerel (Apr-Oct), spotted seatrout (Apr-Sep).

Inshore - Marsh habitats are extremely productive and support high biodiversity and abundance of resident estuarine fish. Estuarine areas are important nursery grounds for many commercial species, including snappers, groupers. Inlets and passes are often sites of fish spawning.

Larval and juvenile stages of fish are at a greater risk from the toxic components of oil. Embryonic and larval exposure to PAHs from crude oils has been linked to cardiac defects in pelagic fish species, such as yellowfin tuna. Oil mixed into the water column can adhere to the gills of a fish, causing lethal or sublethal effects.

VI. Human-Use Resources

Lease block MC-300 is within the bluefin tuna Habitat Area of Particular Concern (HAPC) for spawning bluefin tuna.

Species with Essential Fish Habitat in shelf and offshore near the waters of spill include whale shark, bigeye thresher shark, bluefin tuna, skipjack tuna, longbill spearfish, swordfish, white marlin, roundscale spearfish, yellowfin tuna, silky shark, angel shark, blue marlin, longfin mako shark, oceanic whitetip shark,scalloped hammerhead shark, finetooth shark, bignose shark, bull shark, shortfin mako shark, bluefin tuna, longbill spearfish, sailfish, spinner shark, blacknose shark, smooth dogfish, Atlantic sharpnose shark, sandbar shark, and tiger shark.

Federally designated Essential Fish Habitat (EFH) is present in coastal and inshore waters for stone crab, shrimp, reef fish, red drum, coral, and coastal migratory pelagic species.

The area of impact is a productive commercial fishing area and a popular recreational fishing destination. Should the oil make landfall, it has the potential to impact economically important amenity beaches in Mississippi, Alabama, and Florida.

Management Areas present in the area of impact include Gulf Islands National Seashore, Bon Secour NWR, Breton NWR, and numerous state-protected areas. Critical habitat occurs in the area and is summarized by species below:

- Loggerhead sea turtle - Beaches on Horn and Petit Bois Islands, the Alabama shoreline east of Mobile Bay, and Perdido Key. Marine critical habitat occurs in the GOM offshore of the spill site.
- Perdido Key Beach Mouse - Perdido Key
- Alabama Beach Mouse - sites present in Bon Secour NWR and Gulf State Park
- Piping Plover - many of the barrier islands west of Mobile Bay and along Mississippi Sound, Fort Morgan, some sites on Santa Rosa Island
- Gulf sturgeon - Mississippi Sound, Pascagoula Bay, Pensacola Bay and tributary rivers.

References

Albers, P. H. (1995). Petroleum and individual polycyclic aromatic hydrocarbons. *Handbook of ecotoxicology* **2**.

ASTM (2010a). *ASTM Standard F1737/F1737M-10. Standard Guide for Use of Oil Spill Dispersant Application Equipment During Spill Response: Boom and Nozzle Systems*. West Conshohocken, PA, ASTM International.

ASTM (2010b). *ASTM Standard F1738-10. Standard Test Method for Determination of Deposition of Aerially Applied Oil Spill Dispersants*. West Conshohocken, PA, ASTM International.

Bejarano, A. C. and M. G. Barron (2014). Development and practical application of petroleum and dispersant interspecies correlation models for aquatic species. *Environmental Science & Technology* **48**(8): 4564-4572.

Boehm, P. D., L. L. Cook and K. J. Murray (2011). Aromatic hydrocarbon concentrations in seawater: Deepwater Horizon oil spill. *International Oil Spill Conference Proceedings (IOSC)*, American Petroleum Institute. abs371.

Boehm, P. D., K. J. Murray and L. L. Cook (2016). Distribution and Attenuation of Polycyclic Aromatic Hydrocarbons in Gulf of Mexico Seawater from the Deepwater Horizon Oil Accident. *Environmental Science & Technology*.

Carls, M. G., S. D. Rice and J. E. Hose (1999). Sensitivity to fish embryos to weathered crude oil: Part I. Low-level exposure during incubation causes malformations, genetic damage, and mortality in larval Pacific herring (*Clupea pallasi*). *Environmental Toxicology and Chemistry* **18**(3): 481-493.

Esbaugh, A. J., E. M. Mager, J. D. Stieglitz, R. Hoenig, T. L. Brown, B. L. French, T. L. Linbo, C. Lay, H. Forth and N. L. Scholz (2016). The effects of weathering and chemical dispersion on Deepwater Horizon crude oil toxicity to mahi-mahi (*Coryphaena hippurus*) early life stages. *Science of The Total Environment* **543**: 644-651.

Heintz, R. A., S. D. Rice, A. C. Wertheimer, R. F. Bradshaw, F. P. Thrower, J. E. Joyce and J. W. Short (2000). Delayed effects on growth and marine survival of pink salmon *Oncorhynchus gorbuscha* after exposure to crude oil during embryonic development. *Marine Ecology Progress Series* **208**: 205-216.

Heintz, R. A., J. W. Short and S. D. Rice (1999). Sensitivity of fish embryos to weathered crude oil: Part II. Increased mortality of pink salmon (*Oncorhynchus gorbuscha*) embryos incubating downstream from weathered Exxon Valdez crude oil. *Environmental Toxicology and Chemistry* **18**(3): 494-503.

Incardona, J. P., M. G. Carls, H. Teraoka, C. A. Sloan, T. K. Collier and N. L. Scholz (2005). Aryl hydrocarbon receptor-independent toxicity of weathered crude oil during fish development. *Environmental Health Perspectives*: 1755-1762.

Incardona, J. P., T. K. Collier and N. L. Scholz (2004). Defects in cardiac function precede morphological abnormalities in fish embryos exposed to polycyclic aromatic hydrocarbons. *Toxicology and Applied Pharmacology* **196**(2): 191-205.

Incardona, J. P., T. K. Collier and N. L. Scholz (2011). Oil spills and fish health: exposing the heart of the matter. *Journal of Exposure Science and Environmental Epidemiology* **21**(1): 3-4.

Incardona, J. P., L. D. Gardner, T. L. Linbo, T. L. Brown, A. J. Esbaugh, E. M. Mager, J. D. Stieglitz, B. L. French, J. S. Labenia and C. A. Laetz (2014). Deepwater Horizon crude oil impacts the developing hearts of large predatory pelagic fish. *Proceedings of the National Academy of Sciences* **111**(15): E1510-E1518.

Incardona, J. P., T. L. Swarts, R. C. Edmunds, T. L. Linbo, A. Aquilina-Beck, C. A. Sloan, L. D. Gardner, B. A. Block and N. L. Scholz (2013). Exxon Valdez to Deepwater Horizon: Comparable toxicity of both crude oils to fish early life stages. *Aquatic toxicology* **142**: 303-316.

Mager, E. M., A. J. Esbaugh, J. D. Stieglitz, R. Hoenig, C. Bodinier, J. P. Incardona, N. L. Scholz, D. D.

Benetti and M. Grosell (2014). Acute embryonic or juvenile exposure to Deepwater Horizon crude oil impairs the swimming performance of mahi-mahi (*Coryphaena hippurus*). *Environmental science & technology* **48**(12): 7053-7061.

NOAA/ERD (2015). *Chemical Aquatic Fate and Effects (CAFE) Database. Version 1.1 [Computer Software]. National Oceanic and Atmospheric Administration, Emergency Response Division, Office of Response and Restoration, Seattle, WA.*: 40 + Appendices.

NRC (2005). Oil Spill Dispersants: Efficacy and Effects, National Academy Press, Washington, DC p.

Teal, J. M. and R. W. Howarth (1984). Oil spill studies: a review of ecological effects. *Environmental Management* **8**(1): 27-43.

To: DeHaven, Leigh[DeHaven.Leigh@epa.gov]; Principe, Vanessa[Principe.Vanessa@epa.gov]; Matthiessen, Craig[Matthiessen.Craig@epa.gov]; Bove, James[Bove.James@epa.gov]
Cc: Wilson, Gregory[Wilson.Gregory@epa.gov]
From: Conmy, Robyn
Sent: Mon 4/25/2016 12:28:33 PM
Subject: RE: Availability of COREXIT Products for Testing

Thanks Leigh. I have tried both the manufacturer and the distributor (if provided) that was listed with the schedule. Hoping folks were just out of the office or too busy to respond last week – but are available this week.

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Robyn N. Conmy, Ph.D.

Research Ecologist

USEPA/NRMRL/LRPCD

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513-569-7090 (office)

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conmy.robyn@epa.gov

From: DeHaven, Leigh
Sent: Monday, April 25, 2016 8:26 AM
To: Conmy, Robyn <Conmy.Robyn@epa.gov>; Principe, Vanessa <Principe.Vanessa@epa.gov>; Matthiessen, Craig <Matthiessen.Craig@epa.gov>; Bove, James <Bove.James@epa.gov>
Cc: Wilson, Gregory <Wilson.Gregory@epa.gov>
Subject: RE: Availability of COREXIT Products for Testing

Hi Robyn,

I am not certain if you are directly contacting manufacturers only or if you have tried the distributors (which are often the same entity). Anyway, the NCP Technical Notebook (TN) list distributors where the Product Schedule (PS) just lists manufacturers. CSRA just did an check on verifying POC data for the PS and TN, so you may (or may not) have more luck contacting folks if they provided updated information to us during the update. The link for the Technical Notebook is https://www.epa.gov/sites/production/files/2013-08/documents/notebook.pdf. I can ask Luke Durbin from CSRA if he has any notes on contacting the manufactures you listed in your email below and if there were updates that I may not have received written verification from yet.

Leigh

Leigh E. DeHaven
U.S. Environmental Protection Agency
Office of Emergency Management

Office of Land and Emergency Management
1200 Pennsylvania Ave., NW

Room 6450 CC WJC North (Mail code 5104A)
Washington, DC 20460
Tel.: (202) 564-1974

From: Conmy, Robyn
Sent: Monday, April 25, 2016 8:14 AM
To: Principe, Vanessa <Principe.Vanessa@epa.gov>; Matthiessen, Craig <Matthiessen.Craig@epa.gov>; Bove, James <Bove.James@epa.gov>
Cc: Wilson, Gregory <Wilson.Gregory@epa.gov>; DeHaven, Leigh <DeHaven.Leigh@epa.gov>
Subject: RE: Availability of COREXIT Products for Testing

It's crazy that the Nalco is turning out to be the easy product to procure. I have contacted the makers of Finasol, Dispersit and Accell via email and phone, but have not received back any calls or emails. Will be reaching out again this morning!

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Robyn N. Conmy, Ph.D.

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conmy.robyn@epa.gov

From: Principe, Vanessa
Sent: Friday, April 22, 2016 4:22 PM
To: Matthiessen, Craig <Matthiessen.Craig@epa.gov>; Bove, James <Bove.James@epa.gov>
Cc: Wilson, Gregory <Wilson.Gregory@epa.gov>; Conmy, Robyn <Conmy.Robyn@epa.gov>; DeHaven, Leigh <DeHaven.Leigh@epa.gov>
Subject: RE: Availability of COREXIT Products for Testing

This is good news!

HOWEVER - We will need to purchase these, as we are purchasing the ones from TOTAL. The reason we gave TOTAL was that we want to be above board given we will be using results for regulatory purposes and do not want to in any way appear to be giving an advantage to any entity. So we didn't accept their offer for free samples.

Would like to circle back with everybody on Monday to see whether the next communication is from me or from ORD as the purchaser/receiver.

Have a good weekend, V

From: Theriot, Debby [mailto:Debby.Theriot@nalco.com]
Sent: Friday, April 22, 2016 4:01 PM
To: Principe, Vanessa <Principe.Vanessa@epa.gov>
Cc: Wilson, Gregory <Wilson.Gregory@epa.gov>; Conmy, Robyn <Conmy.Robyn@epa.gov>; Matthiessen, Craig <Matthiessen.Craig@epa.gov>; DeHaven, Leigh <DeHaven.Leigh@epa.gov>
Subject: RE: Availability of COREXIT Products for Testing

Hi Vanessa,

I have approval from legal to proceed without the need for NDA. They just ask that we "confirm that the formulation will not be disclosed". I will have the sample team pull these for you and prepare for shipment. Please advise the shipping address.

Samples of products are provide at no cost.

Thanks,

Debby Theriot

Nalco Environmental Solutions LLC

7705 Highway 90-A

Sugar Land, TX 77478

832.851.5164 cell

debby.theriot@nalco.com

www.nalcoesllc.com

From: Principe, Vanessa [mailto:Principe.Vanessa@epa.gov]
Sent: Thursday, April 21, 2016 3:50 PM
To: Theriot, Debby
Cc: Wilson, Gregory; Conmy, Robyn; Matthiessen, Craig; DeHaven, Leigh
Subject: RE: Availability of COREXIT Products for Testing

Debby:

Thank you for providing us with the NDA form.

It appears that your concern is for the protection of Confidential Business Information (CBI) specific to the formulation of your products. EPA safeguards CBI information under the requirements in 40 CFR Part 2, Subpart B. Specifically, for the products we are seeking, and which are already listed in the Product Schedule, current regulatory requirements address CBI under 40 CFR Part 300, Subpart J. These provisions should address your CBI concerns. EPA cannot enter into an NDA addressing CBI as it is bound by its regulations on such matters.

We are still interested in purchasing samples of these products for the purposes of both toxicity

and efficacy testing. Given that the product testing is intended to support both regulatory actions under Subpart J and our general research in the area of oil spill response, any toxicity and efficacy testing results would not be considered CBI.

Please advise on how to proceed with this purchase.

Again, thank you for your attention to this matter,

Vanessa

From: Theriot, Debby [mailto:Debby.Theriot@nalco.com]
Sent: Wednesday, April 20, 2016 1:09 PM
To: Principe, Vanessa <Principe.Vanessa@epa.gov>
Cc: Wilson, Gregory <Wilson.Gregory@epa.gov>; Conmy, Robyn <Conmy.Robyn@epa.gov>; Matthiessen, Craig <Matthiessen.Craig@epa.gov>; DeHaven, Leigh <DeHaven.Leigh@epa.gov>
Subject: RE: Availability of COREXIT Products for Testing

Hi Vanessa,

The standard format is attached. Details and scope are filled in by our paralegal once we receive from the requesting party.

debby

From: Principe, Vanessa [mailto:Principe.Vanessa@epa.gov]
Sent: Tuesday, April 19, 2016 1:33 PM
To: Theriot, Debby
Cc: Wilson, Gregory; Conmy, Robyn; Matthiessen, Craig; DeHaven, Leigh
Subject: RE: Availability of COREXIT Products for Testing

Ms. Theriot:

Thank you for getting back to me. My apologies, but my voice mail did not have any recorded messages from you.

Could you please send us a copy of your NDA for our Office of General Counsel to review?

Thank you for your attention to this matter,

Vanessa

From: Theriot, Debby [mailto:Debby.Theriot@nalco.com]
Sent: Tuesday, April 19, 2016 1:59 PM
To: Principe, Vanessa <Principe.Vanessa@epa.gov>
Cc: Wilson, Gregory <Wilson.Gregory@epa.gov>; Conmy, Robyn <Conmy.Robyn@epa.gov>; Matthiessen, Craig <Matthiessen.Craig@epa.gov>; DeHaven, Leigh <DeHaven.Leigh@epa.gov>
Subject: RE: Availability of COREXIT Products for Testing

Hi Vanessa,

I believe I left a voicemail in return last week. For the release of products for testing, we require testing details for each product to be disclosed and NDA to be executed. Are you able to assist in the process?

I will be able to release samples free of any cost to you once the NDA's are fully executed.

Debby Theriot

Nalco Environmental Solutions LLC

7705 Highway 90-A

Sugar Land, TX 77478

832.851.5164 cell

debby.theriot@nalco.com

www.nalcoesllc.com

From: Principe, Vanessa [mailto:Principe.Vanessa@epa.gov]
Sent: Monday, April 18, 2016 11:10 AM
To: Theriot, Debby
Cc: Wilson, Gregory; Conmy, Robyn; Matthiessen, Craig; DeHaven, Leigh
Subject: Availability of COREXIT Products for Testing

Ms. Theriot,

This follows up my voice mails of last week and today.

Per my message, EPA is seeking to acquire a number of dispersant products listed on the NCP Subpart J Product Schedule for the purposes of both toxicity and efficacy testing. The product testing is intended to further inform currently proposed regulatory actions under Subpart J of the National Contingency Plan. The products will in addition be used to support our general research in the area of oil spill response.

Three of your products [COREXIT EC9527A, EC9500A and EC9500B] have been identified as of interest, as they are commonly stockpiled in the U.S. Not only could these products be encountered when presented with a response situation, but including these dispersant products in toxicity and efficacy testing studies will also allow for comparison and consistency with other existing and ongoing studies by EPA and other federal agencies. EPA's Office of Research and Development (ORD) will be conducting the dispersant studies.

At this time we are seeking 2 U.S. gallons of each of the products.

You can contact either me or Greg Wilson at 202-564-7989. We appreciate your time and attention to this request and look forward to talking to you.

Respectfully,

Vanessa Principe

Vanessa Principe

202-564-7913

Chemical Engineer

Office Of Emergency Management

Office of Land and Emergency Management

U.S. EPA

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From: Matthiessen, Craig
Sent: Thur 8/13/2015 7:56:25 PM
Subject: FW: fyi on interesting paper on modeled dispersed oil tox
Vikebø et al. 2015.pdf

FYI

From: Barron, Mace
Sent: Thursday, August 13, 2015 2:31 PM
To: Wilson, Gregory; Principe, Vanessa; Matthiessen, Craig
Cc: Conmy, Robyn
Subject: fyi on interesting paper on modeled dispersed oil tox

Environmental Science & Technology

Article

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Dispersants Have Limited Effects on Exposure Rates of Oil Spills on Fish Eggs and Larvae in Shelf Seas

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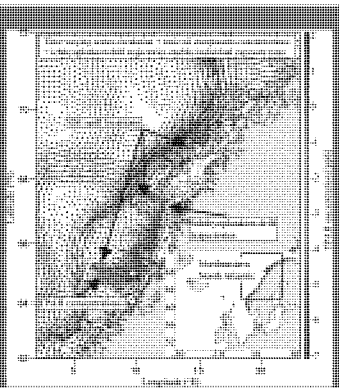
* Supporting Information

Early life stages of fish are particularly vulnerable to oil spills. Simulations of overlap of fish eggs and larvae with oil from different oil-spill scenarios, both without and with the dispersant Corexit 9500, enable quantitative comparisons of dispersants as a mitigation alternative. We have used model simulations of a blow out of 4500 m^3 of crude oil per day (Statfjord light crude) for 30 days at three locations along the Norwegian coast. Eggs were released from nine different known spawning grounds, in the period from March 1st until the end of April, and all spawning products were followed for 90 days from the spill start at April first independent of time for spawning. We have modeled overlap between spawning products and oil concentrations giving a total polycyclic hydrocarbon (TPAH) concentration of more than 10 or 0.1 ppb (µg/l). At these orders of magnitude, we expect acute mortality or sublethal effects, respectively. In general, adding dispersants results in higher concentrations of TPAHs in a reduced volume of water compared to not adding dispersants. Also, the TPAHs are displaced deeper in the water column. Model simulations of the spill scenarios showed that addition of chemical dispersant in general moderately decreased the fraction of eggs and larvae that were exposed above the selected threshold values.



INTRODUCTION

The development of petroleum resources in the marine environment comes with the risk of introducing substances toxic to the inhabitants of the near-field waters. This may be part of normal production[1] or accidental spills.[2,3] National authorities therefore impose requirements on the oil industry of assessing risks before allowing search, development, and production of petroleum resources in their respective economic zones. Whether the risks are acceptable is a political question that is debated on by considering both the risk assessment and corresponding recommendations by the responsible governmental agencies along with the potential profit. A risk assessment typically involves mapping marine resources and physical oceanic features to enable numerical estimates of exposure to oil by key marine species in various oil-spill scenarios (OSSs). Field observations enable biophysical models to be adapted to the area of interest and to marine resources that have been prescreened to be most vulnerable. For the Lofoten-Barents Sea, this has been identified to be early life stages (ELS) of fish and seabirds.[4,5]

If the authorities allow for petroleum extraction, accidental spill of oil may occur. This will result in oil being introduced to the sea at a certain rate, depth, and duration. The oil characteristics, the dynamics of the ocean and atmosphere immediately above, and the presence and composition of oil degrading bacteria determine spatiotemporal oil dispersal, degradation, emulsification, and evaporation. At this point, the responsible oil companies and governmental agencies need to address plans for combating the oil. Several options are at hand. The options for controlling the dispersal of oil are to burn or collect it (surface spill only), or to add chemical dispersants, with the aim of causing the least possible harm to the marine environment and its inhabitants. In this study, we will focus on the use of chemical dispersants.

Research and public debate on the use of dispersants have recently been fueled by the massive use after the Macondo blow-out in 2010. In total, 780 000 m^3 of oil was spilled during 86 days, and a total of 7000 m^3 of dispersants was used at the surface and at the oil release site at approximately 1500 m in depth.[6] Until now, history has shown that use of dispersants may cut both ways. It is suggested that the use of 10 000 tonnes of dispersants in connection with the Torrey Canyon shipwreck had larger environmental impacts than the 119 000 tonnes of oil itself[7] due to the toxicity of the dispersants used at that time. Contrary, it was estimated that the 446 tonnes of dispersants used during the 72 000 tonnes release of oil after the Sea Empress shipwreck in 1996 prohibited between 57 000 - 110 000 tonnes of oil emulsion to reach shore and thereby reduced the environmental impacts.[8] It is believed that the use of dispersants during the Macondo blow-out reduced the amount of oil reaching the shore by trapping it at great depths and increasing the biological degradation of the oil. However, the fate and the impacts of the oil spill still remain uncertain.[9,10]

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In short, the introduction of dispersants shifts the oil droplet spectra toward smaller droplet sizes. Oil droplet sizes and densities, together with the ambient density of the seawater and the level of vertical mixing, determine the vertical displacement of the individual droplets. Smaller droplet sizes due to the introduction of dispersants result in less buoyancy and parts of the spilled oil descending. At the same time, the reduction in droplet sizes enhances the solvability of the oil and, hence, speeds up the transition from oil droplets to the water accommodated fraction (WAF). In turn, this will increase the availability of oil to microbial biodegradation favored by smaller droplets with a higher surface to volume ratio and dissolved oil.[11-13] There are studies that have shown that dispersants may inhibit bacterial degradation of oil,[14] but this has been questioned and attributed to the unrealistic high doses used in the experiments.[15] It has been shown that bacteria can degrade oil at high rates even at low temperatures, although the population growth of the bacteria at these temperatures is low.[12,16-18]

Prior studies have shown that fish ELS are particularly sensitive to total polycyclic aromatic hydrocarbon (TPAH) concentrations, and exposure to low concentrations of TPAHs (1-20 µg/l) is associated with irreversible heart failure, which leads to a number of secondary effects from loss of circulation, like spinal and jaw deformities, that again results in reduced swimming and feeding, and ultimately death during larvae stages (e.g., see refs 19-24). Hence, adding dispersants speeds up the transition from large droplets to smaller droplets, and TPAHs in the WAF before the concentration of toxic components are reduced to below threshold levels for effects due to dilution. While many studies indicate elevated toxicity as a result of introducing dispersants,[25-29] they all attributed this to enhanced concentrations of TPAHs due to the promotion of smaller droplets and hence increasing fraction of oil in WAF. At open sea, biodegradation and dilution rapidly decrease concentrations of toxic components, and the overall effect of introducing dispersants is therefore not obvious. However, there are also studies indicating that chemically dispersed oil appears to be less toxic than mechanically dispersed oil as shown by gene transcription.[30] While dispersants are toxic themselves, their effective doze are higher than what can be expected in the water column during realistic operations.[15] It is therefore not to be expected that oil and dispersants have synergistic effects besides the enhanced amount of small droplets and WAF.[29]

Less attention has been paid at the potential benefits of actively using dispersants to guide oil plumes away from particularly vulnerable species. The use of dispersants, as opposed to not using them, implies oil distributed deeper in the water column. This may in turn affect the dispersal of oil if horizontal currents vary with depth,[31] equivalent to the dispersal of plankton.[32] Numerical predictions supported by measurements of oil dispersal and fate and distribution of relevant marine resources enable such considerations.[31]

We hypothesize that the introduction of dispersants increases the near-field concentrations of toxic components of the oil (here represented by the TPAHs) due to generation of lesser oil droplets and consequently more oil in WAF, but at the same time decreases the volume of water contaminated with toxic levels above effect concentrations reported for fish ELS due to biodegradation and dilution. As a consequence, we expect that introducing dispersants does not increase the amount of fish ELS experiencing levels of oil above effect concentrations. To study this, we simulate the dispersal and fate of oil from three sites at the continental shelf along the Norwegian coast and the corresponding exposure of Northeast Arctic (NEA) cod ELS with and without applying dispersants (Figure 1). We quantify

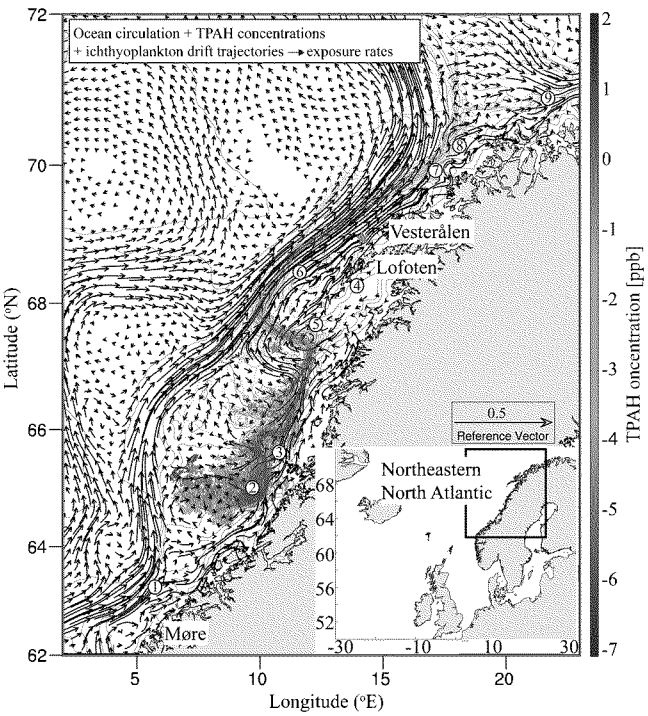

Figure 1. Monthly mean circulation at 20 m depth for April 1997. Blue stars indicate the three oil spill locations investigated here. Oil spilled from the southernmost location results in concentrations (maximum concentration in the water column) of TPAHs according to the colorbar (log 10 ppb). The nine different known SGs considered here are indicated with numbers enclosed by circles. Red lines indicate random examples of egg/larvae drift trajectories originating from SG 2.

the fraction of individuals that are exposed to concentrations of TPAHs of more than 1.0 or 0.1 ppb (µg/l). At these orders of magnitude, we expect acute mortality or sublethal effects, respectively, as described in ref 3. By doing so, we may quantify the (1) effects of using dispersants on the fraction of spawning products exposed to above-threshold levels of TPAHs and (2) how this varies with spill site and distance to the spawning ground (SG). In turn, this allows us to discuss the potential for (3) utilizing dispersants for guiding an oil plume spatially to minimize environmental impact here exemplified by the overlap of fish ELS and toxic components of the oil.

MATERIALS AND METHODS

To quantify the effect of adding dispersants to potential oil slicks on spatiotemporal oil distribution and overlap with fish ELS, we build on the study by Vikebø et al.[31] by adding dispersants sufficient to fully treat all oil released in spill scenarios 1-3. By comparing with scenarios where no dispersants are added, we may contrast the effects on NEA cod ELS. In short, we released 4500 m^3 d^{-1} of oil (Statfjord light crude) at three locations along the coast (65.00° N N7.00° E; 67.00° N N10.33° E; 68.67° N N13.92° E) at the surface April 1, 1997 with duration of 30 days. The overlap (%) of TPAHs with NEA cod ELS from nine spatially separated SGs, distributed from Møre to the Finmark coast (Figure 1), were

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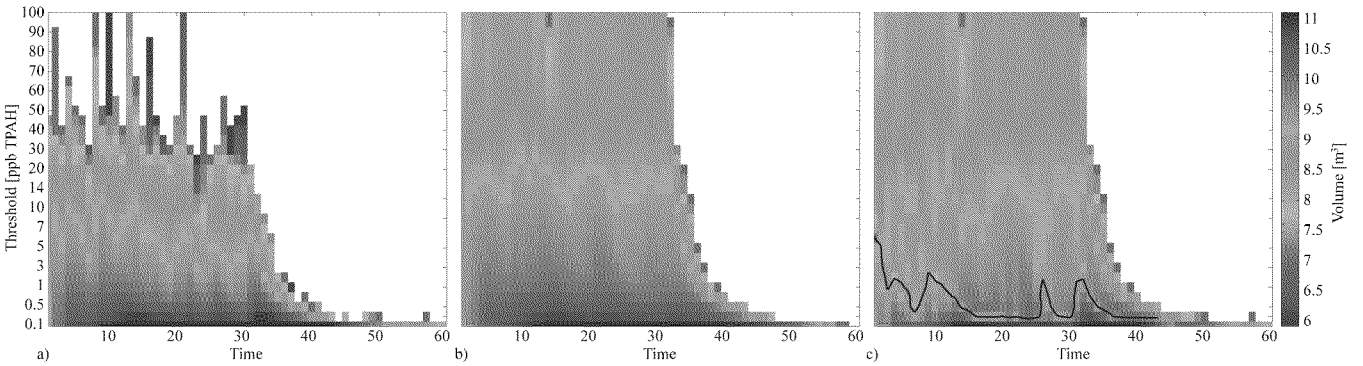

Figure 2. Volume (log 10, m^3) of water with concentrations of TPAHs above threshold values ranging from 0.1 - 100 ppb as a function of time without (a) and with (b) dispersants. The absolute difference between the two is shown in panel c. The solid thick line indicates where they are equal. Below this line, concentrations without dispersants are highest and opposite above this line. The colorbar range 6 - 11 is equivalent to volumes of 1 km^3 of 1 m depth to 100 km^3 of 10 m depth.

quantified for TPAH concentrations at two different vertical levels, either the maximum TPAHs in the water column or the TPAH concentrations at the depth of the diurnally migrating larvae. This is because empiri tells us that NEA cod ELS do migrate vertically according to day or night but that this behavior is uncertain due to scarse data and varying ambient environmental conditions. Hence, it is therefore also relevant to consider the maximum TPAH concentration in the water column at the same lon, lat position and compare this to the concentration if also considering the actual depth of the individual.

Ocean Model ROMS. The ocean model used is the Regional Ocean Model System (ROMS; http://www.myroms.org/). It provides daily mean three-dimensional physics to the oil drift and fate model OSCAR and the individual-based NEA cod egg and larval model. The simulation period (1989 - 2008), area (Nordic Seas and the Barents Sea), spatial resolution (4 × 4 km^2 and 30 vertical sigma layers), boundary forcing, and model performance are described in refs 33 and 34 indicating that coastal shelf and shelf slope dynamics are well reproduced.

Oil Drift and Fate Model OSCAR. The oil drift and fate model OSCAR[35-37] is a pseudolagrangian three-dimensional model where particles resemble oil components and predicts spatiotemporal dispersal along with buoyancy effects on vertical displacements, hydrocarbon dissolution, and hydrate formation.[31] The OSCAR model represents oil by 25 pseudocomponents and is here set up to only report on the TPAH concentrations. The pseudocomponents included in the OSCAR model are given in ref 38. Of these, the TPAHs comprise two different pseudocomponents for Naphtalenes and two different pseudocomponents for TPAHs.

OSCAR features the possibility of modeling response actions by introducing dispersants at various rates and locations. This includes surface application of dispersants from either seaborne or airborne vessels. These response vessels account for storage capacity of dispersants, efficiency of application methods, equipment, and weather conditions.[39] A primary function of dispersant agents is to reduce the oil - water interfacial tension and thereby promote breakup of oil into smaller droplets due to turbulence and breaking waves in the surface layer of the sea.[40]

To compare results with and without the use of dispersants, we choose to avoid the complexity of modeling response vessels. Instead, the oil spill model assumes that application methods, efficiency, weather conditions, and amount of dispersant available is sufficient to fully treat the entire release of oil. This treatment is performed immediately after release to the sea, causing the oil to be fully mixed into the water column as droplets and dissolved constituents. Weathering effects on surface slicks, such as emulsification and evaporation, therefore no longer occur. Furthermore, it is assumed that the reduction in oil - water interfacial tension and the turbulence in the surface layer are sufficient to break the oil into droplets with a diameter of order 10 μm. These assumptions result in an oil-in-water dispersion of near-neutrally buoyant droplets and neutrally buoyant dissolved constituents. The oil remains submerged in the upper water column, where the primary contributors to transport are advection by ocean currents and turbulent diffusion.

ELS Individual-Based Model for NEA Cod. The ELS biophysical model is a particle-tracking model, with build-in modules for individual physiological and behavioral responses in eggs and larvae to ambient forcing. Particles, representing either eggs or larvae, move according to a daily mean modeled circulation archive established with the ROMS model application as described above. Each particle keeps track of the daily temperature exposure allowing for temperature-dependent growth according to ref 41. The egg stage duration is set to 21 days. During this period, the particles are displaced vertically with a binned random walk[42] according to their buoyancy[43] and mixing as reported by the turbulence scheme in the ocean model. After hatching of the eggs, the larvae start migrating vertically depending on the light availability and their individual size. Clearly, there are many factors that might affect larvae behavior,[32,44,45] but our knowledge of this, and field samples of the individual larval state and environmental conditions, is limited. Hence, we have incorporated a diurnal migration dependent on the individual larval swimming capability (here a function of larval length) and the light availability. The larvae are set to ascend during night toward an upper limit of 5 m and descend during day toward a lower limit of 40 m.[46,47,44]

At each of the nine different SGs,[48,49] we introduce 10 500 particles released every third day across 60 days from early March until late April. Each particle is transported according to the currents at the time and location of the respective spatiotemporal varying positions. By coupling the model output of the ELS individual-based model and the oil drift and fate model OSCAR, we keep track of the time-varying TPAH concentrations along the individual egg and larval drift trajectories. To assess overall effect of the various OSSs, we

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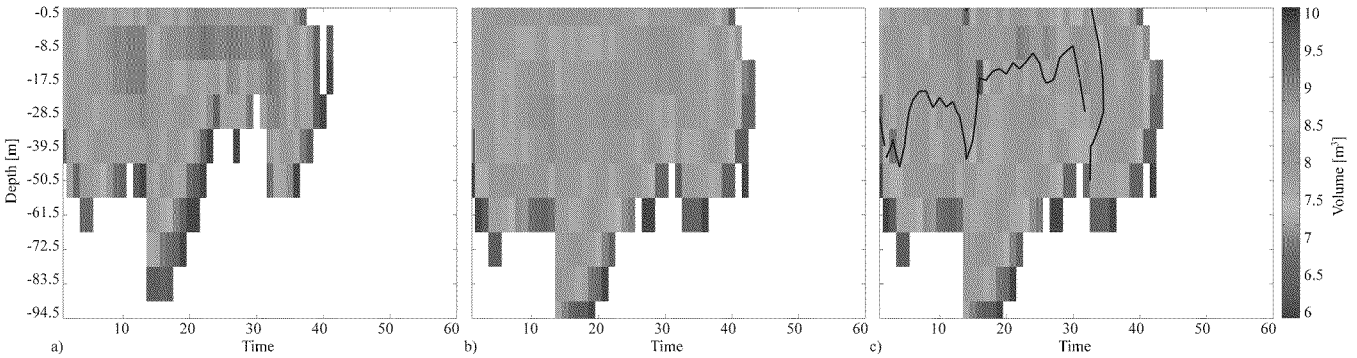

Figure 3. Volume (log 10, m^3) of water per vertical meter with concentrations of TPAHs above 1 ppb in the cases without (a) and with (b) dispersants. The absolute difference between the two is shown in panel c. The solid thick line indicates where they are equal. Above this line, concentrations without dispersants are highest and opposite below this line.

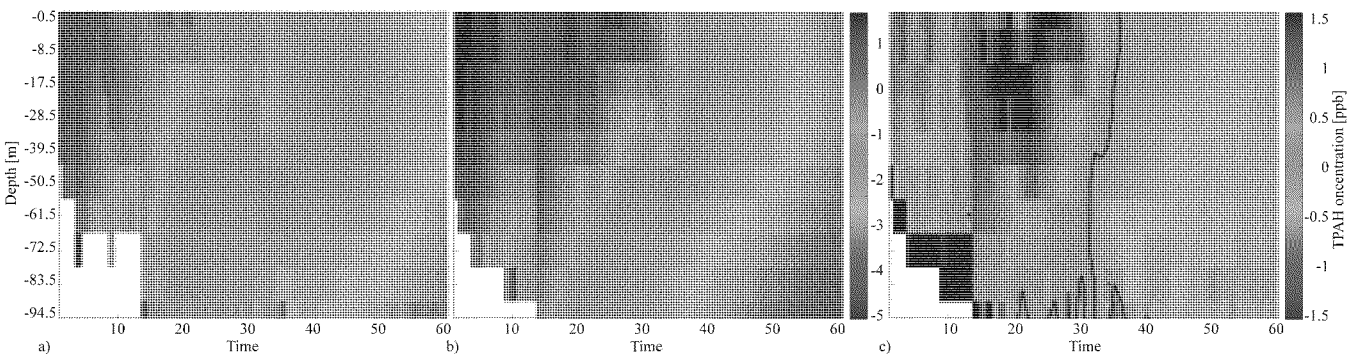

Figure 4. Mean horizontal concentrations of water masses with TPAH concentrations above 1 ppb per depth interval without (a) and with (b) dispersants. The absolute difference between the two is shown in panel c. The solid thick line indicates where they are equal. To the right of this line, concentrations without dispersants are highest and opposite to the left of this line.

scale the different SGs according to recent years of temporal and spatial spawning intensities.[49] The SGs 1-9 contribute with approximately 5, 5, 5, 20, 10, 20, 15, 10, and 10% of the eggs, respectively. Considering each particle as a super-individual representing multiple eggs and larvae enables us to scale the particle release according to our empirical knowledge of spatial and temporal spawning intensities.

RESULTS

General Features of TPAH Dispersal. The OSCAR model simulates the concentrations of dissolved TPAHs in the water column as a function of time after the oil spill starts, without and with dispersants (Corexit 9500). Figure 2 shows the total volume of water (log 10, m^3) with concentrations above various threshold levels of TPAHs from 0.1, 0.5, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 12, 14, 16, 18, and 20 to 100 ppb with increment 5 ppb, as a function of time after the oil spill starts, without (a) and with (b) dispersants (Corexit 9500) as a result of OSS 1. As expected, the water volume with minimum values of TPAHs above the lowest threshold level (0.1 ppb, on the order of 3×10^{11} m^3) is several hundred thousand times greater than for the high threshold levels (100 ppb, on the order of 3×10^6 m^3). The corresponding difference in volume estimates (c) is also shown (b minus a), along with a solid black line showing where they are equal. Clearly, for low threshold levels, below about 8 ppb TPAHs and less depending on time, the total volume of water above the respective threshold levels of TPAHs is higher in the case without the use of dispersants (Figure 2c). If the considered threshold level is above the black line, it is consistently oppositely higher with use of dispersants. It is similar for the OSS 2 (Figure S1a-c, Supporting Information), while scenario 3 results in a volume estimate being the highest when adding dispersants for most thresholds and times (Figure S4a-c). It is evident that introducing dispersants results in concentrations above thresholds also for elevated threshold levels (Figure 2b), while this is not the case when dispersants are not used (Figure 2a). This is similar for all OSSs.

Figure 3 shows the total volume (log 10, m^3) of water with concentrations above 1 ppb TPAHs as a function of depth, without (a) and with (b) dispersants. Again, the corresponding difference is shown in the right panel (c). From above, we have learned that at 1 ppb TPAHs, the total volume of water is higher in the case without dispersants. Here, we can see that this is true in the upper part of the water column, down to about 10-40 m depending on the number of days after the spill starts (Figure 3c). Below this depth, the volume of water is higher in the case with dispersants. This is also a dominating feature for OSS2 (Figure S2a-c) but opposite for OSS3 (Figure S5a-c).

Figure 4 shows the mean horizontal concentration for each depth level including only grid cells above 1 ppb TPAH without (a) and with (b) dispersants. The right-hand panel (c) shows the difference in mean concentration estimates. Here, we can see that though the total volume of water masses with concentrations of TPAHs above 1 ppb is higher in the upper water column without dispersants (Figure 3), the mean concentrations are always higher when dispersants are added as long as the spill endures (Figure 4c; day 1-30). However, after the spill has ended, the mean concentrations throughout

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the water column are higher in the case without dispersants. This is similar for OSS2, but not entirely so for OSS3 (Figures S3a - c and S6a - c).

Hence, in general, the introduction of dispersants results in less water being contaminated with TPAHs, but the contaminated water has higher concentrations of TPAHs. Also, the TPAHs are displaced deeper in the water column.

Eggs and Larvae Exposed to TPAHs. Given the fact that processes controlling vertical distribution of NEA cod larvae are only partly known, and here represented numerically according to our current level of knowledge, we summarize the overlap estimates of TPAHs and ichthyoplankton with and without the use of dispersants for two different values of TPAH concentrations in the water column: the maximum and the depth specific values at the time-varying geographical position of each individual. The exposure values then represent the maximum and the best approximation given our current knowledge of larval behavior. In the following, we present the fraction of individuals from the different SGs exposed to above 1.0 or 0.1 ppb PAH at least once during the 60 day drift period. Also, we have indicated which combinations of OSSs and SGs result in exposures more than 1 standard deviation (s.d.) above the mean of all combinations. Furthermore, we add information on recent years observed spawning distribution and spawning intensity and report on the overall effect of the various OSSs on the eggs and larvae, and quantify how the use of dispersants modifies the results. Finally, we quantify the size of the fractions being exposed to various durations above the threshold levels.

Fraction Exposed to >1.0 ppb TPAHs. Figure 5, panel a shows the fraction exposed to >1.0 ppb TPAHs when accounting for maximum concentrations of oil in the water column. If not introducing dispersants, the results show that a southern oil spill (OSS1) mostly affects eggs and larvae from the southern SGs,[1-3] while northern oil spills (OSS3 and partly OSS2) affect eggs and larvae from almost all SGs. The combinations of oil spills and SGs that result in >1 s.d. (corresponds to about 7% of the individuals) are SG1 - 3 for OSS2 and SG5 for OSS3. When introducing dispersants, the fractions of exposed individuals in the case of OSS1 and OSS2 are reduced, while they are either elevated or reduced depending on SGs in the north (OSS3). The same combinations of OSSs and SGs surpass 1 s.d. above the mean when introducing dispersants (except SG2 during OSS2).

Figure 5, panel b shows the fraction exposed to >1.0 ppb TPAHs when accounting for the egg and larval depth-specific concentrations of oil in the water column along the individual trajectories. The general features of the results, both with and without the use of dispersants, are similar to the case when accounting for maximum concentrationTs of PAHs in the water column, but the overall level of exposure is reduced. The level of 1 s.d. above mean is reduced from about 7% to about 5%.

Fraction Exposed to >0.1 ppb TPAHs. Figure 6, panel a shows the fraction exposed to >0.1 ppb PAH when accounting for maximum concentrations of oil in the water column, with and without the use of dispersants. In the case without dispersants, the results reveal that the combination of OSS1 and SG2 results in the highest fraction of exposure amounting to about 58%. Apart from that, the results are similar to the features of the two previous figures, but with much higher exposure levels. Here, 1 s.d. above the mean is about 21%. Introducing dispersants decreases the exposure levels in the south (OSS1 - 2), while it kept them almost fixed in the north. When accounting for the exposure levels at the depth of the individual egg or larvae (Figure 6b), the features of the results are similar, but the exposure levels generally decrease as indicated by the value of 1 s.d. above mean now reduced from about 21 to 17%.

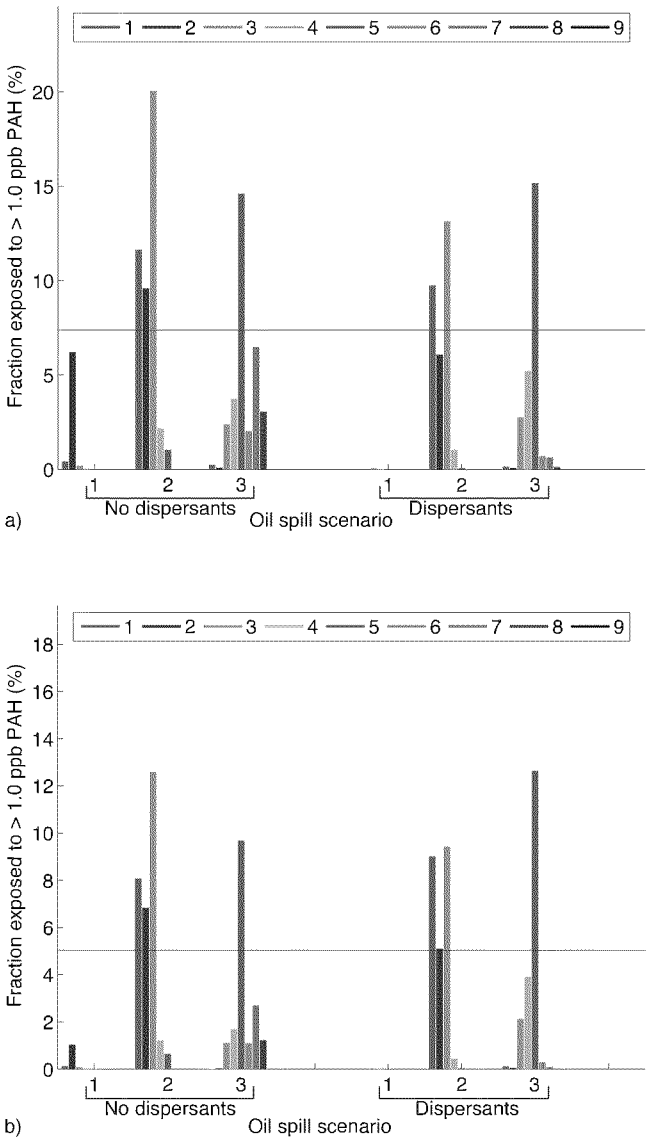

Figure 5. Percentage overlap of the spawning products with TPAH concentrations above 1.0 ppb at least once during the first 60 days after the beginning of the oil spill in OSSs 1 - 3, with and without the use of dispersant, based on the maximum TPAH concentrations in the water column (a) or the individual depth of the offspring (b). The horizontal line denotes one standard deviation above the mean.

Overall Results When Accounting for Realistic Spawning Distribution and Intensity. Figure 7 shows the fraction of eggs and larvae that are exposed to concentrations above the threshold levels (1.0 or 0.1 ppb) of TPAHs for the different OSSs, with and without the use of dispersants, when accounting for the seasonal and spatial spawning intensity. In general, there is a reduction in the fraction of exposed individuals for OSSs, mostly in the south and moderate farther north, when introducing dispersants. This is the case independent of threshold level 1.0 or 0.1 ppb TPAHs or whether the concentration represents the maximum concentration in the water column or the concentration at the depth of the individuals. Note that sublethal effects affect several times

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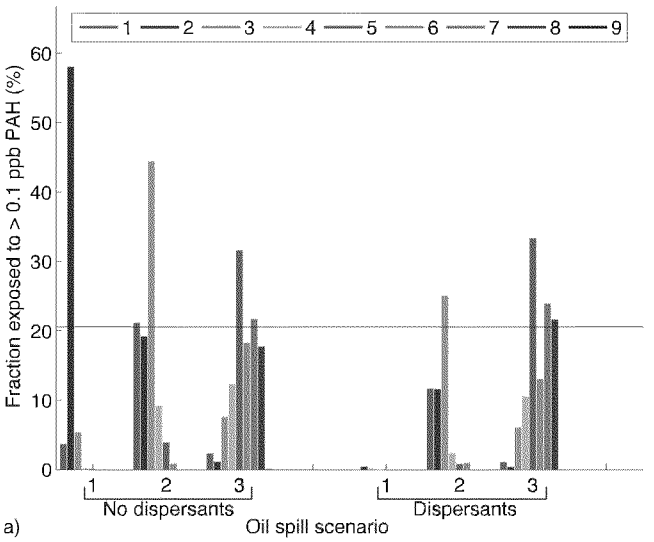

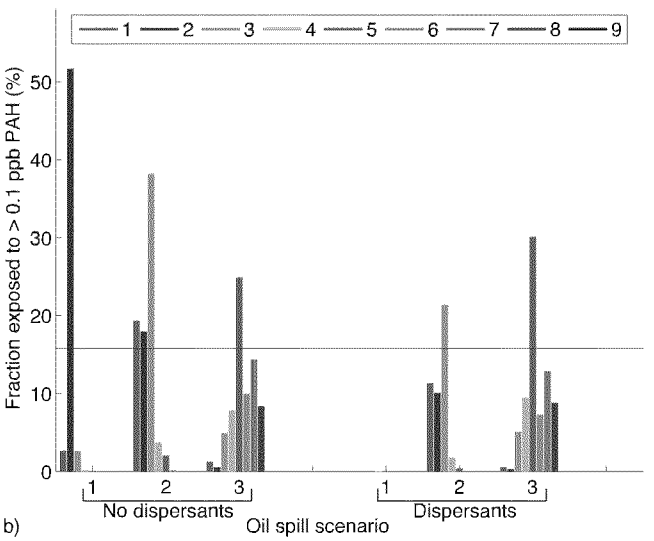

Figure 6. Percentage overlap of the spawning products with TPAH concentrations above 0.1 ppb at least once during the first 60 days after the beginning of the oil spill in OSSs 1-3, with and without the use of dispersant, based on the maximum TPAH concentrations in the water column (a) or the individual depth of the offspring (b). The horizontal line denotes one standard deviation above the mean.

more individuals than those experiencing acute effects, independent of whether one consider TPAH concentrations at the individual depths of eggs or larvae or the maximum in the water column.

Durations of Exposure above Thresholds. Figure 8 shows the fraction of individuals that are exposed to above 1.0 or 0.1 ppb TPAHs for the three different OSSs independent of SGs, without (Figure 8a) and with (Figure 8b) the use of dispersants for different durations. In the case of 1.0 pbb TPAHs, few individuals are exposed to above threshold levels of TPAHs for more than 5 days. At the same time, dependent on the OSS, up to about 50% of the individuals are exposed more than 1 day. In the case of sublethal effects, accounting for the fraction exposed to >0.1 ppb TPAHs, the ratio of individuals exposed to above threshold levels more than a day compared to only a single day increases substantially. In fact, this is now more frequent than only being exposed a single

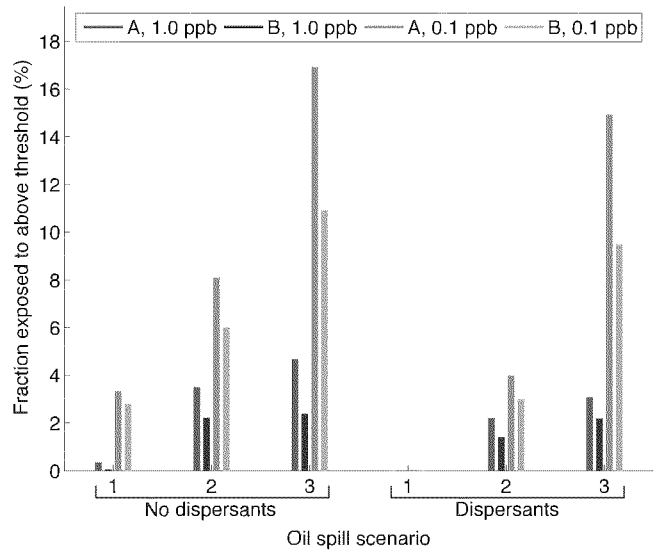

Figure 7. Percentage overlap of offspring with TPAH concentrations above 1.0 or 0.1 ppb at least once during the first 60 days after the beginning of the oil spill in OSSs 1-3, with and without the use of dispersant, based on either the maximum TPAH concentrations in the water column (A) or the TPAH concentrations at the individual depths of the offspring (B) when the seasonal and spatial spawning intensity are incorporated in the analysis.

day. Fewer individuals are affected by above threshold levels of ppb TPAHs when introducing dispersants. However, there is a tendency toward longer durations of exposure.

DISCUSSION

Adding dispersant (Corexit 9500) in case of an oil spill reduces the surface tension of the oil droplets and results in a shift of the oil droplet size spectra toward smaller droplets sizes. In turn, this facilitates both a shift toward more dissolved oil and a displacement away from the surface and into the water column. This also occurs naturally by turbulent mixing caused by, for example, wave breaking and vertical current shear due to wind stress, but adding dispersant chemicals further fuels the process. There are several laboratory studies addressing potential toxic effects of adding dispersant (e.g., 50) and tank studies to quantify changes in the droplet size spectra and concentrations of different oil components in the droplet or WAF. However, to integrate large-scale effects of major oil spills and address how the use of dispersants may contribute to minimize ecosystem effects, one must combine observations and models. Here, we utilize the oil spill and fate model OSCAR, which is parametrized based on observations from both laboratory and field measurements, in combination with an individual-based model for early life stages of NEA cod eggs and larvae to reveal the effects of adding dispersants to a major oil spill.

Adding unlimited dispersant to the oil immediately following the release so that all the oil is fully treated, disregarding the limitations of ship or aeroplane capacities to provide sufficient supplies, results in higher concentrations of TPAHs but in a reduced volume of water compared to a situation where no dispersants are added. Also, adding dispersants causes the TPAHs to be displaced farther down in the water column, and the duration of elevated concentrations of TPAHs after the spill has ended is shortened. However, this is valid for threshold levels of effects around 1.0 ppb TPAHs. If considering threshold levels of toxicity on the order of 10 ppb TPAHs or

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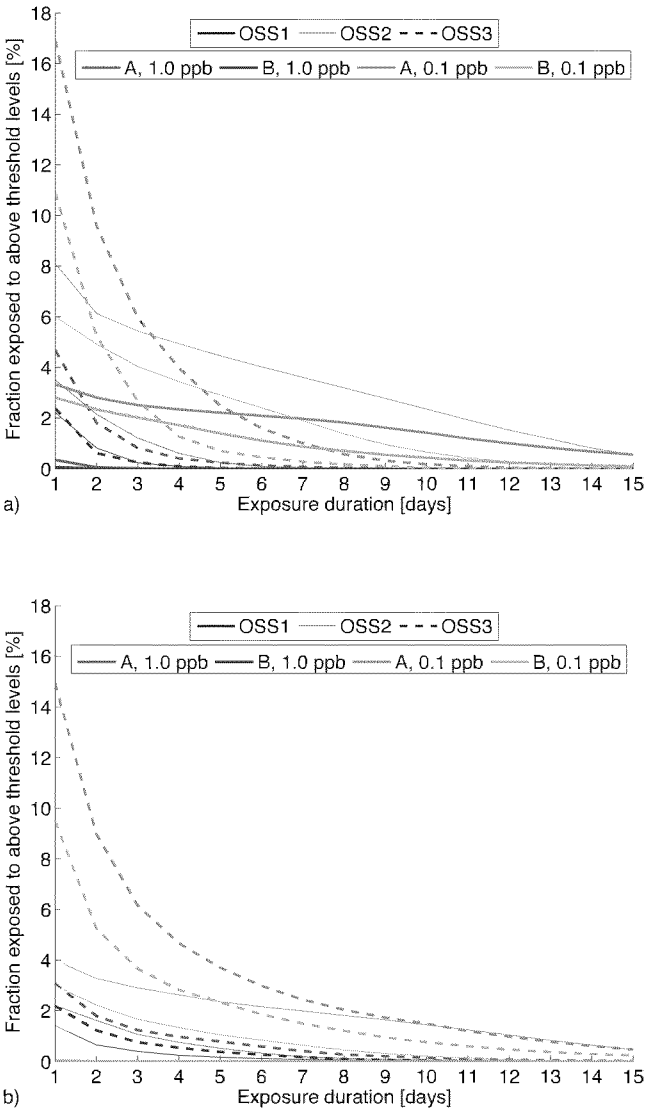

Figure 8. Fraction of individuals exposed to above 1.0 or 0.1 ppb TPAHs for an increasing numbers of days, without (a) or with (b) the use of dispersant, based on either the maximum TPAH concentrations in the water column (A) or the TPAH concentrations at the individual depths of the offspring (B) when the seasonal and spatial spawning intensity are incorporated in the analysis.

higher, the results indicate that the volume of water with above threshold levels of TPAHs is higher when adding dispersants. Hence, establishing accurate no effect concentrations for the marine organism considered is critical to enable assessment of the effects of adding dispersants.

Furthermore, the results show that the location of the oil spill significantly affects the fraction of eggs and larvae that experience above threshold levels of TPAHs. A southern oil spill affects eggs and larvae from nearby SGs, while the northern spills tend to affect offspring from the entire coast, though to a varying degree. This is mainly because the shelf becomes narrower farther north thus limiting the dispersal distance from the coast. At the same time, all individuals that drift toward the nursery grounds of the Barents Sea have to pass close to the spill site. Introducing dispersants to decrease droplet sizes and submerging the oil moderately reduces the fraction of eggs and larvae that are affected by above threshold values of TPAHs. Accounting for maximum concentrations in the water column results in moderately elevated fractions of individuals experiencing above threshold levels of toxins as compared to the modeled depth of the eggs and larvae. However, addressing overlap with concentrations here defined to represent acute or sublethal effects (1.0 or 0.1 ppb TPAHs) makes a significant difference, as sublethal effects affect several times more individuals than those experiencing acute effects. In sum, this emphasizes the importance of continued research on larval behavior and sublethal effects for evaluating the fraction of individuals affected by an oil spill and whether it is recommendable to add dispersant. Also, it is evident from the results presented here that the design of OSSs for oil spill impact assessment is critical.

The duration of exposure heavily depends on the location of the spill. The OSS farthest north results in the shortest exposure, while opposite for the OSS in the south. This is true independent of whether or not dispersants are added. The duration of the exposure may significantly affect the degree of response in the marine organism dependent on the species and stage-dependent net uptake rates.

Toxicity testing in laboratories has focused on acute effects and partly neglected sublethal effects. The reason is obvious. Sublethal effects require long-term monitoring, ideally across generations, while detecting acute effects can be carried out in experiments of much shorter duration and less complexity. This has led to a bias in our knowledge of long-term effects of oil spills. The results here show that a much higher fraction of eggs and larvae experience above threshold levels of TPAHs corresponding to sublethal effects than acute effects. Also, the durations of exposure to such levels of TPAHs are generally longer. While moving toward a consensus in literature on levels and durations resulting in acute effects, the case of sublethal effects is more open. Sublethal effects in many individuals may over time have stronger impact on a population level than acute lethal effects in fewer individuals. This can be the case especially if the sublethal effects lead to developmental disorders in the fish larvae.[20-23] Anyhow, the results presented here indicate that the use of dispersants does not significantly change the fractions of eggs or larvae exposed to either of the two threshold levels.

The situation is more obvious for other marine species. Seabirds breed in colonies along the coast and migrate to feed in an area surrounding the colony.[51] While some seabird species only explore the surface waters, others dive to great depths. Despite their preference for feeding depth, they have to penetrate the surface slick either to feed pelagically or swim down through the water column to reach the preferred prey. If dispersants are added, fewer toxic components of oil will stay at the surface, and more will be submerged as smaller droplets and dissolved. Hence, the use of dispersants may favor seabird survival in case of an accident. On the other hand, the benthic environment may experience more toxic components of oil if dispersants are used. The massive use of dispersants following the Macondo blow-out resulted in deep-ocean intrusion layers of oil that is shown to be the source of elevated levels of hydrocarbons at the seabed.[10] This could be particularly harmful to stationary sponges and corals that filter large amounts of seawater for nutritional uptake while not being able to move out of contaminated areas.[52,53]

Clearly, considering the use of dispersants to minimize ecosystem impacts depends on our understanding of the ecosystem functioning of the area in question. In addition to direct effects, there are secondary effects that complicate such

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considerations, for example, the importance of sponges and corals as spawning locations for fish or the contamination of zooplankton that is fed upon by larval fish. Also, while dispersants may guide part of the oil away from the upper parts of the water column occupied by ELS of fish, it may still affect fish through impacts on SGs in the case when they are located at the seabed (e.g., Norwegian Spring Spawning herring, ref 33).

ASSOCIATED CONTENT

* Supporting Information

For oil spill scenarios 2 and 3: volume (log 10, m^3) of water with concentrations of TPAHs above threshold values ranging from 0.1 - 100 ppb as a function of time without and with dispersants; volume (log 10, m^3) of water per vertical meter with concentrations of TPAHs above 1 ppb in the cases without and with dispersants; and mean horizontal concentrations of water masses with TPAH concentrations above 1 ppb per depth interval without and with dispersants. This material is available free of charge via the Internet at http://pubs.acs.org.

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Notes

The authors declare no competing financial interest.

ACKNOWLEDGMENTS

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REFERENCES

(1) Blanchard, A.; Hauge, K. H.; Andersen, G.; Fosså, J. H.; Grøsvik, B. E.; Handegard, N. O.; Kaiser, M.; Meier, S.; Olsen, E.; Vikebø, F. Harmful routines? Uncertainty in science and conflicting views on routine petroleum operations in Norway. Mar. Policy 2013, 43, 313 - 320 DOI: 10.1016/j.marpol.2013.07.001.

(2) Hauge, K. H.; Blanchard, A.; Andersen, G.; Boland, R.; Grøsvik, B. E.; Howell, D.; Meier, S.; Olsen, E.; Vikebø, F. Inadequate risk assessments • A study on worst-case scenarios related to petroleum exploitation in the Lofoten area. Mar. Policy 2013, 44, 82 - 89 DOI: 10.1016/j.marpol.2013.07.008.

(3) Vikebø, F. B.; Rønningen, P.; Lien, V. S.; Meier, S.; Reed, M.; Ådlandsvik, B.; Kristiansen, T. Spatio-temporal overlap of oil spills and early life stages of fish. ICES J. Mar. Sci. 2014, 71 (4), 970 - 981 DOI: 10.1093/icesjms/fst131.

(4) Hjermann, D. Ø.; Melsom, A.; Dingsør, G. E.; Durant, J. M.; Eikeset, A. M.; Røed, L. P.; Ottersen, G.; Storvik, G.; Stenseth, N. C. Fish and oil in the Lofoten - Barents Sea system: Synoptic review of the effect of oil spills on fish populations. MEPS 2007, 339, 283 - 299 DOI: 10.3354/meps339283.

(5) Olsen, E.; Aanes, S.; Mehl, S.; Holst, J. C.; Aglen, A.; Gjosaeter, H. Cod, haddock, saithe, herring, and capelin in the Barents Sea and adjacent waters: A review of the biological value of the area. ICES J. Mar. Sci. 2010, 67 (1), 87 - 101.

(6) Allan, S. E.; Smith, B. W.; Anderson, K. A. Impact of the Deepwater Horizon oil spill on bioavailable polycyclic aromatic hydrocarbons in the Gulf of Mexico coastal waters. Environ. Sci. Technol. 2012, 46, 2033 - 2039 DOI: 10.1021/es202942q.

(7) Southward, A. J.; Southward, E. C. Recolonization of rocky shores in cornwall after use of toxic dispersants to clean up Torrey-Canyon spill. J. Fish. Res. Board Can. 1978, 35, 682 - 706.

(8) Law, R. J.; Kelly, C. The impact of the "Sea Empress" oil spill. Aquat. Living Resour. 2004, 17 (3), 389 - 394 DOI: 10.1051/alr:2004029.

(9) Paris, C. B.; Hénaff, M. L.; Aman, Z. M.; Subramaniam, A.; Helgers, J.; Wang, D.-P.; Kourafalou, V. H.; Srinivasan, A. Evolution of the Macondo well blowout: Simulating the effects of the circulation and synthetic dispersants on the subsea oil transport. Environ. Sci. Technol. 2012, 46 (24), 13293 - 13302 DOI: 10.1021/es303197h.

(10) Valentine, D. L.; Fisher, G. B.; Bagby, S. C.; Nelson, R. K.; Reddy, C. M.; Sylva, S. P.; Woo, M. A. Fallout plume of submerged oil from Deepwater Horizon. Proc. Natl. Acad. Sci. U. S. A. 2014, 111 (45), 15906 - 15911 DOI: 10.1073/pnas.1414873111.

(11) Prince, R. C.; McFarlin, K. M.; Butler, J. D.; Febbo, E. J.; Wang, F. C. Y.; Nedwed, T. J. The primary biodegradation of dispersed crude oil in the sea. Chemosphere 2013, 90 (2), 521 - 526 DOI: 10.1016/j.chemosphere.2012.08.020.

(12) Campo, P.; Venosa, A. D.; Suidan, M. T. Biodegradability of Corexit 9500 and dispersed South Louisiana crude oil at 5 and 25 °C. Environ. Sci. Technol. 2013, 47 (4), 1960 - 1967 DOI: 10.1021/es303881h.

(13) Radniecki, T. S.; Schneider, M. C.; Semprini, L. The influence of Corexit 9500A and weathering on Alaska North Slope crude oil toxicity to the ammonia oxidizing bacterium, Nitrosomonas europaea. Mar. Pollut. Bull. 2013, 68 (1 - 2), 64 - 70 DOI: 10.1016/j.marpolbul.2012.12.022.

(14) Hamdan, L. J.; Fulmer, P. A. Effects of COREXIT (R) EC9500A on bacteria from a beach oiled by the Deepwater Horizon spill. Aquat. Microb. Ecol. 2011, 63 (2), 101 - 109 DOI: 10.3354/ame01482.

(15) Lee, K.; Nedwed, T.; Prince, R. C.; Palandro, D. Lab tests on the biodegradation of chemically dispersed oil should consider the rapid dilution that occurs at sea. Mar. Pollut. Bull. 2013, 73 (1), 314 - 318 DOI: 10.1016/j.marpolbul.2013.06.005.

(16) Baelum, J.; Borglin, S.; Chakraborty, R.; Fortney, J. L.; Lamendella, R.; Mason, O. U.; Auer, M.; Zemla, M.; Bill, M.; Conrad, M. E.; Malfatti, S. A.; Tringe, S. G.; Holman, H. Y.; Hazen, T. C.; Jansson, J. K. Deep-sea bacteria enriched by oil and dispersant from the Deepwater Horizon spill. Environ. Microbiol. 2012, 14 (9), 2405 - 2416 DOI: 10.1111/j.1462-2920.2012.02780.x.

(17) Hazen, T. C.; Dubinsky, E. A.; DeSantis, T. Z.; Andersen, E. A.; Piceno, Y. M.; et al. Deep-sea oil plume enriches indigenous oil-degrading bacteria. Science 2010, 330 (6001), 204 - 208 DOI: 10.1126/science.1195979.

(18) McFarlin, K. M.; Prince, R. C.; Perkins, R.; Leigh, M. B. Biodegradation of Dispersed Oil in Arctic Seawater at -1 °C. PLoS One 2014, 9 (1), No. e84297, DOI: 10.1371/journal.pone.0084297.

(19) Carls, M. G.; Rice, S. D.; Hose, J. E. Sensitivity of fish embryos to weathered crude oil: Part I. Low-level exposure during incubation causes malformations, genetic damage, and mortality in larval Pacific herring (Clupea pallasi). Environ. Toxicol. Chem. 1999, 18 (3), 481 - 493 DOI: 10.1002/etc.5620180317.

(20) Incardona, J. P.; Luke, D.; Gardner, L. D.; Linbo, T. L.; Brown, T. L.; Esbaugh, A. J.; Mager, E. M.; Stieglitz, J. D.; French, B. L.; Labenia, J. S.; Laetz, C. A.; Tagal, M.; Sloan, C. A.; Elizur, A.; Benetti, D. D.; Grosell, M.; Block, B. A.; Scholz, N. L. Deepwater Horizon crude oil impacts the developing hearts of large predatory pelagic fish. Proc. Natl. Acad. Sci. U. S. A. 2014, 111 (15), E1510 - E1518 DOI: 10.1073/pnas.1320950111.

(21) Incardona, J. P.; Collier, T. K.; Scholz, N. L. Defects in cardiac function precede morphological abnormalities in fish embryos exposed to polycyclic aromatic hydrocarbons. Toxicol. Appl. Pharmacol. 2004, 196 (2), 191 - 205 DOI: 10.1016/j.taap.2003.11.026.

(22) Incardona, J. P.; Carls, M. G.; Teraoka, H.; Sloan, C. A.; Collier, T. K.; Scholz, N. L. Aryl hydrocarbon receptor-independent toxicity of weathered crude oil during fish development. Environ. Health Perspect. 2005, 113 (12), 1755 - 1762 DOI: 10.1289/ehp.8230.

(23) Incardona, J. P.; Swarts, T. L.; Edmunds, R. C.; Linbo, T. L.; Aquilina-Beck, A.; Sloan, C. A.; Gardner, L. D.; Block, B. A.; Scholz, N. L. Exxon Valdez to Deepwater Horizon: Comparable toxicity of both

ED_001324_00005781-00008

crude oils to fish early life stages. Aquat. Toxicol. 2013, 142, 303-316 DOI: 10.1016/j.aquatox.2013.08.011.

(24) Meier, S.; Morton, H. C.; Andersson, E.; Geffen, A. J.; Taranger, G. L.; et al. Low-dose exposure to alkylphenols adversely affects the sexual development of Atlantic cod (Gadus morhua): Acceleration of the onset of puberty and delayed seasonal gonad development in mature female cod. Aquat. Toxicol. 2010, 105 (1-2), 136-150 DOI: 10.1016/j.aquatox.2011.06.003.

(25) Ramachandran, S. D.; Hodson, P. V.; Khan, C. W.; Lee, K. Oil dispersant increases PAH uptake by fish exposed to crude oil. Ecotoxicol. Environ. Saf. 2004, 59 (3), 300-308 DOI: 10.1016/j.ecoenv.2003.08.018.

(26) Couillard, C. M.; Lee, K.; Legare, B.; King, T. L. Effect of dispersant on the composition of the water-accommodated fraction of crude oil and its toxicity to larval marine fish. Environ. Toxicol. Chem. 2005, 24 (6), 1496-1504 DOI: 10.1897/04-267R.1.

(27) Wu, D. M.; Wang, Z. D.; Hollebone, B.; McIntosh, S.; King, T.; Hodson, P. V. Comparative toxicity of four chemically dispersed and undispersed crude oils to rainbow trout embryos. Environ. Toxicol. Chem. 2012, 31 (4), 754-765 DOI: 10.1002/etc.1739.

(28) Almeda, R.; Wambaugh, Z.; Wang, Z. C.; Hyatt, C.; Liu, Z. F.; Buskey, E. J. Interactions between Zooplankton and Crude Oil: Toxic Effects and Bioaccumulation of Polycyclic Aromatic Hydrocarbons. PLoS One 2013, 8 (6), No. e67212, DOI: 10.1371/journal.pone.0067212.

(29) Adams, J.; Sweezey, M.; Hodson, P. V. Oil and oil dispersants do not cause synergistic toxicity to fish embryos. Environ. Toxicol. Chem. 2014, 33 (1), 107-114 DOI: 10.1002/etc.2397.

(30) Olsvik, P. A.; Lie, K. K.; Nordtug, T.; Hansen, B. H. Is chemically dispersed oil more toxic to Atlantic cod (Gadus morhua) larvae than mechanically dispersed oil? A transcriptional evaluation. BMC Genomics 2012, 13, 702 DOI: 10.1186/1471-2164-13-702.

(31) Vikebø, F. B.; Rønningen, P.; Lien, V.; Meier, S.; Reed, M.; Ådlandsvik, B. Spatiotemporal overlap of oil spill and early life stages of fish. ICES J. Mar. Sci. 2014, 71 (4), 970-981 DOI: 10.1093/icesjms/fst131.

(32) Fiksen, Ø.; Jørgensen, C.; Kristiansen, T.; Vikebø, F.; Huse, G. Linking behavioural ecology and oceanography: Larval behavior determines growth, mortality, and dispersal. MEPS 2007, 347, 195-205 DOI: 10.3354/meps06978.

(33) Vikebø, F.; Husebø, Å.; Slotte, A.; Stenevik, E. K.; Lien, V. Effect of hatching date, vertical distribution, and interannual variation in physical forcing on northward displacement and temperature conditions of Norwegian spring-spawning herring larvae. ICES J. Mar. Sci. 2010, 67 (9), 1948-1956 DOI: 10.1093/icesjms/fsq084.

(34) Lien, V.; Vikebø, F. B.; Skagseth, Ø. One mechanism contributing to co-variability of the Atlantic inflow brances to the Arctic. Nat. Commun. 2013, 4, 1488 DOI: 10.1038/ncomms2505.

(35) Johansen, Ø. DeepBlow • A Lagrangian plume model for deep water blowouts. Spill Sci. Technol. Bull. 2000, 6 (2), 103-111 DOI: 10.1016/S1353-2561(00)00042-6.

(36) Johansen, Ø. Development and verification of deep-water blowout models. Mar. Pollut. Bull. 2003, 47 (9-12), 360-368 DOI: 10.1016/S0025-326X(03)00202-9.

(37) Reed, M.; Johansen, Ø; Brandvik, P. J.; Daling, P.; Lewis, A.; Fiocco, R.; Mackays, D.; Prentki, R. Oil spill modeling towards the close of the 20th century: Overview of the state of the art. Spill Sci. Technol. Bull. 1999, 5 (1), 3-16 DOI: 10.1016/S1353-2561(98)00029-2.

(38) Reed, M.; Daling, P. S.; Brakstad, O. G.; Singsaas, I.; Faksness, L. -G.; Hetland, B.; Efrol, N. OSCAR 2000: A Multi-Component 3-Dimensional Oil Spill Contingency and Response Model. Proceedings of the 23rd Arctic Marine Oilspill Program (AMOP) Technical Seminar; Environment Canada: Ottawa, Ontario, 2000; pp 663-952.

(39) Reed, M.; Daling, P.; Lewis, A.; Ditlevsen, M. K.; Brørs, B.; Clark, J.; Aurand, D. Modeling of dispersant application to oil spills in shallow coastal waters. Environ. Modell. Software 2004, 19 (7-8), 681-690 DOI: 10.1016/j.envsoft.2003.08.014.

(40) National Research Council (U.S.). Committee on Understanding Oil Spill Dispersants: Efficacy and Effects. Oil Spill Dispersants: Efficacy and Effects; National Academies Press: Washington, DC, 2005, p 377.

(41) Folkvord, A. Comparison of size-at-age of larval cod (Gadus morhua L.) from different populations based on size- and temperature-dependent models. Can. J. Fish. Aquat. Sci. 2005, 62 (3), 1037-1052 DOI: 10.1139/F07-045.

(42) Thygesen, U. H.; Ådlandsvik, B. Simulating vertical turbulent dispersal with finite volumes and binned random walks. MEPS 2007, 347, 145-153 DOI: 10.3354/meps06975.

(43) Opdal, A. F.; Vikebø, F. B.; Fiksen, Ø. Parental migration, climate, and thermal exposure of larvae: Spawning in southern regions gives Northeast Arctic cod a warm start. MEPS 2011, 439, 255-262 DOI: 10.3354/meps09335.

(44) Vikebø, F.; Jørgensen, C.; Kristiansen, T.; Fiksen, Ø. Drift, growth, and survival of larval Northeast Arctic cod with simple rules of behavior. MEPS 2007, 347, 207-219 DOI: 10.3354/meps06979.

(45) Kristiansen, T.; Vollset, K. W.; Sundby, S.; Vikebø, F. B. Turbulence enhances feeding of larval cod at low prey densities. ICES J. Mar. Sci. 2014, 71 (9), 2515-2529 DOI: 10.1093/icesjms/fsu051.

(46) Lough, R. G.; Potter, D. C. Vertical distribution patterns and diel migrations of larval and juvenile haddock Melanogrammus aeglefinus and Atlantic cod Gadus morhua on Georges Bank. Fish. Bull. 1993, 91 (2), 281-303.

(47) Ellertsen, B.; Fossum, P.; Solemdal, P.; Sundby, S.; Tilseth, S. A case study of the distribution of cod larvae and availability of prey organisms in relation to physical processes in Lofoten. In The Propagation of Cod (Gadus morhua L.); Dahl, E., Danielssen, D. S., Moskness, E., Solemdal, P., Eds.; Flødevigen Rapportserie 1: Arendal, Norway, 1984; pp 453-478.

(48) Sundby, S.; Bratland, P. Spatial distribution and production of eggs from Northeast Arctic cod at the coast of northern Norway 1983-1985. Fisken og Havet 1987, 1, 1-58.

(49) Vikebø, F. B.; Ådlandsvik, B.; Albretsen, J.; Sundby, S.; Stenevik, E. K.; Huse, G.; Kristiansen, T.; Eriksen, E. Real-time ichthyoplankton drift in Northeast Arctic cod and Norwegian Spring Spawning herring. PLoS One 2011, 6 (11), No. e27367, DOI: 10.1371/journal.pone.0027367.

(50) Gardiner, W. W.; Word, J. Q.; Word, J. D.; Perkins, R. A.; McFarlin, K. M.; et al. The acute toxicity of chemically and physically dispersed crude oil to key arctic species under arctic conditions during the open water season. Environ. Toxicol. Chem. 2013, 32 (10), 2284-2300 DOI: 10.1002/etc.2307.

(51) Barrett, R. T.; Lorentsen, S. H.; Anker-Nilssen, T. The status of breeding seabirds in mainland Norway. Atlantic Seabirds 2006, 8 (3), 97-126.

(52) Kutti, T.; Bannister, R. J.; Fossa, J. H. Community structure and ecological function of deep-water sponge grounds in the Traenadypet MPA-Northern Norwegian continental shelf. Cont. Shelf Res. 2013, 69, 21-30 DOI: 10.1016/j.csr.2013.09.011.

(53) White, H. K.; Hsing, P.-Y.; Cho, W.; Shank, T. M.; Cordes, E. E.; et al. Impact of the Deepwater Horizon oil spill on a deep-water coral community in the Gulf of Mexico. Proc. Natl. Acad. Sci. U. S. A. 2012, 109 (50), 20303-20308 DOI: 10.1073/pnas.1118029109.

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To: Principe, Vanessa[Principe.Vanessa@epa.gov]; Matthiessen, Craig[Matthiessen.Craig@epa.gov]; Bove, James[Bove.James@epa.gov]
Cc: Wilson, Gregory[Wilson.Gregory@epa.gov]; DeHaven, Leigh[DeHaven.Leigh@epa.gov]
From: Conmy, Robyn
Sent: Mon 4/25/2016 12:13:39 PM
Subject: RE: Availability of COREXIT Products for Testing

It's crazy that the Nalco is turning out to be the easy product to procure. I have contacted the makers of Finasol, Dispersit and Accell via email and phone, but have not received back any calls or emails. Will be reaching out again this morning!

<>/<>/<>/<>/<>/<>/<>/<>/<>/<>/<>/<>/<>/<>/<>/<>

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From: Principe, Vanessa
Sent: Friday, April 22, 2016 4:22 PM
To: Matthiessen, Craig <Matthiessen.Craig@epa.gov>; Bove, James <Bove.James@epa.gov>
Cc: Wilson, Gregory <Wilson.Gregory@epa.gov>; Conmy, Robyn <Conmy.Robyn@epa.gov>; DeHaven, Leigh <DeHaven.Leigh@epa.gov>
Subject: RE: Availability of COREXIT Products for Testing

This is good news!

HOWEVER - We will need to purchase these, as we are purchasing the ones from TOTAL. The reason we gave TOTAL was that we want to be above board given we will be using results for regulatory purposes and do not want to in any way appear to be giving an advantage to any entity. So we didn't accept their offer for free samples.

Would like to circle back with everybody on Monday to see whether the next communication is from me or from ORD as the purchaser/receiver.

Have a good weekend, V

From: Theriot, Debby [mailto:Debby.Theriot@nalco.com]
Sent: Friday, April 22, 2016 4:01 PM
To: Principe, Vanessa <Principe.Vanessa@epa.gov>
Cc: Wilson, Gregory <Wilson.Gregory@epa.gov>; Conmy, Robyn <Conmy.Robyn@epa.gov>; Matthiessen, Craig <Matthiessen.Craig@epa.gov>; DeHaven, Leigh <DeHaven.Leigh@epa.gov>
Subject: RE: Availability of COREXIT Products for Testing

Hi Vanessa,

I have approval from legal to proceed without the need for NDA. They just ask that we "confirm that the formulation will not be disclosed". I will have the sample team pull these for you and prepare for shipment. Please advise the shipping address.

Samples of products are provide at no cost.

Thanks,

Debby Theriot

Nalco Environmental Solutions LLC

7705 Highway 90-A

Sugar Land, TX 77478

832.851.5164 cell

debby.theriot@nalco.com

www.nalcoesllc.com

From: Principe, Vanessa [mailto:Principe.Vanessa@epa.gov]
Sent: Thursday, April 21, 2016 3:50 PM
To: Theriot, Debby
Cc: Wilson, Gregory; Conmy, Robyn; Matthiessen, Craig; DeHaven, Leigh
Subject: RE: Availability of COREXIT Products for Testing

Debby:

Thank you for providing us with the NDA form.

It appears that your concern is for the protection of Confidential Business Information (CBI) specific to the formulation of your products. EPA safeguards CBI information under the requirements in 40 CFR Part 2, Subpart B. Specifically, for the products we are seeking, and which are already listed in the Product Schedule, current regulatory requirements address CBI under 40 CFR Part 300, Subpart J. These provisions should address your CBI concerns. EPA cannot enter into an NDA addressing CBI as it is bound by its regulations on such matters.

We are still interested in purchasing samples of these products for the purposes of both toxicity and efficacy testing. Given that the product testing is intended to support both regulatory actions under Subpart J and our general research in the area of oil spill response, any toxicity and efficacy testing results would not be considered CBI.

Please advise on how to proceed with this purchase.

Again, thank you for your attention to this matter,

Vanessa

From: Theriot, Debby [mailto:Debby.Theriot@nalco.com]
Sent: Wednesday, April 20, 2016 1:09 PM
To: Principe, Vanessa <Principe.Vanessa@epa.gov>
Cc: Wilson, Gregory <Wilson.Gregory@epa.gov>; Conmy, Robyn <Conmy.Robyn@epa.gov>; Matthiessen, Craig <Matthiessen.Craig@epa.gov>; DeHaven, Leigh <DeHaven.Leigh@epa.gov>
Subject: RE: Availability of COREXIT Products for Testing

Hi Vanessa,

The standard format is attached. Details and scope are filled in by our paralegal once we receive from the requesting party.

debby

From: Principe, Vanessa [mailto:Principe.Vanessa@epa.gov]
Sent: Tuesday, April 19, 2016 1:33 PM
To: Theriot, Debby
Cc: Wilson, Gregory; Conmy, Robyn; Matthiessen, Craig; DeHaven, Leigh
Subject: RE: Availability of COREXIT Products for Testing

Ms. Theriot:

Thank you for getting back to me. My apologies, but my voice mail did not have any recorded messages from you.

Could you please send us a copy of your NDA for our Office of General Counsel to review?

Thank you for your attention to this matter,

Vanessa

From: Theriot, Debby [mailto:Debby.Theriot@nalco.com]
Sent: Tuesday, April 19, 2016 1:59 PM
To: Principe, Vanessa <Principe.Vanessa@epa.gov>
Cc: Wilson, Gregory <Wilson.Gregory@epa.gov>; Conmy, Robyn <Conmy.Robyn@epa.gov>; Matthiessen, Craig <Matthiessen.Craig@epa.gov>; DeHaven, Leigh <DeHaven.Leigh@epa.gov>
Subject: RE: Availability of COREXIT Products for Testing

Hi Vanessa,

I believe I left a voicemail in return last week. For the release of products for testing, we require testing details for each product to be disclosed and NDA to be executed. Are you able to assist in the process?

I will be able to release samples free of any cost to you once the NDA's are fully executed.

Debby Theriot

Nalco Environmental Solutions LLC

7705 Highway 90-A

Sugar Land, TX 77478

832.851.5164 cell

debby.theriot@nalco.com

www.nalcoesllc.com

NALCO
Environmental
Solutions LLC

From: Principe, Vanessa [mailto:Principe.Vanessa@epa.gov]
Sent: Monday, April 18, 2016 11:10 AM
To: Theriot, Debby
Cc: Wilson, Gregory; Conmy, Robyn; Matthiessen, Craig; DeHaven, Leigh
Subject: Availability of COREXIT Products for Testing

Ms. Theriot,

This follows up my voice mails of last week and today.

Per my message, EPA is seeking to acquire a number of dispersant products listed on the NCP Subpart J Product Schedule for the purposes of both toxicity and efficacy testing. The product testing is intended to further inform currently proposed regulatory actions under Subpart J of the National Contingency Plan. The products will in addition be used to support our general research in the area of oil spill response.

Three of your products [COREXIT EC9527A, EC9500A and EC9500B] have been identified as of interest, as they are commonly stockpiled in the U.S. Not only could these products be encountered when presented with a response situation, but including these dispersant products in toxicity and efficacy testing studies will also allow for comparison and consistency with other existing and ongoing studies by EPA and other federal agencies. EPA's Office of Research and Development (ORD) will be conducting the dispersant studies.

At this time we are seeking 2 U.S. gallons of each of the products.

You can contact either me or Greg Wilson at 202-564-7989. We appreciate your time and attention to this request and look forward to talking to you.

Respectfully,

Vanessa Principe

Vanessa Principe

202-564-7913

Chemical Engineer

Office Of Emergency Management

Office of Land and Emergency Management

U.S. EPA

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To: Bove, James[Bove.James@epa.gov]
Cc: Wilson, Gregory[Wilson.Gregory@epa.gov]; Conmy, Robyn[Conmy.Robyn@epa.gov]; DeHaven, Leigh[DeHaven.Leigh@epa.gov]; Matthiessen, Craig[Matthiessen.Craig@epa.gov]
From: Principe, Vanessa
Sent: Wed 4/20/2016 5:36:49 PM
Subject: FW: Availability of COREXIT Products for Testing
CDA - oil spill dispersant template NES LLC.pdf

Jim:

Attached is the NDA form from NALCO. Not certain if she understood that we were seeking to purchase the samples, not to request them for free. Not sure whether that would have an impact on their request for a signed NDA.

Let's chat on what our next steps should be after you have a chance to review. Teleworking today (302-262-0311 – H; 301-509-3428 – Mobile), in the office tomorrow if that's best.

Thanks! V

From: Theriot, Debby [mailto:Debby.Theriot@nalco.com]
Sent: Wednesday, April 20, 2016 1:09 PM
To: Principe, Vanessa <Principe.Vanessa@epa.gov>
Cc: Wilson, Gregory <Wilson.Gregory@epa.gov>; Conmy, Robyn <Conmy.Robyn@epa.gov>; Matthiessen, Craig <Matthiessen.Craig@epa.gov>; DeHaven, Leigh <DeHaven.Leigh@epa.gov>
Subject: RE: Availability of COREXIT Products for Testing

Hi Vanessa,

The standard format is attached. Details and scope are filled in by our paralegal once we receive from the requesting party.

debby

From: Principe, Vanessa [mailto:Principe.Vanessa@epa.gov]
Sent: Tuesday, April 19, 2016 1:33 PM
To: Theriot, Debby
Cc: Wilson, Gregory; Conmy, Robyn; Matthiessen, Craig; DeHaven, Leigh
Subject: RE: Availability of COREXIT Products for Testing

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Thank you for your attention to this matter,

Vanessa

From: Theriot, Debby [mailto:Debby.Theriot@nalco.com]
Sent: Tuesday, April 19, 2016 1:59 PM
To: Principe, Vanessa <Principe.Vanessa@epa.gov>
Cc: Wilson, Gregory <Wilson.Gregory@epa.gov>; Conmy, Robyn <Conmy.Robyn@epa.gov>; Matthiessen, Craig <Matthiessen.Craig@epa.gov>; DeHaven, Leigh <DeHaven.Leigh@epa.gov>
Subject: RE: Availability of COREXIT Products for Testing

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I will be able to release samples free of any cost to you once the NDA's are fully executed.

Debby Theriot

Nalco Environmental Solutions LLC

7705 Highway 90-A

Sugar Land, TX 77478

832.851.5164 cell

debby.theriot@nalco.com

www.nalcoesllc.com

From: Principe, Vanessa [mailto:Principe.Vanessa@epa.gov]
Sent: Monday, April 18, 2016 11:10 AM
To: Theriot, Debby
Cc: Wilson, Gregory; Conmy, Robyn; Matthiessen, Craig; DeHaven, Leigh
Subject: Availability of COREXIT Products for Testing

Ms. Theriot,

This follows up my voice mails of last week and today.

Per my message, EPA is seeking to acquire a number of dispersant products listed on the NCP Subpart J Product Schedule for the purposes of both toxicity and efficacy testing. The product testing is intended to further inform currently proposed regulatory actions under Subpart J of the National Contingency Plan. The products will in addition be used to support our general research in the area of oil spill response.

Three of your products [COREXIT EC9527A, EC9500A and EC9500B] have been identified as of interest, as they are commonly stockpiled in the U.S. Not only could these products be encountered when presented with a response situation, but including these dispersant products in toxicity and efficacy testing studies will also allow for comparison and consistency with other existing and ongoing studies by EPA and other federal agencies. EPA's Office of Research and Development (ORD) will be conducting the dispersant studies.

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You can contact either me or Greg Wilson at 202-564-7989. We appreciate your time and attention to this request and look forward to talking to you.

Respectfully,

Vanessa Principe

Vanessa Principe

202-564-7913

Chemical Engineer

Office Of Emergency Management

Office of Land and Emergency Management

U.S. EPA

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To: DeHaven, Leigh[DeHaven.Leigh@epa.gov]
Cc: Durbin, Luke[Luke.Durbin@csra.com]
From: Tirrell, Rebecca
Sent: Thur 4/7/2016 3:33:00 AM
Subject: TD83 Documentation Reference Table - Draft
TD83 Documentation Reference Table_DRAFT_6April2016.docx

Hi Leigh,

Please find attached for your review, our response to TD#83: Documentation Reference Table for Updates to NCP Product Schedule Listings – DRAFT. This effort was another great exercise in looking at all the scenarios and potential pitfalls/past experiences under one table and compiling a list of preferred documentation. In addition, we listed out key terms and basic understanding of those terms that are used in the maintenance of the Product Schedule. Additional discussion or clarification on those terms could be useful in ensuring the appropriate entity is requesting the change and providing the documentation.

Looking forward to discussing this draft in more detail upon your review!

Regards,

Rebecca

Rebecca Tirrell

Program Director, Emergency Management

SRA International, Inc., A CSRA Company

3434 Washington Boulevard, Room 2020E, Arlington, VA 22201

o: 703-284-6643 | c: (703) 801-6783 | NEW EMAIL: Rebecca.Tirrell@csra.com | www.csra.com

Follow us on Facebook, Twitter, and LinkedIn

Out of office dates: Wednesday, March 30 – Friday, April 1

Please update your contact list with new email address: Rebecca.Tirrell@csra.com

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To: Wilson, Gregory[Wilson.Gregory@epa.gov]; Matthiessen, Craig[Matthiessen.Craig@epa.gov]; DeHaven, Leigh[DeHaven.Leigh@epa.gov]
Cc: Wilson, Gregory[Wilson.Gregory@epa.gov]
From: Principe, Vanessa
Sent: Wed 4/6/2016 1:50:47 PM
Subject: RE: Obtaining Dispersants for our Tox Testing [FW: ICCOPR NOAA Update]

FYI

We chatted with Jim on Monday about this, and whether there may be an avenue under current Sub J language, to compel product manufacturers to sell products to EPA without the nondisclosure waivers for tox testing. He was going to think it over and run it by some other folks in OGC.

Looks like NOAA is also running into the same problem and considering testing using alternate products; at this point Corexit and Finasol are the ones we know are requiring signed agreements that the products are not being purchased for tox testing purposes.

V

From: Scott Lundgren - NOAA Federal [mailto:scott.lundgren@noaa.gov]
Sent: Monday, April 04, 2016 9:11 PM
To: Principe, Vanessa <Principe.Vanessa@epa.gov>
Cc: Gary Shigenaka - NOAA Federal <gary.shigenaka@noaa.gov>; lisa.dipinto@noaa.gov
Subject: Fwd: ICCOPR NOAA Update

Hi Vanessa,

Sorry I was in the air when you called and didn't note the voicemail light immediately. I got your message about nondisclosure challenges with obtaining dispersants for research. This is posing increasing problems. The mescosm studies on 9580 that NOAA NCCOS is looking to do is being held up by our inability to acquire without no disclosure as I mentioned at the last ICCOPR, to the extent that alternate products are being considered.

Clean Caribbean and Americas donated a stockpile of "pre agreement" dispersants (Corexit principally I believe) to WHOI ... This facilitated the recent baleen work. I think some of the nondisclosure contract items were a few years post DWH, but will check with Lisa by copy if they bumped into this issue of acquiring dispersants for research.

Gary Shigenaka from ERD may have more insight if you have additional questions.

Thanks

Scott
---------- Forwarded message ----------
From: **Scott Lundgren - NOAA Federal** <scott.lundgren@noaa.gov>
Date: Monday, December 14, 2015
Subject: ICCOPR NOAA Update
To: Steve Lehmann - NOAA Federal <steve.lehmann@noaa.gov>

Thanks Steve,

Go ahead and brief.

One item I'd adjust or speak to a little differently is "Obtaining test dispersant. Remains a constant struggle to obtain dispersants for testing purposes."

At the last ICCOPR, I spoke to the CCA Dispersant Research Bank that Paul Schuler has made available (but lightly publicized) by making pre-agreement Corexit available to researchers with the small stockpile at WHOI, following a review to ensure that exposure concentrations are field realistic. That should help a lot.

Also, I spoke to some of the Baleen study at last one, so I'd focus on the preliminary results and rapidly cover the background.

-Scott

Scott Lundgren
Chief, Emergency Response Division
NOAA Office of Response and Restoration
Desk: 240-533-0408 *(New number as of 12/2015)*
24hr: 206-526-4911

Web | Blog | Facebook | Twitter

On Mon, Dec 14, 2015 at 9:13 AM, Steve Lehmann - NOAA Federal <steve.lehmann@noaa.gov> wrote:

Attached, the NOAA update for ICCOPR. Let me know if there is something else you want in it.

If you and Dave are attending by phone, I assume I'll give the update or do you want to do it remotely.

Steve

--

Stephen Lehmann
NOAA Senior Scientific Support Coordinator

Emergency Response Division / Office of Response & Restoration

10 George St. Suite 220
Lowell, MA 01852-2293
Office: 978-654-6385

Fax: 978-654-6386
Mobile: 617-877-2806
Emergency (24/7): 206-526-4911

Email: steve.lehmann@noaa.gov
Website: http://response.restoration.noaa.gov/

--

Scott Lundgren
Chief, Emergency Response Division
Office of Response and Restoration
NOAA National Ocean Service
1305 East West Hwy, SSMC4-10148
Silver Spring, MD 20910-3278
Desk: 240-533-0408
24hr: 206-526-4911

http://response.restoration.noaa.gov

To: Vocke, William CIV[William.T.Vocke@uscg.mil]
Cc: Principe, Vanessa[Principe.Vanessa@epa.gov]; Matthiessen, Craig[Matthiessen.Craig@epa.gov]; DeHaven, Leigh[DeHaven.Leigh@epa.gov]; Conmy, Robyn[Conmy.Robyn@epa.gov]
From: Wilson, Gregory
Sent: Fri 7/31/2015 6:11:00 PM
Subject: REMINDER - ICCOPR R&T PLAN REVIEW
ICCOPR RT Plan Draft for Members 23JULY2015 v1 line nmbr_OEM_7_31_15.docx
Copy of RT Plan Comment Matrix 23JULY2015_OEM_7_31_15.xls

Bill:

Attached are our comments on the revised R&T Plan. We are sending you both a populated spreadsheet and an annotated word document as a backup. Most of our concerns are in the newly developed Definitions section, and on characterization of dispersants use.

We want to also request you allow for Robyn, as the official EPA ICCOPR member, to have the opportunity to review and add any comments; we understand she is out of the office until August 7, so she may need a bit of extra time beyond your due date. Further, for those comments we have indicated are critical to EPA, we would like an opportunity to review the changes made to reflect those concerns prior to bringing the Plan to the ICCOPR membership for a final vote.

FYI, both Vanessa and I will be on leave until the week of August 24, and will look for any revised version addressing our comments first thing as we get back.

We thank you again for the opportunity to review and for working to address our concerns.

v/r,
Greg

-----Original Message-----
From: Vocke, William CIV [mailto:William.T.Vocke@uscg.mil]
Sent: Thursday, July 30, 2015 3:30 PM
To: Wilson, Gregory
Cc: Principe, Vanessa; Conmy, Robyn
Subject: RE: REMINDER - ICCOPR R&T PLAN REVIEW

Thanks Greg.

I know several members are on/going on leave. But we've all had a good chance to review portions. So please send any comments you have.

Hope you and Vanessa both have good vacations.

Bill

-----Original Message-----
From: Wilson, Gregory [mailto:Wilson.Gregory@epa.gov]
Sent: Thursday, July 30, 2015 3:22 PM
To: Vocke, William CIV
Cc: Principe, Vanessa; Conmy, Robyn
Subject: RE: REMINDER - ICCOPR R&T PLAN REVIEW

Thanks for the reminder. Just an fyi, I believe Robyn is out until 8/7, and Vanessa and I are going on annual leave after tomorrow. We are trying to get our review done now, but wanted to alert you that folks are out of pocket.

-----Original Message-----
From: Vocke, William CIV [mailto:William.T.Vocke@uscg.mil]
Sent: Thursday, July 30, 2015 2:48 PM
To: Abe.nachabe@navy.mil; Andrew.J.Bruzewicz@usace.army.mil; Balsley, Alexander CIV; barry_Forsythe@fws.gov; Bowis, Meagan K LT; Carnegie, Tammie R LT; christina_kravitz@fws.gov; Conmy, Robyn; Crecy, Stacey L LCDR; daniel.yuska@dot.gov; dave.westerholm@noaa.gov; David.Lehman@dot.gov; david.moore@bsee.gov; debbie.payton@noaa.gov; DiRenzo, Joseph CIV; Elena.Melchert@hq.doe.gov; Erica.Folio@Hq.Doe.Gov; Fletcher, James E CIV; frank.stone@navy.mil; Hall, Gregory CDR (EDU); kurt.a.hansen@uscg.mil; holly_herod@fws.gov; jason.boehm@nist.gov; Jeff.Ji@boem.gov; Jenkins, Shannon R CIV; jfarrell@arctic.gov; Jim Merritt; john.kucklick@nist.gov; john.kucklick@noaa.gov; Kemp.skudin@navy.mil; kevin.easley@hq.doe.gov; Lori.Medley@bsee.gov; Loring, Joseph B CAPT; Lundgren, Scott; mfocazio@usgs.gov; michael.carter@dot.gov; michael.j.green-1@nasa.gov; Monica Maghini; Platt, Jeffrey R LT; Principe, Vanessa; rachel.hardey.ctr@navy.mil; robb.hyde@navy.mil; robert.w.smith@dot.gov; Scott Lundgren NOAA; Stephanie A. Brown; steve.lehmann@noaa.gov; steven.pearson@bsee.gov; Steven.V.Cary@usace.army.mil; Turner, Arden C CIV; mark.g.vanhaverbeke@uscg.mil; Vocke, William CIV; Walter.Johnson@boem.gov; wayne.yoder@dhs.gov; Weaver, James (USCG); Wilson, Gregory
Subject: REMINDER - ICCOPR R&T PLAN REVIEW

All,

This is just a friendly reminder that comments on the Draft ICCOPR R&T Plan are due to me by COB August 7, 2015. Please take some time and review the plan. This is the final round of edits before the Plan is put up for a vote.

Bill

To: DeHaven, Leigh[DeHaven.Leigh@epa.gov]
Cc: Durbin, Luke[Luke_Durbin@sra.com]
From: Tirrell, Rebecca
Sent: Wed 7/29/2015 9:24:04 PM
Subject: TD#43 Third Evaluation of RhamnoWash 10
TD43_RhamnoWash10_Rev3_29July2015_DRAFT.docx

Leigh,

Attached for your use, please find the review summary for RhamnoWash 10. The testing lab repeated the ENTIRE suite of toxicity tests and used the correct Reference Toxicant according to the lab report. A discrepancy was found between the Physical Property data for pour point: 1.6°C versus 2.6°C as reported in the earlier packages. May simply have been a typo. I have to say it was a pleasant surprise to see a completely revised Toxicity Report and not just a change in Reference Toxicant values.

MANUFACTURER ACTIONS – Third Review

•□□□□□□□□ NCP Product Schedule Listing Application, page 4 of 6, Part VIII Physical Properties, please clarify the change in Pour Point to 1.6°C from 2.6°C (page 4 of 6 from June 2, 2015 application).

Let us know if you have any questions,

Rebecca

Rebecca Tirrell

Director, Emergency Management Programs – CEAO

SRA International, Inc. | www.sra.com

o: 703.284.6643 | c: 703.801.6783

e: Rebecca_Tirrell@sra.com

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To: DeHaven, Leigh[DeHaven.Leigh@epa.gov]
Cc: Durbin, Luke[Luke.Durbin@csra.com]
From: Tirrell, Rebecca
Sent: Wed 1/18/2017 10:29:57 PM
Subject: RE: TD110/111 PS, TN and Webpage Updates

Leigh,

Thank you! The OEM Website Change Request is in development and will be submitted to the OEM Website Administration Team.

Sounds like a good idea to clarify moving the product to another category due to change in 1994 requirements (e.g., previously categorized dispersants did not meet the threshold for the dispersant effectiveness test).

Talk to you soon!

Rebecca

Rebecca Tirrell

Senior Program Manager – Emergency Management

SRA International, Inc., A CSRA Company

Science, Policy and Mission Programs

3434 Washington Boulevard, Room 2020E, Arlington, VA 22201

o: 571-290-4336 | **m:** (703) 801-6783 | **e:** Rebecca.Tirrell@csra.com | www.csra.com

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Planned absences: January 20; February 17-21

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From: DeHaven, Leigh [mailto:DeHaven.Leigh@epa.gov]
Sent: Wednesday, January 18, 2017 11:12 AM
To: Tirrell, Rebecca
Cc: Durbin, Luke
Subject: Re: TD110/111 PS, TN and Webpage Updates

Hi Rebecca and Luke,

This looks very good. The Product Schedule is cleaning up well! Nice Job! Ready to send to the presses...

I do have a comment about the "Formerly D-#". We know what they are, but one who is not familiar with the PS/TN may think that "D-#" is not the name of a product. For the next round of PS/TN changes and updates, let's talk about a way to share what the "Formerly D-#" means and state it in a concise manner. Not sure if this may be contentious to manufacturer or not. Let's discuss ideas.

I forgot to let you know that I am working from home today and tomorrow due to Inauguration prep in the Federal Triangle in case you need to reach me.

Thank you,

Leigh

From: Tirrell, Rebecca <Rebecca.Tirrell@csra.com>
Sent: Tuesday, January 17, 2017 5:13 PM
To: DeHaven, Leigh
Cc: Durbin, Luke
Subject: TD110/111 PS, TN and Webpage Updates

Hi Leigh,

Please find attached the PS, TN, and associate OEM NCP Subpart J webpage updates for TD110 and TD111. Product Schedule changes include contact and website edits for NORSOREX® APX (M-30); and removal of "formerly known as" product names. The formerly known as language has been maintained in the Technical Notebook bulletins; however, the notation has been moved to the 4th line of the bulletin, for example:

TECHNICAL PRODUCT BULLETIN #D-1

USEPA, OEM REGULATIONS IMPLEMENTATION DIVISION

ORIGINAL LISTING DATE: MARCH 10, 1978

REVISED LISTING DATE: DECEMBER 18, 1995

"COREXIT® EC9527A"

I. NAME, BRAND, OR TRADEMARK

COREXIT® EC9527A

Type of Product: Dispersant

(formerly COREXIT 9527)

Attached files include the following:

- Product Schedule

- Product Schedule Reference Document
- Technical Notebook
- Associated Webpage files:

o EPA Subpart J Page

o NCP Product Schedule Link

o NCP Product Schedule Technical Notebook Link

o EPA Alphabetical List Page

o EPA Toxicity-Effectiveness Summary Page

o NORSOREX® APX bulletin

- Formerly Known As Bulletin files:

o COREXIT® EC9527A bulletin

o MARE CLEAN 200 bulletin

o COREXIT® EC9500A bulletin

o BIODISPERS bulletin

o TOPSALL #30 (aka, SUPERALL #38) bulletin

o COREXIT® EC9580A bulletin

o DE-SOLV-IT INDUSTRIAL FORMULA bulletin

o PREMIER 99 bulletin

o SIMPLE GREEN® bulletin

o AQUACLEAN bulletin

o BIOSOLVE® PINKWATER® bulletin

o ENVIROCLEAN bulletin

o SYSTEM E.T. 20 bulletin

o BET BIOPETRO bulletin

o S-200C bulletin

o CIAGENT bulletin

Let us know if you have any changes!

Rebecca

Rebecca Tirrell

Senior Program Manager – Emergency Management

SRA International, Inc., A CSRA Company

Science, Policy and Mission Programs

3434 Washington Boulevard, Room 2020E, Arlington, VA 22201

o: 571-290-4336 | **m:** (703) 801-6783 | **e:** Rebecca.Tirrell@csra.com | www.csra.com

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Planned absences: January 20; February 17-21

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To: DeHaven, Leigh[DeHaven.Leigh@epa.gov]
From: Tirrell, Rebecca
Sent: Tue 7/28/2015 2:15:47 AM
Subject: TD#42 Revised: NCP Product Schedule Updates
PS_July15_DRAFT.docx
TN_July15_DRAFT.docx
Siltech OP-40_TNB rev_7-27-15.docx
ThickSlick 6535_TNB rev_7-27-15.docx
EPA Alphabetical List Page_27July15 draft.docx
EPA Emergencies Page_News-Highlights_27July15 draft.docx
EPA Subpart J Page_27July15 draft.docx
NCP Product Schedule Link_27July15 draft.docx
NCP Product Schedule TNB Link_27July15 draft.docx

Leigh,

Attached for your review please find NCP Product Schedule, Technical Notebook, and associated OEM Website pages. Let me know if you have any questions. Updates for July include revising Mr. Lane's product line for THICKSLICK 6535 (S-5) and SILTECH OP-40 (S-6). Attached files:

- NCP Product Schedule
- NCP Product Schedule Technical Notebook
- Website Pages:
  - Emergencies Home Page
  - NCP Subpart J Page
  - Alphabetical Listing Page
  - THICKSLICK 6535 Bulletin Page
  - SILTECH OP-40 Bulletin Page
  - NCP Product Schedule Link
  - NCP Product Schedule TNB Link

Let's check in Tuesday morning, it's been a rough afternoon and I was offline for a while.

Rebecca

Rebecca Tirrell

Director, Emergency Management Programs – CEAO

SRA International, Inc. | www.sra.com

o: 703.284.6643 | c: 703.801.6783

e: Rebecca_Tirrell@sra.com

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To: Matthiessen, Craig[Matthiessen.Craig@epa.gov]
Cc: Tulis, Dana[Tulis.Dana@epa.gov]; Wilson, Gregory[Wilson.Gregory@epa.gov]; Principe, Vanessa[Principe.Vanessa@epa.gov]; DeHaven, Leigh[DeHaven.Leigh@epa.gov]; Bove, James[Bove.James@epa.gov]; Gelzer, Claudia C CAPT[Claudia.C.Gelzer@uscg.mil]; Debbie Payton - NOAA Federal[debbie.payton@noaa.gov]; steve.lehmann@noaa.gov[steve.lehmann@noaa.gov]; Miller, Eric CDR[Eric.J.Miller2@uscg.mil]; alan.mearns@noaa.gov[alan.mearns@noaa.gov]; Lundgren, Scott[Scott.R.Lundgren@uscg.mil]
From: Jennifer Barre - NOAA Federal
Sent: Mon 6/2/2014 5:16:46 PM
Subject: Re: Reference Discrepancies in LAEO Paper
LAEO Reference Discrepancy Highlights 5-29-14.doc

.....
,,,,,
Attached is a newer version. Dr.Barker requested slight changes to the first highlighted discrepancy.

Very Respectfully,

LTJG Jennifer L Barre
Emergency Response Program Coordinator
Emergency Response Division, Office of Response and Restoration
NOAA's Ocean Service
1305 East West Hwy, SSMC4-10137
Silver Spring, MD 20910-3278
301-909-8109 Cell | 301-713-3038 x109 Office | 301-713-4389 Fax

http://response.restoration.noaa.gov
Stay up to date with our Blog

On Fri, May 30, 2014 at 11:34 AM, Matthiessen, Craig <Matthiessen.Craig@epa.gov> wrote:

FYI and for use in the meeting June 11 with LAEO, here is an extract of some of the top reference discrepancies discovered by Jennifer in the LAEO Position Paper. Regards – Craig

R. Craig Matthiessen

OSWER/OEM/RID Director

202-564-8016

To: DeHaven, Leigh[DeHaven.Leigh@epa.gov]
Cc: Durbin, Luke[Luke.Durbin@csra.com]
From: Tirrell, Rebecca
Sent: Tue 1/17/2017 10:13:06 PM
Subject: TD110/111 PS, TN and Webpage Updates
PS_Jan17_draft.docx
PS-Reference Document_Jan17_draft.docx
TN_Jan17_draft.docx
EPA Subpart J Page_17Jan17_draft.docx
NCP Product Schedule Link_17Jan17_draft.docx
NCP Product Schedule TN Link_17Jan17_draft.docx
EPA Alphabetical List Page_17Jan17_draft.docx
EPA Tox-Eff Summary Page_17Jan17_draft.docx
NORSOREX APX_TNB_rev 1-17-17_draft.docx
COREXIT EC9527A_TNB_rev 1-17-17_draft.docx
MARE CLEAN 200_rev 1-17-17_draft.docx
COREXIT EC9500A_TNB_rev 1-17-17_draft.docx
BIODISPERS_TNB_rev 1-17-17_draft.docx
TOPSALL 30_TNB_rev 1-17-17_draft.docx
COREXIT EC9580A_TNB_rev 1-17-17_draft.docx
DE-SOLV-IT INDUSTRIAL FORMULA_TNB_rev 1-17-17_draft.docx
PREMIER 99_TNB_rev 1-17-17_draft.docx
SIMPLE GREEN_TNB_rev 1-17-17_draft.docx
AQUACLEAN_TNB_rev 1-17-17_draft.docx
BIOSOLVE PINKWATER_TNB_rev 1-17-17_draft.docx
ENVIROCLEAN_TNB_rev 1-17-17_draft.docx
SYSTEM ET 20_TNB_rev 1-17-17_draft.docx
BET BIOPETRO_TNB_rev 1-17-17_draft.docx
S-200C_TNB_rev 1-17-17_draft.docx
CIAGENT_TNB_rev 1-17-17_draft.docx

Hi Leigh,

Please find attached the PS, TN, and associate OEM NCP Subpart J webpage updates for TD110 and TD111. Product Schedule changes include contact and website edits for NORSOREX® APX (M-30); and removal of "formerly known as" product names. The formerly known as language has been maintained in the Technical Notebook bulletins; however, the notation has been moved to the 4th line of the bulletin, for example:

TECHNICAL PRODUCT BULLETIN #D-1

USEPA, OEM REGULATIONS IMPLEMENTATION DIVISION

ORIGINAL LISTING DATE: MARCH 10, 1978

REVISED LISTING DATE: DECEMBER 18, 1995

"COREXIT® EC9527A"

I. NAME, BRAND, OR TRADEMARK

COREXIT® EC9527A

Type of Product: Dispersant

(formerly COREXIT 9527)

Attached files include the following:

- Product Schedule
- Product Schedule Reference Document
- Technical Notebook
- Associated Webpage files:
  - EPA Subpart J Page
  - NCP Product Schedule Link
  - NCP Product Schedule Technical Notebook Link
  - EPA Alphabetical List Page
  - EPA Toxicity-Effectiveness Summary Page
  - NORSOREX® APX bulletin
- Formerly Known As Bulletin files:
  - COREXIT® EC9527A bulletin
  - MARE CLEAN 200 bulletin
  - COREXIT® EC9500A bulletin

- BIODISPERS bulletin
- TOPSALL #30 (aka, SUPERALL #38) bulletin
- COREXIT® EC9580A bulletin
- DE-SOLV-IT INDUSTRIAL FORMULA bulletin
- PREMIER 99 bulletin
- SIMPLE GREEN® bulletin
- AQUACLEAN bulletin
- BIOSOLVE® PINKWATER® bulletin
- ENVIROCLEAN bulletin
- SYSTEM E.T. 20 bulletin
- BET BIOPETRO bulletin
- S-200C bulletin
- CIAGENT bulletin

Let us know if you have any changes!

Rebecca

Rebecca Tirrell

Senior Program Manager – Emergency Management

SRA International, Inc., A CSRA Company

Science, Policy and Mission Programs

3434 Washington Boulevard, Room 2020E, Arlington, VA 22201

o: 571-290-4336 | **m:** (703) 801-6783 | **e:** Rebecca.Tirrell@csra.com | www.csra.com

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Planned absences: January 20; February 17-21

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TECHNICAL PRODUCT BULLETIN #D-4
USEPA, OEM REGULATIONS IMPLEMENTATION DIVISION
ORIGINAL LISTING DATE: APRIL 13, 1994
REVISED LISTING DATE: DECEMBER 18, 1995
"COREXIT® EC9500A"

I. NAME, BRAND, OR TRADEMARK
COREXIT® EC9500A
Type of Product: Dispersant
(formerly COREXIT 9500)

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT
Nalco Environmental Solutions LLC
7705 Highway 90-A
Sugar Land, TX 77478
Product Management:
Office: (281) 263-7709
Mobile: (832) 851-5164
E-mail: debby.theriot@nalco.com
(Ms. Debby Theriot)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS
Nalco Environmental Solutions LLC
7705 Highway 90-A
Sugar Land, TX 77478
Product Management:
Office: (281) 263-7709
Mobile: (832) 851-5164
E-mail: debby.theriot@nalco.com
(Ms. Debby Theriot)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION
1. Flammability: IMO - Non-flammable; DOT - Non-hazardous.
2. Ventilation: Use with ventilation equal to unobstructed outdoors in moderate breeze.
3. Skin and eye contact; protective clothing; treatment in case of contact: Avoid eye contact. In case of eye contact, immediately flush eyes with large amounts of water for at least 15 minutes. Get prompt medical attention. Avoid contact with skin and clothing. In case of skin contact, immediately flush with large amounts of water, and soap if available. Remove contaminated clothing, including shoes, after flushing has begun. If irritation persists, seek medical attention. For open systems where contact is likely, wear long sleeve shirt, chemical resistant gloves, and chemical protective goggles.
4.a. Maximum storage temperature: 170°F
4.b. Minimum storage temperature: -30°F
4.c. Optimum storage temperature range: 40°F to 100°F
4.d. Temperatures of phase separations and chemical changes: None

V. SHELF LIFE
The shelf life of unopened drums of COREXIT® EC9500A is unlimited. Containers should always be capped when not in use to prevent contamination and evaporation of solvents.

VI. RECOMMENDED APPLICATION PROCEDURE
1. Application Method: COREXIT® EC9500A contains the same surfactants present in COREXIT® EC9527A and a new improved oleophilic solvent delivery system.

Aerial Spraying - Aircraft provide the most rapid method of applying dispersants to an oil spill and a variety of aircraft can be used for spraying. For aerial spraying, COREXIT® EC9500A is applied undiluted. Typical application altitudes of 30 to 50 feet have been used, although higher altitudes may be effective under certain conditions. Actual effective altitudes will depend on the application equipment, weather and aircraft. Careful selection of spray nozzles is critical to achieve desired dose levels, since droplet size must be controlled. Many nozzles used for agricultural spraying are of low capacity and produce too fine a spray. A quarter-inch open pipe may be all that is necessary if the aircraft travels at 120 mph (104 knots) or more, since the air shear at these speeds will be sufficient to break the dispersant into the proper sized droplets.

Boat Spraying - COREXIT® EC9500A may also be applied by workboats equipped with spray booms mounted ahead of the bow wake or as far forward as possible. The preferred and most effective method of application from a workboat is to use a low-volume, low-pressure pump so the chemical can be applied undiluted. Spray equipment designed to provide a five to ten percent diluted dispersant solution to the spray booms can also be used. COREXIT® EC9500A should be applied as droplets, not fogged or atomized. Natural wave or boat wake action usually provides adequate mixing energy to disperse the oil.

Recent tests have indicated that a fire monitor modified with a screen cap for droplet size control may also be useful for applying COREXIT® EC9500A. Due to the increased volume output and the greater reach of the fire monitor, significantly more area can be covered in a shorter period of time.

System Calibration - Spray systems should be calibrated at temperatures anticipated to insure successful application and dosage control. Application at sub-freezing temperatures may require larger nozzle, supply lines and orifices due to higher product viscosity.
2. Concentration/Application Rate: A treatment rate of about 2 to 10 U.S. gallons per acre, or a dispersant to oil ratio of 1:50 to 1:10 is recommended. This rate varies depending on the type of oil, degree of weathering, temperature, and thickness of the slick.

3. Conditions for Use: As with all dispersants, timely application ensures the highest degree of success. Early treatment with COREXIT® EC9500A, even at reduced treat rates, can also counter the "mousse" forming tendencies of the spilled oil. COREXIT® EC9500A is useful on oil spills in salt water.

VII. TOXICITY AND EFFECTIVENESS

a. Toxicity

Material Tested	Species	LC50 (ppm)
COREXIT® EC9500A	Menidia beryllina	25.20 96-hr
	Mysidopsis bahia	32.23 48-hr
No. 2 Fuel Oil	Menidia beryllina	10.72 96-hr
	Mysidopsis bahia	16.12 48-hr
COREXIT® EC9500A &	Menidia beryllina	2.61 96-hr
No. 2 Fuel Oil (1:10)	Mysidopsis bahia	3.40 48-hr
Reference Toxicant (SDS)	Menidia beryllina	7.07 96-hr
	Mysidopsis bahia	9.82 48-hr

NOTE: This toxicity data was derived using the concentrated product. See Section VI of this bulletin for information regarding the manufacturer's recommendations for concentrations and application rates for field use.

b. Effectiveness:

SWIRLING FLASK DISPERSANT EFFECTIVENESS TEST WITH SOUTH LOUISIANA (S/L) AND PRUDHOE BAY (P/B) CRUDE OILS

Oil	Effectiveness (%)
Prudhoe Bay Crude	45.3
South Louisiana Crude	54.7
Average of Prudhoe Bay and South Louisiana Crudes	50.0

VIII. MICROBIOLOGICAL PROPERTIES

NA

IX. PHYSICAL PROPERTIES

1. Flash Point: 181.4°F
2. Pour Point: <-71°F
3. Viscosity: 22.5 cSt at 104°F
4. Specific Gravity: 0.95 at 60°F
5. pH: 6.2
6. Chemical Name and Percentage by Weight of the Total Formulation: CONFIDENTIAL
7. Surface Active Agents: CONFIDENTIAL
8. Solvents: CONFIDENTIAL
9. Additives: None
10. Solubility: Miscible

X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

Compound	Concentration (ppm)
Arsenic	0.16
Cadmium	ND
Chromium	0.03
Copper	0.10
Lead	ND
Mercury	ND
Nickel	ND
Zinc	ND
Cyanide	ND
Chlorinated hydrocarbons	ND

TECHNICAL PRODUCT BULLETIN #D-1
USEPA, OEM REGULATIONS IMPLEMENTATION DIVISION
ORIGINAL LISTING DATE: MARCH 10, 1978
REVISED LISTING DATE: DECEMBER 18, 1995
"COREXIT® EC9527A"

I. NAME, BRAND, OR TRADEMARK
COREXIT® EC9527A
Type of Product: Dispersant
(formerly COREXIT 9527)

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT
Nalco Environmental Solutions LLC
7705 Highway 90-A
Sugar Land, TX 77478
Product Management:
Office: (281) 263-7709
Mobile: (832) 851-5164
E-mail: debby.theriot@nalco.com
(Ms. Debby Theriot)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS
Nalco Environmental Solutions LLC
7705 Highway 90-A
Sugar Land, TX 77478
Product Management:
Office: (281) 263-7709
Mobile: (832) 851-5164
E-mail: debby.theriot@nalco.com
(Ms. Debby Theriot)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION
1. Flammability: COREXIT® EC9527A is not classified as flammable by either DOT or IMO regulations.
2. Ventilation: Avoid prolonged breathing of vapors. Use with ventilation equal to unobstructed outdoors in moderate breeze.
3. Skin and eye contact; protective clothing; treatment in case of contact: Avoid eye contact. In case of eye contact, immediately flush eyes with large amounts of water for at least 15 minutes. Get prompt medical attention. Avoid contact with skin and clothing. In case of skin contact, immediately flush with large amounts of water, and soap if available. Remove contaminated clothing, including shoes, after flushing has begun. If irritation persists, seek medical attention. For open systems where contact is likely, wear long sleeve shirt, chemical resistant gloves, and chemical protective goggles.
4.a. Maximum storage temperature: 170°F
4.b. Minimum storage temperature: -30°F

4.c. Optimum storage temperature range: 40°F to 100°F
4.d. Temperatures of phase separations and chemical changes: COREXIT® EC9527A is not adversely affected by changes in storage temperature unless evaporation is allowed to occur.

V. SHELF LIFE
The shelf life of unopened drums of COREXIT® EC9527A is unlimited. Containers should always be capped when not in use to prevent contamination and evaporation of solvents.

VI. RECOMMENDED APPLICATION PROCEDURE
1. Application Method: COREXIT® EC9527A is most effectively applied by aircraft, however, application with boat spray booms, boat fire monitors, and by hand held sprayers and back packs has been successfully done on a number of spills and trials.

Aerial Spraying - Aircraft provide the most rapid method of applying dispersants to an oil spill and a variety of aircraft can be used for spraying. For aerial spraying, COREXIT® EC9527A is applied undiluted. Typical application altitudes of 30 to 50 feet have been used, although higher altitudes may be effective under certain conditions. Actual effective altitudes will depend on the application equipment, weather and aircraft. Careful selection of spray nozzles is critical to achieve desired dose levels, since droplet size must be controlled. Many nozzles used for agricultural spraying are of low capacity and produce too fine a spray. A quarter-inch open pipe may be all that is necessary if the aircraft travels at 120 mph (104 knots) or more, since the air shear at these speeds will be sufficient to break the dispersant into the proper sized droplets.

Boat Spraying - COREXIT® EC9527A may be applied by workboats equipped with spray booms mounted ahead of the bow wake or as far forward as possible. The preferred and most effective method of application from a workboat is to use a low-volume, low-pressure pump so the chemical can be applied undiluted. Spray equipment designed to provide a five to ten percent diluted dispersant solution to the spray booms can also be used. COREXIT® EC9527A should be applied as droplets, not fogged or atomized. Natural wave or boat wake action usually provides adequate mixing energy to disperse the oil.

Recent tests have indicated that a fire monitor modified with a screen cap for droplet size may also be useful for applying COREXIT® EC9527A. Due to the increased volume output and the greater reach of the fire monitor, significantly more area can be covered in a shorter period of time.

System Calibration - Spray systems should be calibrated at temperatures anticipated to insure successful application and dosage control.
2. Concentration/Application Rate: A treatment rate of about 2 to 10 U.S. gallons per acre, or a dispersant to oil ratio of 1:50 to 1: 10 is recommended. This rate varies depending on the type of oil, degree of weathering, temperature, and thickness of the slick.
3. Conditions for Use: As with all dispersants, timely application ensures the highest degree of success. Early treatment with COREXIT® EC9527A, even at reduced treat rates, can reduce the "mousse" forming tendencies of the spilled oil. COREXIT® EC9527A is useful on oil spills in salt water.

VII. TOXICITY AND EFFECTIVENESS

a. Toxicity:

Material Tested	Species	LC50 (ppm)
COREXIT® EC9527A	Menidia beryllina	14.57 96-hr
	Mysidopsis bahia	24.14 48-hr
No. 2 Fuel Oil	Menidia beryllina	10.72 96-hr
	Mysidopsis bahia	16.12 48-hr
COREXIT® EC9527A &	Menidia beryllina	4.49 96-hr
No. 2 Fuel Oil (1:10)	Mysidopsis bahia	6.60 48-hr
Reference Toxicant (DSS)	Menidia beryllina	7.07 96-hr
	Mysidopsis bahia	9.82 48-hr

NOTE: This toxicity data was derived using the concentrated product. See Section VI of this bulletin for information regarding the manufacturer's recommendations for concentrations and application rates for field use.

b. Effectiveness:

SWIRLING FLASK DISPERSANT EFFECTIVENESS TEST WITH SOUTH LOUISIANA (S/L) AND PRUDHOE BAY (P/B) CRUDE OIL

Oil	Effectiveness (%)
Prudhoe Bay Crude	37.4
South Louisiana Crude	63.4
Average of Prudhoe Bay and South Louisiana Crudes	50.4

VIII. MICROBIOLOGICAL ANALYSIS

NA

IX. PHYSICAL PROPERTIES

1. Flash Point: 163°F
2. Pour Point: < - 40°F
3. Viscosity: 160 cSt at 32°F
4. Specific Gravity: 0.98 - 1.02
5. pH: 6.1
6. Surface Active Agents: CONFIDENTIAL
7. Solvents: Water, Propylene Glycol, 2-Butoxyethanol
8. Additives: CONFIDENTIAL
9. Solubility: Complete

X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

Compound	Concentration (ppm)
Arsenic	<0.005
Cadmium	<0.01
Chromium	1.0
Copper	<0.2
Lead	<0.1
Mercury	<0.003
Nickel	<0.1
Zinc	0.1
Cyanide	<0.01
Chlorinated Hydrocarbons	<0.01

FYI – OEM Website Location: http://www.epa.gov/emergency-response/alphabetical-list-ncp-product-schedule-products-available-use-during-oil-spill

Alphabetical List of NCP Product Schedule (Products Available for Use During an Oil Spill)

Disclaimer: The listing of a product on the Product Schedule does NOT mean that EPA approves, recommends, licenses, certifies, or authorizes the use of the product on an oil discharge. The listing means only that data have been submitted to EPA as required by Subpart J of the National Contingency Plan, Section 300.915. (Source: 40 CFR §300.920 (e))

As required by Subpart J of the National Contingency Plan, EPA maintains the National Contingency Plan (NCP) Product Schedule.
NCP PRODUCT SCHEDULE (January 2017) (PDF)

The table below shows all products (including "aka's") currently listed in the NCP Product Schedule. Technical product summaries can be accessed by clicking on the product name. To limit the view to a specific category, use the drop down box in the "Category" column.

- Product Categories under NCP Subpart J includes regulatory definitions of the product types used below.
- NCP Product Schedule Toxicity and Effectiveness Summaries of these products are also available.

More information on the Product Schedule is available at NCP Product Schedule – Subpart J, or contact the NCP Product Schedule Information Line.

Product	Category
	View by: All Categories
ACCELL CLEAN® SWA	Surface Washing Agent
ACCELL CLEAN® DWD	Dispersant
ACT TERRA FIRMA	Bioremediation Agent
ACT-TF (see ACT TERRA FIRMA)	Bioremediation Agent
ADP-7	Surface Washing Agent
AGROREMED (see SPILLREMED (MARINE)®)	Bioremediation Agent
ALL PURPOSE CLEANER & REMEDIATOR (see GREEN BEAST™ OIL SPILL & ODOR REMEDIATOR)	Surface Washing Agent
ALSOCUP	Miscellaneous Oil Spill Control Agent – MOSCA
AQUA N-CAP™ POLYMER (see OIL SOLUTIONS POWDER)	Miscellaneous Oil Spill Control Agent – MOSCA

AQUACLEAN	Surface Washing Agent
AWAN PRA OIL FIELD SOLUTION™ (see EPA OIL FIELD SOLUTION™)	Surface Washing Agent
B&S INDUSTRIAL (see STEP ONE)	Bioremediation Agent
BET BIOPETRO	Bioremediation Agent
BG-CLEAN™ 401	Surface Washing Agent
BIODISPERS	Dispersant
BIOGRASS EXTRA®	Surface Washing Agent
BIO-REGEN HYDROCARBON (see SOIL RX)	Bioremediation Agent
BIOREM-2000 OIL DIGESTER™	Bioremediation Agent
BIOREM-2000 SC (see BIOREM-2000 OIL DIGESTER™)	Bioremediation Agent
BIOSOLVE® PINKWATER®	Surface Washing Agent
BIOWORLD BIOREMEDIATION HYDROCARBON TREATMENT PRODUCTS	Bioremediation Agent
CAS 100©	Miscellaneous Oil Spill Control Agent – MOSCA
CAST OFF™ (see FORMULA 206-1x BIO-WASH™)	Surface Washing Agent
CIAGENT	Miscellaneous Oil Spill Control Agent – MOSCA
CLEAN GREEN	Surface Washing Agent
CLEANGREEN® PLANET WASH (see CLEAN GREEN)	Surface Washing Agent
CN-110	Surface Washing Agent
COREXIT® EC9500A	Dispersant
COREXIT® EC9500B	Dispersant
COREXIT® EC9527A	Dispersant
COREXIT® EC9580A	Surface Washing Agent
CORIBA 700 ER (see CORIBA 700 SR)	Surface Washing Agent
CORIBA 700 OS (see CORIBA 700 SR)	Surface Washing Agent
CORIBA 700 SR	Surface Washing Agent
CORIBA 713 ER (see CORIBA 713 SR)	Surface Washing Agent
CORIBA 713 OS (see CORIBA 713 SR)	Surface Washing Agent
CORIBA 713 SR	Surface Washing Agent
CYTOSOL	Surface Washing Agent
DE-SOLV-IT CLEAN AWAY APC SUPER CONCENTRATE	Surface Washing Agent
DE-SOLV-IT INDUSTRIAL FORMULA	Surface Washing Agent
DISPERSIT SPC 1000™	Dispersant
DO-ALL #18	Surface Washing Agent

DRYLET™ MB BIOREMEDIATION	Bioremediation Agent
DUALZORB®	Bioremediation Agent
DYNAMIC GREEN™	Surface Washing Agent
ECOVOOM-MARINE (see JEP-MARINE CLEAN)	Surface Washing Agent
ELASTOL	Miscellaneous Oil Spill Control Agent – MOSCA
ENVIROCLEAN	Surface Washing Agent
ENVIRONMENTAL 1 CRUDE OIL CLEANER	Surface Washing Agent
ENVIRONMENTAL 1 WASHING AGENT (see ENVIRONMENTAL 1 CRUDE OIL CLEANER)	Surface Washing Agent
EO ALL PURPOSE SOAP-LAVENDER	Surface Washing Agent
EPA OIL FIELD SOLUTION™	Surface Washing Agent
ERGOFIT MICRO MIX AQUA	Bioremediation Agent
E-SAFE©	Surface Washing Agent
ETHOS CLEAN	Surface Washing Agent
F-500	Surface Washing Agent
FFT-SOLUTION®	Dispersant
FINASOL® OSR 52	Dispersant
FIREMAN'S BRAND SPILLCLEAN (see SPILLCLEAN)	Surface Washing Agent
FORMULA 206-1x (see FORMULA 206-1x BIO-WASH™)	Surface Washing Agent
FORMULA 206-1x BIO-WASH™	Surface Washing Agent
G-CLEAN OSC-1809	Surface Washing Agent
GELCO 200	Miscellaneous Oil Spill Control Agent – MOSCA
GLOBAL ENVIRONMENTAL CLEANER™ (see EPA OIL FIELD SOLUTION™)	Surface Washing Agent
GOLD CREW SW	Surface Washing Agent
GREEN BEAST OIL SPILL & ODOR REMEDIATOR	Surface Washing Agent
GREEN BEAST WASHING AGENT (see GREEN BEAST OIL SPILL & ODOR REMEDIATOR	Surface Washing Agent
GREEN TECHNOLOGIES SOLUTIONS-OIL RECOVERY (GTS-OR)	Surface Washing Agent
HEAVY DUTY DEGREASER CONCENTRATE (see WATER WORKS™ HEAVY DUTY DEGREASER CONCENTRATE)	Surface Washing Agent
HYDRO-BOND™	Miscellaneous Oil Spill Control Agent – MOSCA

HYDRO-CLEAN™ (see EPA OIL FIELD SOLUTION™)	Surface Washing Agent
HYDROREMED (see SPILLREMED (MARINE)®)	Bioremediation Agent
JD-109	Dispersant
JD-2000™	Dispersant
JEP-MARINE CLEAN	Surface Washing Agent
JE1058BS	Bioremediation Agent
LAND AND SEA RESTORATION	Bioremediation Agent
LIQUID ELASTOL (see ELASTOL)	Miscellaneous Oil Spill Control Agent – MOSCA
MARE CLEAN 200	Dispersant
MARINE D-BLUE CLEAN™	Dispersant
MARINE GREEN CLEAN™	Surface Washing Agent
MARINE GREEN CLEAN PLUS™	Surface Washing Agent
MARI-ZYME (see ZYME-FLOW)	Miscellaneous Oil Spill Control Agent – MOSCA
MICRO-BLAZE®	Bioremediation Agent
MICROSORB SC (see OPPENHEIMER FORMULA)	Bioremediation Agent
MUNOX SR®	Bioremediation Agent
NALE-IT	Surface Washing Agent
NATURAMA G3 A-5	Surface Washing Agent
NATURE'S WAY HS	Surface Washing Agent
NEOS AB3000	Dispersant
NOKOMIS 3-AA	Dispersant
NOKOMIS 3-F4	Dispersant
NOKOMIS 5-W	Surface Washing Agent
NONTOX™	Surface Washing Agent
NORSOREX® APX	Miscellaneous Oil Spill Control Agent – MOSCA
OIL BOND®	Miscellaneous Oil Spill Control Agent – MOSCA
OILCLEAN w/ACTIVATOR (see PRO-ACT)	Bioremediation Agent
OIL SOLUTIONS POWDER	Miscellaneous Oil Spill Control Agent – MOSCA
OIL SPILL CLEANUP (see G-CLEAN OSC-1809)	Surface Washing Agent
OIL SPILL EATER II	Bioremediation Agent
OPFLEX®	Miscellaneous Oil Spill Control Agent – MOSCA
OPPENHEIMER FORMULA	Bioremediation Agent
OSR-10	Surface Washing Agent
PES-51	Miscellaneous Oil Spill Control Agent – MOSCA
PETRO-CLEAN	Surface Washing Agent
PETROMAX PSC 3	Surface Washing Agent

PETROMAX SOIL CLEANING AND WASHING AGENT (see PETROMAX PSC 3)	Surface Washing Agent
PETROTECH 25	Surface Washing Agent
PREMIER 99	Surface Washing Agent
PRO-ACT	Bioremediation Agent
PROCLEANS	Surface Washing Agent
PX 700™	Miscellaneous Oil Spill Control Agent – MOSCA
RAPIDGRAB 2000™	Miscellaneous Oil Spill Control Agent – MOSCA
REMEDIADE™	Bioremediation Agent
RHAMNOWASH 10	Surface Washing Agent
S-200C	Bioremediation Agent
S-200 OILGONE® (M-32)	Miscellaneous Oil Spill Control Agent - MOSCA
SAFE KLEEN	Surface Washing Agent
SAF-RON GOLD	Dispersant
SANDKLENE 950	Surface Washing Agent
SC-1000™	Surface Washing Agent
SEA BRAT #4	Dispersant
SEACARE ECOSPERSE 52 (see FINASOL® OSR 52)	Dispersant
SEACARE E.P.A. (see DISPERSIT SPC 1000™)	Dispersant
SEPARATE (see ELASTOL)	Miscellaneous Oil Spill Control Agent – MOSCA
SF-GOLD DISPERSANT (see SAF-RON GOLD)	Dispersant
SHAMANTRA BIO (see SHAMANTRA GREEN)	Bioremediation Agent
SHAMANTRA GREEN	Bioremediation Agent
SHEEN-MAGIC©	Surface Washing Agent
SILTECH OP-40	Surface Collecting Agent
SIMPLE GREEN®	Surface Washing Agent
SIMPLE GREEN® 2013 Reformulation	Surface Washing Agent
SOC 10	Surface Washing Agent
SOIL RX	Bioremediation Agent
SP 7010 (see REMEDIADE™)	Bioremediation Agent
SPILLCLEAN or SPILLCLEAN ["Concentrate"]	Surface Washing Agent
SPILLREMED (MARINE)®	Bioremediation Agent
SPILLREMED (INDUSTRIAL)	Bioremediation Agent
STEP ONE	Bioremediation Agent
SUMP SAFE BIO-RECLAIM	Bioremediation Agent

SUPERALL #38 (see TOPSALL #30)	Surface Washing Agent
SYSTEM E.T. 20	Bioremediation Agent
The OPPENHEIMER FORMULA I (see OPPENHEIMER FORMULA)	Bioremediation Agent
THICKSLICK 6535	Surface Collecting Agent
TOPSALL #30	Surface Washing Agent
TRAILZORB (see DUALZORB®)	Bioremediation Agent
TULXA	Surface Washing Agent
TXCHEM HE-1000™	Surface Washing Agent
UNITED 658 PETRO-ZYME (see ZYME-FLOW)	Miscellaneous Oil Spill Control Agent – MOSCA
VAPORREMED (see SPILLREMED (MARINE)®)	Bioremediation Agent
VB591™, VB997™, BINUTRIX®	Bioremediation Agent
VERU-SOLVE™ MARINE 200 HP	Surface Washing Agent
WASTE AWAY®	Bioremediation Agent
WASTE-SET #3200®	Miscellaneous Oil Spill Control Agent – MOSCA
WASTE-SET #3400®	Miscellaneous Oil Spill Control Agent – MOSCA
WATER WORKS™ HEAVY DUTY DEGREASER CONCENTRATE	Surface Washing Agent
WHITZORB (see DUALZORB®)	Bioremediation Agent
WMI-2000	Bioremediation Agent
ZI-400	Dispersant
ZI-400 OIL SPILL DISPERSANT (see ZI-400)	Dispersant
ZYME-FLOW	Miscellaneous Oil Spill Control Agent – MOSCA
ZYME-TREAT (see ZYME-FLOW)	Miscellaneous Oil Spill Control Agent – MOSCA

OEM Website Location: http://www.epa.gov/emergency-response/national-contingency-plan-subpart-j

National Contingency Plan Subpart J

One of EPA's top priorities is to prevent, prepare for, and respond to oil spills that occur in and around inland waters of the United States. EPA is the lead federal response agency for oil spills occurring in inland waters. The U.S. Coast Guard is the lead response agency for spills in coastal waters and deepwater ports. Subpart J of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) directs EPA to prepare a schedule of dispersants, other chemicals, and oil spill mitigating devices and substances that may be used to remove or control oil discharges.

- NCP Product Schedule
- NCP Product Schedule Technical Notebook
- How to List a New Product on the NCP Product Schedule
- Reminders for Manufacturers of Listed Products
- NCP Subpart J Regulations
- Effectiveness and Toxicity Testing
- Disclaimer Information
- For More Information

NCP Product Schedule

The NCP Product Schedule (January 2017) (PDF) is also available for download in its entirety.

EPA maintains the NCP Product Schedule, which lists the following types of products that are authorized for use on oil discharges:

- Dispersants
- Surface washing agents
- Surface collecting agents
- Bioremediation agents
- Miscellaneous oil spill control agents

See Definitions of Product Categories
See Alphabetical List of NCP Product Schedule Products with Links to Technical Product Summaries

Sorbents

Sorbents are defined in the National Contingency Plan Subpart J, but the regulation does not require their inclusion on the NCP Product Schedule if they meet the regulatory definition. Manufacturers may write a letter with confidential business information to EPA and receive an official letter stating that their product meets the regulatory definition of a sorbent. This letter can be shared with the Federal On-Scene Coordinator of an oil spill to verify the sorbent composition. Chemical sorbents are classified as Miscellaneous Oil Spill Control Agents on the NCP Product Schedule. Sorbents must always be removed from oil spills and be disposed of properly.

Safer Choice

Note: Products may be eligible for recognition by EPA's Safer Choice (previously the

Design for the Environment) program as a safer oil spill treatment. The Safer Choice program labels products that have met its stringent criteria for human health and environmental safety.

NCP Product Schedule Technical Notebook

The NCP Product Schedule Technical Notebook (January 2017) (PDF) presents **manufacturer's** summary information on the conditions under which each of the products is recommended to be used. **Manufacturer** information may provide handling and worker precautions, storage information, recommended application procedures, physical properties, and toxicity, effectiveness, or other analyses.

Disclaimer: The listing of a product on the Product Schedule does NOT mean that EPA approves, recommends, licenses, certifies, or authorizes the use of the product on an oil discharge. The listing means only that data have been submitted to EPA as required by Subpart J of the National Contingency Plan, Section 300.915. (Source: 40 CFR § 300.920 (e))

How to List a New Product on the NCP Product Schedule

There is an established process that manufacturers must follow to have a product listed on the NCP Product Schedule.

1. Begin by reviewing data requirements in section 300.915 of Subpart J of the NCP Product Schedule.
2. Determine product category (e.g., dispersant, surface washing agent, etc.)
3. Fulfill each of the data requirements for selected product category, including effectiveness and toxicity testing (if applicable). If you need assistance locating a laboratory to help fulfill these requirements, please call the NCP Product Schedule Information Line.
4. Send a hard copy of **all** data requirements for review to:
   NCP Product Schedule Manager
   U.S. Environmental Protection Agency
   William Jefferson Clinton Building - Mail Code 5104-A
   Room 6450CC
   Washington, D.C. 20460
5. If you have further questions or require more information, please call the NCP Product Schedule Information Line.

Reminders for Manufacturers of Listed Products

For manufacturers of products listed on the NCP Product Schedule, EPA has provided a list of Subpart J Manufacturer Reminders for inclusion of the Subpart J product disclaimer statement, removal of EPA's logo from documentation, and making changes to contact information.

Subpart J Regulations

EPA is seeking comments on the proposed amendments to Subpart J of the NCP to clarify and update the Product Schedule listing procedures. These updates include effectiveness and toxicity testing. Comments are due on or before April 22, 2015. The compiled comments will be addressed in the final rule.

- NCP Subpart J: Use of Dispersants and Other Chemicals - 40 CFR 300.900 - 300.920 (PDF)
- NCP: Definitions - 40 CFR 300.5 (PDF)
- September 15, 1994: National Oil and Hazardous Substances Pollution Contingency Plan; Final Rule. 59 FR 47384

Proposed Amendments to Subpart J of the National Contingency Plan

Effectiveness and Toxicity Testing

For the products on the schedule, EPA provides NCP Product Schedule Toxicity and Effectiveness Summaries for each product category. Appendix C to 40 CFR part 300 describes methods for required effectiveness and toxicity tests for specific product categories. See: 40 CFR part 300 Appendix C | PDF (22 pp, 284 K, About PDF)

Disclaimer Information

The listing of a product on the NCP Product Schedule does not constitute approval of the product. To avoid possible misinterpretation or misrepresentation, any label, advertisement, or technical literature that refers to the placement of the product on the NCP Product Schedule must either reproduce in its entirety EPA's written statement that it will add the product to the NCP Product Schedule under Sec. 300.920(a)(2) or (b)(2), or include the disclaimer shown below. If the disclaimer is used, it must be conspicuous and must be fully reproduced. Failure to comply with these restrictions or any other improper attempt to demonstrate the approval of the product by any National Response Team (NRT) or other U.S. Government agency shall constitute grounds for removing the product from the NCP Product Schedule. [40 CFR 300.920(e)]

Disclaimer

[PRODUCT NAME] is on the U.S. Environmental Protection Agency's NCP Product Schedule. This listing does NOT mean that EPA approves, recommends, licenses, certifies, or authorizes the use of [PRODUCT NAME] on an oil discharge. This listing means only that data have been submitted to EPA as required by subpart J of the National Contingency Plan, Sec. 300.915.

For More Information

- Environmental Monitoring for Atypical Dispersant Operations: Including Guidance for Subsea Application and Prolonged Surface Application – This guidance was approved by the NRT to assist On–Scene Coordinators and Regional Response Teams in making incident–specific and planning decisions regarding environmental monitoring for atypical dispersant operations.
- See NCP Subpart J Product Schedule Fact Sheet (PDF)
- Call the NCP Product Schedule Information Line

Contact Us to ask a question, provide feedback, or report a problem.

OEM Website Location: http://www.epa.gov/emergency-response/national-contingency-plan-product-schedule-toxicity-and-effectiveness-summaries

National Contingency Plan Product Schedule Toxicity and Effectiveness Summaries

For the products on the National Contingency Plan (NCP) Product Schedule, EPA provides a summary of effectiveness and toxicity for each of the product categories:

- Dispersants
- Surface washing agents
- Surface collecting agents
- Bioremediation agents
- Miscellaneous oil spill control agents

Appendix C to 40 CFR part 300 (PDF) (277 pp, 1.8MB, About PDF) describes methods for required toxicity (Dispersants, Surface Washing Agents, Surface Collecting Agents, and Miscellaneous Oil Spill Control Agents) and effectiveness (Bioremediation Agents) tests.

Dispersants

Product	Toxicity (LC50 values in ppm)				Effectiveness (%)		
	Product Only		1:10 Product to No. 2 Fuel Oil				
	Menidia (96-hr)	Mysidopsis (48-hr)	Menidia (96-hr)	Mysidopsis (48-hr)	Prudhoe Bay Crude Oil	South Louisiana Crude Oil	Average of Crude Oils
ACCELL CLEAN® DWD	5.66	2.07	8.05	1.32	58.70	96.03	77.37
BIODISPERS	13.46	78.90	5.95	2.66	51.00	63.00	57.00
COREXIT® EC9500A	25.20	32.33	2.61	3.40	45.30	54.70	50.00
COREXIT® EC9500B	29.13	10.00	4.46	2.13	57.00	50.90	53.90
COREXIT® EC9527A	14.57	24.14	4.49	6.60	37.40	63.40	50.40
DISPERSIT SPC 1000™	3.50	16.60	7.90	8.20	40.00	100.00	73.00
FFT-SOLUTION®	5.34	2.72	5.14	2.75	49.97	48.87	49.42
FINASOL® OSR 52	11.66	9.37	5.40	2.37	32.50	71.60	52.10
JD-109	1.90	1.18	3.84	3.51	26.00	91.00	58.50
JD-2000™	407.00	90.50	3.59	2.19	60.40	77.80	69.10
MARE CLEAN 200	1996.00	938.00	42.00	9.84	63.97	84.14	74.06
MARINE D-BLUE CLEAN™	18.00	56.00	32.00	18.00	45.00	55.59	50.30
NEOS AB3000	91.10	33.00	57.00	25.00	19.70	89.80	54.80
NOKOMIS 3-AA	34.22	20.16	7.03	5.56	63.20	65.70	64.50
NOKOMIS 3-F4	29.80	32.20	100	58.40	62.20	64.90	63.55
SAF-RON GOLD	29.43	63.00	9.25	3.04	84.80	53.80	69.30
SEA BRAT #4	30.00	14.00	23.00	18.00	53.55	60.65	57.10

SEACARE ECOSPERSE 52 (see FINASOL® OSR 52)	11.66	3.77	5.40	2.37	32.50	71.60	52.10
SEACARE E.P.A. (see DISPERSIT SPC 1000™)	3.50	16.60	7.90	8.20	40.00	100.00	73.00
SF-GOLD DISPERSANT (see SAF-RON GOLD)	29.43	63.00	9.25	3.04	84.80	53.80	69.30
ZI-400	31.76	20.96	8.35	1.77	50.10	89.80	69.90
ZI-400 OIL SPILL DISPERSANT (see ZI-400)	37.16	20.96	8.35	1.77	50.10	89.80	69.90

Surface Washing Agents

Product (1:10 Product-to-No. 2 Fuel Oil ratio)	**Toxicity (LC50 values in ppm)**	
	Menidia (96-hr)	**Mysidopsis (48-hr)**
ACCELL CLEAN® SWA	17.13	2.92
ADP-7	14.10	7.81
ALL PURPOSE CLEANER & REMEDIATOR (see GREEN BEAST™ OIL SPILL & ODOR REMEDIATOR)	7.15	2.24
AQUACLEAN	6.50	2.10
AWAN PRA OIL FIELD SOLUTION™ (see EPA OIL FIELD SOLUTION™)	2.94	1.12
BG-CLEAN™ 401	13.10	2.86
BIOGRASS EXTRA®	2.54	2.24
BIOSOLVE® PINKWATER®	7.40	1.30
CAST OFF™ (see FORMULA 206-1x BIO-WASH™)	3.90	4.10
CLEAN GREEN	4.73	2.24
CLEANGREEN® PLANET WASH	4.73	2.24
CN-110	7.40	1.19
COREXIT® EC9580A	13.20	9.06
CORIBA 700 ER (see CORIBA 700 SR)	22.80	3.58
CORIBA 700 OS (see CORIBA 700 SR)	22.80	3.58
CORIBA 700 SR	22.80	3.58
CORIBA 713 ER (see CORIBA 713 SR)	9.55	4.04
CORIBA 713 OS (see CORIBA 713 SR)	9.55	4.04
CORIBA 713 SR	9.55	4.04
CYTOSOL	24.30	7.00
DE-SOLV-IT CLEAN AWAY APC SUPER CONCENTRATE	6.42	0.69
DE-SOLV-IT INDUSTRIAL CLEANER	9.40	1.68
DO ALL #18	9.38	0.57
DYNAMIC GREEN™	6.85	3.30
ECOVOOM-MARINE (see JEP-MARINE CLEAN)	3.58	2.32
E-SAFE©	8.77	14.20
ENVIROCLEAN	8.13	1.76
ENVIRONMENTAL 1 CRUDE OIL CLEANER	2.19	0.43
ENVIRONMENTAL 1 WASHING AGENT (see ENVIRONMENTAL 1 CRUDE OIL CLEANER)	2.19	0.43
EPA OIL FIELD SOLUTION™	2.94	1.12
EO ALL PURPOSE SOAP-LAVENDER	3.14	2.37

ETHOS CLEAN	25.00	5.00
F-500	<10.00	32.00
FIREMAN'S BRAND SPILLCLEAN (see SPILLCLEAN)	3.30	1.30
FORMULA 206-1x (see FORMULA 206-1x BIO-WASH™)	3.90	4.10
FORMULA 206-1x BIO-WASH™	3.90	4.10
G-CLEAN OSC-1809	6.05	2.51
GLOBAL ENVIRONMENTAL CLEANER™ (see EPA OIL FIELD SOLUTION™)	2.94	1.12
GOLD CREW SW	6.34	2.70
GREEN BEAST OIL SPILL & ODOR REMEDIATOR	7.15	2.24
GREEN BEAST WASHING AGENT (see GREEN BEAST OIL SPILL & ODOR REMEDIATOR)	7.15	2.24
GREEN TECHNOLOGIES SOLUTIONS-OIL RECOVERY (GTS-OR)	5.77	2.18
HEAVY DUTY DEGREASER CONCENTRATE (see WATER WORKS™ HEAVY DUTY DEGREASER CONCENTRATE)	14.60	2.27
HYDRO-CLEAN™ (see EPA OIL FIELD SOLUTION™)	2.94	1.12
JEP-MARINE CLEAN	3.58	2.32
MARINE GREEN CLEAN™	34.00	45.00
MARINE GREEN CLEAN PLUS™	30.00	32.00
NALE-IT	3.82	1.84
NATURAMA G3 A-5	3.68	2.24
NATURE'S WAY HS	3.91	1.07
NOKOMIS 5-W	3.07	2.24
NONTOX™ SURFACE WASHING AGENT	3.29	2.19
OIL SPILL CLEANUP (see G-CLEAN OSC-1809)	6.05	2.51
OSR-10	16.00	4.77
PETRO-CLEAN	115.00	105.00
PETROMAX PSC 3	1.99	1.00
PETROMAX SOIL CLEANING AND WASHING AGENT (see PETROMAX PSC 3)	1.99	1.00
PETROTECH 25	3.40	1.00
PREMIER 99	8.20	2.50
PROCLEANS	4.78	11.68
RHAMNOWASH 10	13.70	2.15
SC-1000™	4.72	2.13
SAFE KLEEN	2.60	6.50
SANDKLENE 950	4.48	2.24
SHEEN-MAGIC©	7.82	5.75
SIMPLE GREEN®	8.30	4.40
SIMPLE GREEN® 2013 Reformulation	28.50	5.05
SOC 10	6.31	2.24
SPILLCLEAN	3.30	1.30
SPILLCLEAN ["Concentrate"] (see SPILLCLEAN)	3.30	1.30
SUPERALL #38 (see TOPSALL #30)	4.60	5.00
TOPSALL #30	4.60	5.00
TULXA	6.08	2.24
TXCHEM HE-100™	7.07	2.11
VERU-SOLVE™ MARINE 200 HP	10.67	2.51
WATER WORKS™ HEAVY DUTY DEGREASER CONCENTRATE	14.60	2.27

Surface Collecting Agents

Product (1:10 Product-to-No. 2 Fuel Oil ratio)	Toxicity (LC50 values in ppm)	
	Menidia (96-hr)	Mysidopsis (48-hr)
SILTECH OP-40	9.70	3.27
THICKSLICK 6535	5.91	1.53

Bioremediation Agents

Product (1:10 Product-to-No. 2 Fuel Oil ratio)	Toxicity* (LC50 values in ppm)		Effectiveness (28 day)	
	Menidia (96-hr)	Mysidopsis (48-hr)	Alkanes Reduction (%)	Aromatics Reduction (%)
ACT TERRA FIRMA	2.61	1.19	99.60	94.20
ACT-TF (see ACT TERRA FIRMA)	2.61	1.19	99.60	94.20
AGROREMED (see SPILLREMED (MARINE)®)	37.50	22.40	97.00	47.00
B&S INDUSTRIAL (see STEP ONE)	NA	NA	44.03	54.51
BET BIOPETRO	NA	NA	99.00	67.00
BIO-REGEN HYDROCARBON (see SOIL RX)	NA	NA	49.71	73.64
BIOREM-2000 OIL DIGESTER™	NA	NA	99.80	71.00
BIOREM-2000 SC (see BIOREM-2000 OIL DIGESTER™)	NA	NA	99.80	71.00
BIOWORLD BIOREMEDIATION TREATMENT PRODUCTS	13.90	7.10	97.00	88.00
DRYLET™ MB BIOREMEDIATION	NA	NA	98.60	85.10
DUALZORB®	8.43	2.70	99.40	92.50
ERGOFIT MICRO MIX AQUA	NA	NA	99.10	82.20
HYDROREMED (see SPILLREMED (MARINE)®)	37.50	22.40	97.00	47.00
JE1058BS	8.68	2.44	92.6	39.0
LAND AND SEA RESTORATION PRODUCT 001 (VELITE)	NA	NA	42.92	31.92
MICRO-BLAZE®	NA	NA	94.10	47.60
MICROSORB SC (see OPPENHEIMER FORMULA)	NA	NA	89.10	38.20
MUNOX SR®	NA	NA	94.9	75.5
OILCLEAN w/ACTIVATOR (see PRO-ACT)	NA	NA	99.86	94.15
OIL SPILL EATER II (OSE II)	NA	NA	89.80	89.60

OPPENHEIMER FORMULA	NA	NA	89.10	38.20
PRO-ACT	NA	NA	99.86	94.15
REMEDIADE™	NA	NA	99.0	99.4
S-200C	25.33	17.67	98.00	10.40
SHAMANTRA BIO (see SHAMANTRA GREEN)	NA	NA	99.7	95.3
SHAMANTRA GREEN	NA	NA	99.7	95.3
SOIL RX	NA	NA	49.71	73.64
SP 7010 (see REMEDIADE™)	NA	NA	99.0	99.4
SPILLREMED (INDUSTRIAL (see SPILLREMED (MARINE)®)	37.50	22.40	97.00	47.00
SPILLREMED (MARINE)®	37.50	22.40	97.00	47.00
STEP ONE	NA	NA	44.03	54.51
SUMP SAFE BIO-RECLAIM	NA	NA	47.40	49.00
SYSTEM E.T. 20	NA	NA	99.10	77.00
TRAILZORB (see DUALZORB®)	8.43	2.70	99.40	92.50
VAPORREMED (see SPILLREMED (MARINE)®)	37.50	22.40	97.00	47.00
*VB591™, VB997™, BIONUTRIX®	NA	NA	96.80	73.10
WASTE AWAY®	12.54	2.11	99.20	60.70
WHITZORB (see DUALZORB®)	8.43	2.70	99.40	92.50
WMI-2000	NA	NA	60.30	33.30

*Toxicity testing is not required for Bioremediation Agents; data provided if submitted by vendor.

Miscellaneous Oil Spill Control Agents

Table 1: Miscellaneous Oil Spill Control Agents

Product (1:10 Product-to-No. 2 Fuel Oil ratio)	Toxicity (LC50 values in ppm)		Effectiveness (%)
	Menidia (96-hr)	Mysidopsis (48-hr)	
ELASTOL	8.20	3.70	NA
LIQUID ELASTOL (see ELASTOL)	8.20	3.70	NA
MARI-ZYME (see ZYME-FLOW)	8.70	1.60	NA
OPFLEX® THE GREEN STUFF	5.49	1.67	NA
PES-51	435.00	14.50	NA
PX 700™	5.65	2.77	NA

S-200 OILGONE®	15.83	2.46	NA
SEPARATE (see ELASTOL)	8.20	3.70	NA
UNITED 658 PETRO-ZYME (see ZYME-FLOW)	8.70	1.60	NA
ZYME-FLOW	8.70	1.60	NA
ZYME-TREAT (see ZYME-FLOW)	8.70	1.60	NA

Table 2: Solidifiers

Product (1:10 Product-to-No. 2 Fuel Oil ratio)	**Toxicity (LC50 values in ppm)**		**Effectiveness (%)**
	Menidia (96-hr)	**Mysidopsis (48-hr)**	
ALSOCUP	14.00	10.00	NA
AQUA N-CAP™ POLYMER (see OIL SOLUTIONS POWDER)	22.50	2.13	NA
CAS 100©	5.94	1.41	NA
CIAGENT	5.93	1.73	NA
GELCO 200	3.15	3.51	NA
HYDRO-BOND™	19.93	1.93	NA
NORSOREX® APX	39.80	3.06	NA
OIL BOND®	3.80	9.60	NA
OIL SOLUTIONS POWDER	22.50	2.13	NA
RAPIDGRAB 2000™	4.07	2.60	NA
WASTE-SET 3200®	552.00	58.00	NA
WASTE-SET 3400®	442.00	36.00	NA

TECHNICAL PRODUCT BULLETIN #D-3
USEPA, OEM REGULATIONS IMPLEMENTATION DIVISION
ORIGINAL LISTING DATE: FEBRUARY 23, 1988
REVISED LISTING DATE: JANUARY 26, 1996
"MARE CLEAN 200"

I. NAME, BRAND, OR TRADEMARK
MARE CLEAN 200
Type of Product: Dispersant (Solvent-Based)
(formerly MARE CLEAN 505)

II. NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT
Ichinen Chemicals Co., Ltd
Mita Twin Building, East Wing 8F
4-2-8 Shibaura, Minato-ku,
Tokyo, Japan 108-0023
Phone: (81) 3-6414-5601
Fax: (81) 3-6414-5621
(Mr. Tsuyoshi Imai)

III. NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS
Ichinen Chemicals Co., Ltd
Mita Twin Building, East Wing 8F
4-2-8 Shibaura, Minato-ku
Tokyo, Japan 108-0023
Phone: (81) 3-6414-5601
Fax: (81) 3-6414-5621
(Mr. Tsuyoshi Imai)

IV. SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION
1. Flammability: The flash point is 212°F @ 20°F
2. Ventilation: Is required. Use in closed room is not recommended.
3. Skin and eye contact; protective clothing; treatment in case of contact: Use protective goggles to avoid eye contact. In case of eye contact, wash immediately with plenty of water and consult with physician.
4.a. Maximum storage temperature: 122°F
4.b. Minimum storage temperature: 21°F
4.c. Optimum storage temperature range: 32°F to 86°F
4.d. Temperatures of phase separations and chemical changes: Phase separation does not relate to temperatures. Chemical changes may occur at temperatures above 194°F.

V. SHELF LIFE
The shelf life of MARE CLEAN 200 is 10 years when stored indoors. (Container will deteriorate before contents.)

VI. RECOMMENDED APPLICATION PROCEDURE

1. Application Method: Sprinkle the dispersant on the oil spill, then 5-10 minutes later stir the surface intensively. For convenience, MARE CLEAN 200 may be diluted with water if desired.
2. Concentration/Application Rate: Use 53-66 gallons of MARE CLEAN 200 per ton of oil
3. Conditions for Use: The performance of MARE CLEAN 200 is not affected by water salinity. At temperatures below 40°F or in case of heavy crude oil spill, MARE CLEAN 200 should be used without dilution. MARE CLEAN 200 is an effective dispersant for any liquid hydrocarbon.

VII. TOXICITY AND EFFECTIVENESS

1. Toxicity:

Material Tested	Species	LC50 (ppm)	
MARE CLEAN 200	Menidia beryllina	1996.00	96-hr
	Mysidopsis bahia	938.00	48-hr
No. 2 Fuel Oil	Menidia beryllina	10.72	96-hr
	Mysidopsis bahia	16.12	48-hr
MARE CLEAN 200 and	Menidia beryllina	42.00	96-hr
No. 2 Fuel Oil (1:10)	Mysidopsis bahia	9.84	48-hr
Reference Toxicant (SDS)	Menidia beryllina	7.07	96-hr
	Mysidopsis bahia	9.82	48-hr

NOTE: This toxicity data was derived using the concentrated product. See Section VI of this bulletin for information regarding the manufacturer's recommendations for concentrations and application rates for field use.

b. Effectiveness:

SWIRLING FLASK DISPERSANT EFFECTIVENESS TEST WITH SOUTH LOUISIANA (S/L) AND PRUDHOE BAY (P/B) CRUDE OILS

Oil	Effectiveness (%)
Prudhoe Bay Crude	63.97
South Louisiana Crude	84.14
Average of Prudhoe Bay and South Louisiana Crudes	74.06

VIII. MICROBIOLOGICAL ANALYSIS

NA

IX. PHYSICAL PROPERTIES

1. Flash Point: 212°F@ 20°F
2. Pour Point: 14 @ 10°F
3. Viscosity: 2.4 @ 5 cSt at 104°F
4. Specific Gravity: 0.95 @ 0.03 at 77°F
5. pH: 7.7 @ 1.0 (10% solution)
6. Surface Active Agents: A mixture of sorbitan fatty acid esters, polysorbates, and polyoxyethylene fatty acid esters.
7. Solvents: Paraffinic hydrocarbons (CAS 74664-93-0)
8. Additives: None
9. Solubility: NA

X. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

Compound	Concentration (ppm)
Arsenic	<0.50
Cadmium	<0.100
Chromium	<0.500
Copper	<0.250
Lead	<2.50
Mercury	<0.0200
Nickel	<0.250
Zinc	0.611
Cyanide	<0.01
Chlorinated Hydrocarbons	<0.10

OEM Website Location: http://www.epa.gov/emergency-response/ncp-product-schedule-products-available-use-oil-spills

NCP Product Schedule (Products Available for Use on Oil Spills)

NATIONAL CONTINGENCY PLAN (NCP) Product Schedule

Disclaimer: The listing of a product on the Product Schedule does NOT mean that EPA approves, recommends, licenses, certifies, or authorizes the use of the product on an oil discharge. The listing means only that data have been submitted to EPA as required by Subpart J of the National Contingency Plan, Section 300.915. (Source: 40 CFR § 300.920 (e)).

- NCP Product Schedule (January 2017) (PDF)

OEM Website Location: http://www.epa.gov/emergency-response/ncp-product-schedule-technical-notebook

NCP Product Schedule Technical Notebook

NCP Product Schedule Technical Notebook

- NCP Product Schedule Technical Notebook (January 2017) (PDF)