

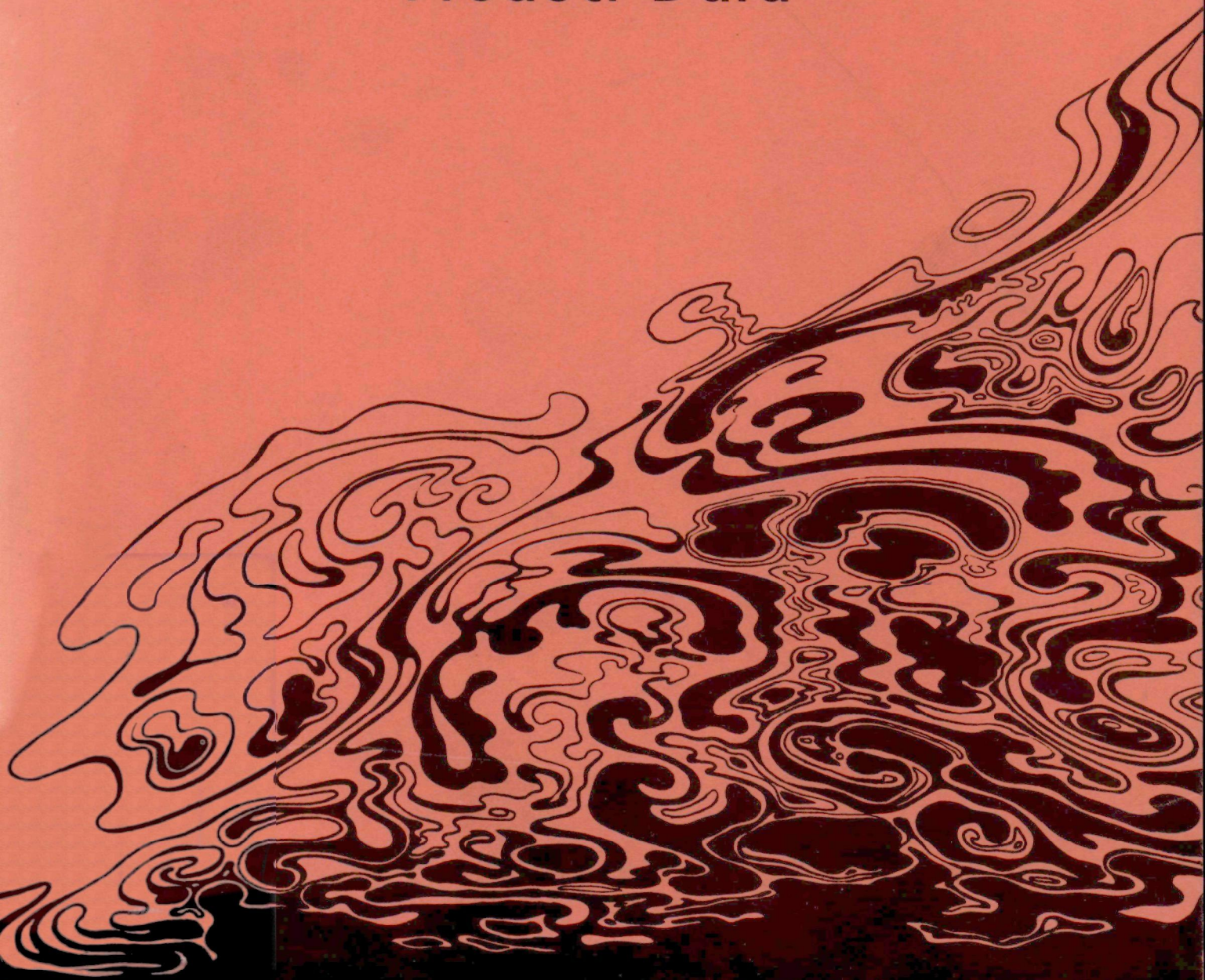


Edison Water Quality Laboratory

April 1971

Oil Spill Dispersants

Product Data



FOREWORD

The purpose of this manual is to furnish a ready access to currently available oil spill dispersant information. It was specifically prepared for the Division of Oil and Hazardous Materials, which expressed a need for such a compilation.

The manual summarizes oil spill dispersant product data available to the Oil Pollution Research Section staff at the time of preparation. As such, it comprises data summarized from the library, reprint, product and administrative files of the Edison Water Quality Laboratory.

This report contains reference to some preliminary unpublished toxicity data from EPA and other Federal Agencies, state agencies and private industry, and as such, dissemination of such information should be handled with discretion.

Acknowledgment is given to the many interested parties who have contributed information which aided in the preparation of this manual.

INTRODUCTION

This manual is separated into four sections which include two product sections, a manufacturer's product section and a reference section.

The products listed in Section A have the most information at this time, whereas only limited data were available for those products listed in Section B. For convenience in updating the manual as new products and new information on existing products become available, the sections are not paginated.

In Section C manufacturers are listed alphabetically with the products of each manufacturer cross-referenced to the section listings.

Section D lists references cited in the product sections.

SECTION A

SECTION A

The following dispersant products are listed in
Section A:

ALKEN O.S.D.	HOLL-CHEM #622
AMEROID	IGEPAL CO-430
AQUANEX MC	IGEPAL CO-530
BACTO-ZYME	ISOMAL 265
B&B 2021-S	JANSOLV-60 & 60W
B&B 2023	LLCP-12
BESCO B-51-DT	MAGIC POWER
BESCO D-EMULSION NO. 100	MAGNUS
BESCO SLICK - 440	MET AQUACLENE 100
BLITZ	OD - 2
BP - 1002	OIL SPILL ERADICATOR X-1-11
BP - 1100	(PETROLITE) W-1439
CASOL	(PETROLITE) WF-30
COLLOID - 88	POLYCLENS (MOLTOKLAR)
COREXIT 7664	POLYCOMPLEX A-11 & A-11 D
COREXIT 8666	RIDZLIK
DI-CHEM 320	SEAMULSO E
DISPERSE-OIL	SKANEX S-102
DISPERSOL OS	SLIX
F.O. 300-B	SPILL- X
F.O. 300-H	SURFLO RD 282
FOILZOIL	TALENT
(GAMLEN) D SOLVENT	TEOC 444
GAMOSOL	TEOC 777
GOLD CREW	TYFOSOL 80
HEMCO NO. 2	(WYANDOTTE) SPILL REMOVER

ALKEN O.S.D.

<u>MANUFACTURER</u>	Alken-Murray Corporation 111 Fifth Avenue New York, New York 10003
<u>COST</u>	\$2.99/gal. (55 gal. drum)
<u>AVAILABILITY</u>	F.O.B. Cleveland, Ohio
<u>PRODUCT DESCRIPTION</u>	Nonionic/anionic mixture of emulsifiers in 50% aromatic solvent
<u>SPECIFIC GRAVITY</u>	0.904 @ 60° F
<u>FLASH POINT</u>	180° F (C.O.C.)
<u>SOLUBILITY</u>	Miscible in water
<u>SHELF LIFE</u>	> 18 months
<u>OTHER</u>	Store @ 40° F to 110° F pH 9.2 - 9.6
<u>HUMAN HAZARD</u>	Maximum allowable concentration for inhalation >1,000 ppm
<u>MANUFACTURER'S USE RECOMMENDATIONS</u>	
<u>Application Method</u>	Spray undiluted. Agitate. Reacts immediately.
<u>Dosage</u>	Dispersant to oil ratio 1:10 to 1:15 by volume
<u>Use Limitations</u>	Use above 35° F on light and heavy distillate residual and crude oils. Do not use below -5° F. Not for use in potable water supplies.
<u>REMARKS</u>	Manufacturer reports 99 (+) % effectiveness in laboratory tests. Maximum allowable concentration for marine life reported by manufacturer to be > 100 ppm.

AMEROID OIL SPILL EMULSIFIER #1

<u>MANUFACTURER</u>	Drew Chemical Corp. 522 Fifth Avenue New York, New York 10036
<u>COST</u>	\$2.60 - \$3.20/gal.
<u>AVAILABILITY</u>	Worldwide @ 121 points.
<u>PRODUCT DESCRIPTION</u>	Nonionic ethylene dioxide condensate with petroleum solvent.
<u>SPECIFIC GRAVITY</u>	0.960 @ 68° F
<u>FLASH POINT</u>	168° F (C.O.C.)
<u>SOLUBILITY</u>	Emulsifies in water
<u>SHELF LIFE</u>	Unlimited
<u>OTHER</u>	Store @ 10-150° F
<u>MANUFACTURER'S USE RECOMMENDATIONS</u>	
<u>Application Method</u>	Educt @ 3 to 5% concentration using pressurized sprayer. Reaction time is immediate.
<u>Dosage</u>	Dispersant to oil ratio 1:20 to 1:33 by volume.
<u>Use Limitations</u>	Use on light and heavy distillate, residual and crude oils. Increase dosage on weathered crudes.

NOTE: Other Drew Chemical Corp. products that may be promoted for cleaning up oil spills: Drew Oil and Grease Remover, Ameroid HDE-777, Ameroid Oil & Grease Remover, Ameroid L.A.C.

EFFECTIVENESS:

Manufacturer reports 75% oil dispersed in lab tests.

Other: Dispersant to oil ratio of 1:10 to 1:20 required to disperse seven crude and three fuel oils. Least effective on Devonian Crude (17).

Spill Experience:

Incident

Anne Mildred Brøvig, February 1966	Effectiveness unknown
Torrey Canyon, March 1967	Effectiveness unknown
General Colocotronis (Bahamas)	Effectiveness unknown

Toxicity Tests:

Species

Reference

Fathead minnow (<u>Pimephales promelas</u>)	96 hr TL _m - 6.1 ppm	(17)
Zebra fish (<u>Brachydanio rerio</u>) no survival	24 hrs @ 20 ppm	(12)
Marine fish (<u>Gambusia</u>) 21 of 21 dead in	24 hrs @ 15 ppm	

AQUANEX MC

<u>MANUFACTURER</u>	Montgomery Chemical Company P. O. Box 187 Jenkintown, Pennsylvania 19046
<u>COST</u>	\$1.30 - \$1.40/gal.
<u>AVAILABILITY</u>	F.O.B. Gloucester, New Jersey
<u>SPECIFIC GRAVITY</u>	0.830 @ 60° F
<u>FLASH POINT</u>	180° F Tag Open Cup
<u>SHELF LIFE</u>	Unlimited
<u>OTHER</u>	Store @ ambient to 120° F
<u>HUMAN HAZARD</u>	Minimal toxicity. MAC-500 ppm for inhalation

MANUFACTURER'S USE RECOMMENDATIONS

<u>Application Method</u>	Spray undiluted. Agitate. Reacts immediately.
<u>Dosage</u>	Dispersant to oil ratio estimated @ 1:10 by volume
<u>Use Limitations</u>	Recommended for use on light and heavy distillate, residual and crude oil.

BACTO-ZYME

<u>MANUFACTURER</u>	Nevada Enzymes, Inc. 3049 Riegel, Building C Las Vegas, Nevada 89012
<u>COST</u>	\$3.95/gal. (1-55 gal. drum)
<u>AVAILABILITY</u>	F.O.B. Las Vegas, Nevada
<u>PRODUCT DESCRIPTION</u>	Ferment of organic materials - 92%; polyglycols - 2%; amines - 4%; esters - 2% (Liquid Corn Steep)
<u>SOLUBILITY</u>	Completely soluble in water
<u>SHELF LIFE</u>	Unlimited
<u>OTHER</u>	Store under 120° F
<u>HUMAN HAZARD</u>	Non-toxic
<u>MANUFACTURER'S USE RECOMMENDATIONS</u>	
<u>Application Method</u>	Apply in fine spray diluted four times with water. Contact time 0 to 4 hours.
<u>Use Limitations</u>	Recommended for use on distillate and crude oils at temperatures above 50° F.
<u>REMARKS</u>	<p>Ford Motor Company, Central Testing Lab., Dearborn, Michigan, found product to be very effective.</p> <p>Used by City of Denver, Colorado on July 1969 to clean up an asphalt paving residue on lake.</p> <p>Reportedly used by Dept. of Interior, Willow Beach Fish Hatchery at Lake Mead and found safe at a dilution of 25,000 to 1 when used to clean algae from raceways.</p>
<u>REFERENCE</u>	(14)

B&B 2021-S

<u>MANUFACTURER</u>	B&B Chemical Co., Inc. Box 796 Miami, Florida 33166
<u>COST</u>	\$2.20/gal. (55 gal. drum)
<u>AVAILABILITY</u>	Available in bulk on East Coast
<u>PRODUCT DESCRIPTION</u>	Soaps 30-50%; aromatic solvents 48-65%; inhibitors 2-5%
<u>SPECIFIC GRAVITY</u>	0.91
<u>FLASH POINT</u>	> 150° F (C.O.C.)
<u>SHELF LIFE</u>	One Year
<u>HUMAN HAZARD</u>	200 ppm threshold limit value (inhalation)
<u>MANUFACTURER'S USE RECOMMENDATIONS</u>	
<u>Application Method</u>	Spray undiluted with high pressure hoses. Agitate.
<u>Dosage</u>	1 gal. to 50-100 ft ² on a thin slick
<u>Use Limitations</u>	Recommended for use on light and heavy distillate, residual and crude oils
<u>REMARKS</u>	Manufacturer reports 100% effectiveness on thin slicks in Florida waters. Exceeds requirements of MIL-S-22864 (Ships).

Spill Experience:
Incident

Bahamas Agricultural Ltd. of Owens-Illinois used product on oil spill in Bahamas.

Belcher Oil Co., Port Everglades, Florida used product to disperse Bunker C oil spill. Port Everglades Authority reports oil was effectively dispersed and no toxicity effects were observed.

REFERENCE (14)

B&B 2023

<u>MANUFACTURER</u>	B&B Chemical Co., Inc. Box 796 Miami, Florida 33166
<u>COST</u>	\$2.85/gal. (55 gal. drums)
<u>AVAILABILITY</u>	Available in bulk on East Coast
<u>PRODUCT DESCRIPTION</u>	Nonionic detergents - 70%; water - 30%
<u>SPECIFIC GRAVITY</u>	1.01
<u>FLASH POINT</u>	None
<u>SHELF LIFE</u>	Unlimited
<u>HUMAN HAZARD</u>	1000 ppm threshold limit value (inhalation)
<u>MANUFACTURER'S USE RECOMMENDATIONS</u>	
<u>Application Method</u>	Dilute to as much as 25 times with water and spray. Agitate. Reacts immediately.
<u>Dosage</u>	1 gal. to 50-100 ft ² on a thin slick
<u>Use Limitations</u>	More effective at warm temperatures
<u>REMARKS</u>	Manufacturer reports 100% effectiveness on thin slicks. Used at U.S.N. Shipyards at Philadelphia (1969) and Charleston (1970).
<u>REFERENCE</u>	(14)

BESCO B-51-DT

<u>MANUFACTURER</u>	The Besco Corporation 200 N. Myrtle Street Metairie, Louisiana 70004
<u>COST</u>	\$1.80/gal. (1-20 55 gal. drums)
<u>AVAILABILITY</u>	F.O.B. New Orleans, Louisiana
<u>PRODUCT DESCRIPTION</u>	Detergent type with surfactants, coupling agents.
<u>SPECIFIC GRAVITY</u>	1.007
<u>FLASH POINT</u>	Non-flammable
<u>VISCOSITY</u>	34 cps @ 20° C
<u>SOLUBILITY</u>	Soluble in water
<u>SHELF LIFE</u>	Indefinite above freezing
<u>HUMAN HAZARD</u>	Non-toxic
<u>MANUFACTURER'S USE RECOMMENDATIONS</u>	
<u>Application Method</u>	Spray undiluted with low pressure. Agitate after one to three minutes contact time.
<u>Dosage</u>	Dispersant to oil ratio 1:2 to 1:4 by volume.
<u>REMARKS</u>	Manufacturer reports very satisfactory effectiveness in treating oil spills over a fourteen month period.
<u>REFERENCE</u> (14)	

BESCO D-EMULSION NO. 100

<u>MANUFACTURER</u>	The Besco Corporation 200 N. Myrtle Street Metairie, Louisiana 70004
<u>COST</u>	\$1.60/gal. (1-20 55 gal. drums)
<u>AVAILABILITY</u>	F.O.B. New Orleans, Louisiana
<u>PRODUCT DESCRIPTION</u>	Aliphatic petroleum hydrocarbons, nonionic synthetic penetrating surface active agents and coupling agents.
<u>SPECIFIC GRAVITY</u>	0.815
<u>FLASH POINT</u>	120° to 140° F
<u>VISCOSITY</u>	1.65 cps @ 25° C
<u>SOLUBILITY</u>	Emulsifies in water
<u>SHELF LIFE</u>	Unlimited
<u>HUMAN HAZARD</u>	Non-toxic
<u>MANUFACTURER'S USE RECOMMENDATIONS</u>	
<u>Application Method</u>	Spray undiluted with low pressure. Agitate after one to three minutes contact time.
<u>Dosage</u>	Dispersant to oil ratio 1:2 to 1:4 by volume
<u>REMARKS</u>	Manufacturer reports very good effectiveness in treating oil spills over eight year period. Product is presently being replaced by Besco- Slick-440.
<u>REFERENCE</u> (14)	

BESCO SLICK - 440

<u>MANUFACTURER</u>	The Besco Corporation 200 N. Myrtle Street Metairie, Louisiana 70004
<u>COST</u>	\$1.90/gal. (1-20 55 gal. drums)
<u>AVAILABILITY</u>	F.O.B. New Orleans, Louisiana
<u>SPECIFIC GRAVITY</u>	1.061
<u>FLASH POINT</u>	100° to 120° F (C.C.)
<u>VISCOSITY</u>	1.85 cps @ 25° C
<u>SOLUBILITY</u>	Emulsifies in water
<u>SHELF LIFE</u>	Unlimited
<u>HUMAN HAZARD</u>	Non-toxic
<u>MANUFACTURER'S USE RECOMMENDATIONS</u>	
<u>Application Method</u>	Spray undiluted with low pressure. Agitate after one to three minutes contact time.
<u>Dosage</u>	Dispersant to oil ratio 1:2 to 1:4 by volume
<u>REMARKS</u>	Manufacturer reports very good effectiveness and improvement over Besco D Emulsion No. 100. Has been used to treat spills over 3 1/2 year period.
<u>REFERENCE</u>	(14)

BLITZ

<u>MANUFACTURER</u>	The Clarkson Laboratories, Inc. 1450 Ferry Avenue Camden, New Jersey 08104 also 107 Fourth Avenue New York, New York 10003
<u>COST</u>	\$1.95/gal.
<u>AVAILABILITY</u>	F.O.B. Camden, New Jersey or San Francisco, California
<u>SPECIFIC GRAVITY</u>	1.020
<u>FLASH POINT</u>	Non-flammable
<u>SOLUBILITY</u>	Soluble in water
<u>SHELF LIFE</u>	Unlimited
<u>OTHER</u>	Store @ 32° F to 100° F If desired, add 25% ethylene glycol to prevent freezing.
<u>HUMAN HAZARD</u>	Non-toxic
<u>MANUFACTURER'S USE RECOMMENDATIONS</u>	
<u>Application Method</u>	Spray diluted 2:1 with water
<u>Dosage</u>	Dispersant to oil ratio 1:15 by volume
<u>Use Limitations</u>	Recommended for use on distillate fuel oil or fresh crude.
<u>REMARKS</u>	Manufacturer reports product disperses 100% of the oil that it emulsifies. Used in New York Harbor by Texaco Oil Company and in Camden, New Jersey to disperse gasoline spill on land (1967). Effectiveness not reported.

BP-1002

<u>MANUFACTURER</u>	BP North America, Inc. 620 Fifth Avenue New York, New York 10020
<u>COST</u>	\$1.08/gal.
<u>AVAILABILITY</u>	F.O.B. United Kingdom
<u>PRODUCT DESCRIPTION</u>	Nonionic emulsifiers in aromatic petroleum solvent (kerosene) (60-70% aromatic), 3% coconut oil, 12% sulfonated dodecyl benzene.
<u>SPECIFIC GRAVITY</u>	0.88 @ 15.5° C
<u>FLASH POINT</u>	115° F (P.M.C.C.)
<u>VISCOSITY</u>	> 10 cp @ 20° C
<u>SOLUBILITY</u>	Emulsifies in water
<u>HUMAN HAZARD</u>	Non-toxic but prevent eye contact
<u>MANUFACTURER'S USE RECOMMENDATIONS</u>	
<u>Application Method</u>	Spray undiluted. Contact time - none
<u>Dosage</u>	Dispersant to oil ratio 1:5 to 1:10 by volume
<u>Use Limitations</u>	Recommended for use on all oils both on water and shore.
<u>REMARKS</u>	Manufacturer reports product effective for sea and shore use.
<u>Other</u>	Dispersant to oil ratio of 1:10 emulsifies 82% of HD-SAE 20 motor oil.(1) Gulf Oil reports 1:10 ratio effective for black oils.

Spill Experience:

Incident

Anne Mildred Brøvig, February 1966, North Sea - Amount of oil treated
unknown.

Torrey Canyon, March 1967, Cornwall, England - 540,000 gallons at sea
1,200,000 gallons on shore

It was estimated that use at sea prevented 14,000 tons of "Torrey Canyon"
oil from reaching shore. Effectiveness reports are conflicting.

Toxicity Tests:

<u>Species</u>		<u>Reference</u>
Mummichog (<u>Fundulus heteroclitus</u>)	24 hr TL _m 10 mg/l 96 hr TL _m 10 mg/l	(13)
Pink Shrimp (<u>Pandalus montagui</u>)	48 hr TL _m 5.8 ppm	(3)
Brown Shrimp (<u>Crangon crangon</u>)	48 hr TL _m 5.8 ppm	(3)
Shore Crabs (<u>Carcinus maenas</u>)	48 hr TL _m 15. ppm	(3)
Cockles (<u>Cardium edule</u>)	48 hr TL _m 81. ppm	(3)
Marine Fish (<u>Gambusia</u>)	6 of 21 dead in 24 hr @ 1 ppm	(23)
	12 of 22 dead in 24 hr @ 15 ppm	(23)
	21 of 21 dead in 24 hr @ 30 ppm	(23)

BP-1100

MANUFACTURER BP North America, Inc.
620 Fifth Avenue
New York, New York 10020

COST \$1.00 - \$1.50/gal.

AVAILABILITY In U. S. - B.P. Corp., Marcus Hook, Pennsylvania

PRODUCT DESCRIPTION Oil-soluble nonionic emulsifiers in petroleum-based solvents (non-aromatic)

SPECIFIC GRAVITY 0.82 - 0.83 @ 20° C

FLASH POINT 80° F (PMCC) Flammable

VISCOSITY > 10 cp @ 20° C

SOLUBILITY Emulsifies in water

HUMAN HAZARD Non-toxic. Avoid inhalation or eye contact.

MANUFACTURER'S USE RECOMMENDATIONS

Application Method Spray undiluted. Agitate.

Dosage Dispersant to oil ratio 1:10 by volume.

Use Limitations Recommended for use on all oils on water and shores. On sandy beaches spray one hour before tide comes in after exposing oily sand.

Toxicity Tests:

<u>Species</u>	<u>Reference</u>
Brown shrimp (<u>Crangon crangon</u>) 48 hr TL _m > 3300 ppm	(14)

CASOL

<u>MANUFACTURER</u>	Wyandotte Chemicals Corp. J. B. Ford Division Wyandotte, Michigan 48192
<u>COST</u>	\$2.00/gal. (55 gal. drum)
<u>AVAILABILITY</u>	Five manufacturing plants: Los Angeles, California; Stroudsburg, Pennsylvania; Atlanta, Georgia; Wyandotte, Michigan; and Venezuela
<u>PRODUCT DESCRIPTION</u>	Polyglycols - 20%; aliphatic solvents - 80%
<u>SPECIFIC GRAVITY</u>	0.82 - 0.88
<u>FLASH POINT</u>	> 190° F (T.C.C.) 100% volatile. Product will burn.
<u>VISCOSITY</u>	ca 5 cs.
<u>SOLUBILITY</u>	Emulsifies with water - mixes with oil type solvents
<u>SHELF LIFE</u>	Unlimited
<u>OTHER</u>	Store at 0° F to 140° F 5-day BOD @ 20° C 600,000 mg/l ⁽¹⁵⁾
<u>HUMAN HAZARD</u>	Ingestion toxicity and toxic effects, as well as therapeutic treatment, same as for kerosene or fuel oil. Maximum allowable concentration 500 ppm 8 hour exposure.

MANUFACTURER'S USE RECOMMENDATIONS

<u>Application Method</u>	Spray undiluted. Agitate.
<u>Dosage</u>	Dispersant to oil ratio 1:5 by volume
<u>Use Limitations</u>	Recommended for use on light and heavy distillate, residual, and crude oils. Works best in fresh water, but has been successful in sea water.

Toxicity Tests:

<u>Species</u>		<u>Reference</u>
Fathead minnow (<u>Pimephales promelas</u>)	96 hr TL _m 32.0 ppm	(15)
Goldfish	24 to 96 hr LD ₅₀ 15 ppm	(25)

COLLOID-88 OIL SLICK DISPERSANT

<u>MANUFACTURER</u>	Colloid Chemical Co. 31 Perkins Street Brockton, Massachusetts 02402
<u>COST</u>	\$2.50 - \$3.75/gal.
<u>AVAILABILITY</u>	F.O.B. Brockton, Massachusetts
<u>PRODUCT DESCRIPTION</u>	An aqueous based suspension of microscopically sized particles of an inert mineral with emulsion stabilizers and penetrants in small amounts.
<u>SPECIFIC GRAVITY</u>	1.15 @ 77° F
<u>FLASH POINT</u>	Non-flammable
<u>VISCOSITY</u>	88 cp @ 68° F
<u>SOLUBILITY</u>	Insoluble in water
<u>SHELF LIFE</u>	Unlimited
<u>OTHER</u>	Fluid to 20° F
<u>HUMAN HAZARD</u>	Avoid eye or skin contact.
<u>MANUFACTURER'S USE RECOMMENDATIONS</u>	
<u>Application Method</u>	Spray diluted 49 to 99 times with sea water at high pressure. Immediate reaction.
<u>Dosage</u>	Dispersant to oil ratio 1:2 to 1:50 by volume.
<u>Use Limitations</u>	Use on light and heavy distillate, residual and crude oils. Does not sink or permanently emulsify oil, only disperses it into minute floating globules. Do not use over shellfish beds.
<u>REMARKS</u>	Manufacturer reports one part of agent disperses 10 parts Bunker C or 50 parts No. 2 fuel oil. Product may be called S-1, or Coastal Services 88.

Spill Experience:

Incident

"Ocean Eagle", San Juan, Puerto Rico (March 1968)

Over 1000 spills treated in last two years in New England, Fort Lauderdale and Tampa, Florida.

City Service spill, Braintree, Massachusetts (June 1969)

Buzzards Bay, Massachusetts (September 1969)

Effectiveness not reported for above incidents.

Toxicity Tests:

<u>Species</u>		<u>Ref.</u>
Snails (<u>Litorina littorea</u>)	- Safe @ 1000 ppm with or without oil	(14)
Sea urchins	- Safe @ 1000 ppm with or without oil	"
Other fish	- Safe @ 1000 ppm with or without oil	"
Clams (<u>Mercenaria mercenaria</u>)	- Not safe for use over shellfish beds	
Softshell clam (<u>Mya arenia</u>)	- 96 hr TL _m 45 ppm	(33)
Mummichog (<u>Fundulus heteroclitus</u>)	96 hr TL _m 70 ppm	"
Winter flounder (<u>Psuedo pluronectes</u>)	96 hr TL _m 10 ppm*	"
Lobster (<u>Homorus americana</u>)	96 hr TL _m 46 ppm	"
Edible mussel (<u>Mytilus edulis</u>)	96 hr TL _m 54 ppm*	"
Atlantic silverside	96 hr TL _m 32 ppm	"

*tentative subject to revision

**COREXIT 7664
AND
COREXIT 7664* (Star on Drum)**

<u>MANUFACTURER</u>	Enjay Chemical Co. 60 West 49 Street New York, New York. 10020	
<u>COST</u>	\$3.50 to \$3.90/gal.	
<u>AVAILABILITY</u>	Major ports and cities in U. S.	
<u>PRODUCT DESCRIPTION</u>	Water-based nonionic-polyhydric alcohol ester of fatty acid with isopropyl alcohol and water solvents.	
	<u>Original 7664</u>	<u>Modified 7664*</u>
<u>SPECIFIC GRAVITY</u>	1.004 @ 60° F	1.02 @ 60° F
<u>FLASH POINT</u>	90° F (T.O.C.)	> 175° F (T.O.C.)
<u>VISCOSITY</u>	30 Cs @ 100° F 500 Cs @ 32° F	160 SSU @ 100° F 115 Cs @ 32° F
<u>SOLUBILITY</u>	Soluble in water	Soluble in water
<u>SHELF LIFE</u>	Unlimited	
<u>OTHER</u>	Pour Point - 5° F 5-day BOD - 380,000 mg/l ⁽¹⁵⁾	Pour Point + 25° F Store above 30° F
<u>HUMAN HAZARD</u>	Avoid eye contact. For inhalation threshold limit is 400 ppm.	

MANUFACTURER'S USE RECOMMENDATIONS

<u>Application Method</u>	Spray diluted 16 to 24 times with water. Reaction time - immediate on agitation.
<u>Dosage</u>	Dispersant to oil ratio 1:10 to 1:50 by volume.
<u>Use Limitations</u>	For use on light and heavy liquid oils (distillates, residuals and crude oils). Marginal effectiveness on oils with viscosities > 1000 Cs or under calm conditions without external agitation. Not effective below 25° F.

REMARKS Manufacturer reports 100% effectiveness in lab tests.

Dispersant to oil ratio of 1:2 to 1:5 was required to disperse seven crude oils and three fuel oils. Most effective on fuel oils and cambrian crude. Least effective on Leduc Crude. On a 1 (high) to 4 (low) scale, Corexit rated 2.5⁽¹⁷⁾.

Spill Experience:

Incident

General Colocotronis off Bahamas	- 50 drums used. Amount of oil treated - unknown.
Esso Essen off Africa	- 100 drums used. Amount of oil treated - unknown.
Esso Andron off Africa	- 168 drums used. Amount of oil treated - unknown.
Santa Barbara, California	- ? drums used. Amount of oil treated - unknown.
Polycommander, Aruba N.W.I.	- 35 drums used. Amount of oil treated - unknown.

Toxicity Tests:

Species

See attached table.

SUMMARY OF TOXICITY TESTS ON COREXIT 7664

<u>Test Organism</u>	<u>Oil</u>	<u>Reported As</u>	<u>Concentration</u>	<u>Reference</u>
Steelhead Fingerling	None	96 hr TL _m	15.8 mg/l	(6)
Pacific oyster larva (<u>Crassostrea gigas</u>)	None	Non-toxic	10 mg/l	"
	None	Toxic	40 mg/l	"
Shrimp (<u>Penaeus sp.</u>)	None	48 hr TL _m	5,000 ppm	(34)
Shrimp (<u>Palaemonetes sp.</u>)	None	48 hr TL _m	10,000 ppm	"
With 10X So. La. Crude Oil, depending on oil		48 hr TL _m	50-500 ppm	"
Mummichog (<u>Fundulus heteroclitus</u>)	None	24 hr TL _m	> 10,000 mg/l	(13)
		96 hr TL _m	2,300 mg/l	"
Fathead minnow (<u>Pimephales promelas</u>)	None	96 hr TL _m	> 3,200 ppm	(15)
With 2X Mich. Crude Oil		24 hr TL _m	1,800 ppm	"
<u>Fundulus parvipinnis</u>	None	24 hr TL _m	> 15,900 ppm	(18)
		96 hr TL _m	7,200 ppm	"
Fathead minnow (<u>Pimephales promelas</u>)	None	96 hr TL _m	> 10,000 ppm	(17)
Shrimp (<u>Penaeus duorarum</u>)	None	No Kill, 24 hrs	10,000 ppm	(23)
Fish (<u>Gambusia</u>)	None	No Kill, 48 hrs	10,000 ppm	"
Zebra fish (<u>Brachydanio rerio</u>)	None	No Kill, 24 hrs	15,000 ppm	(12)
Rockfish (<u>Clinidae</u>)	None	No Kill, 24 hrs	500-1,000 ppm	(32)
	None	No Kill, 12 hrs	10,000 ppm	"
Whelk (<u>Burnupena sp.</u>)	None	No Kill, 24 hrs	10,000 ppm	"
Limpet (<u>Patella granularis</u>)	None	Kill, 24 hrs	1-10,000 ppm	"

SUMMARY OF TOXICITY TESTS ON COREXIT 7664 (Cont'd)

<u>Test Organism</u>	<u>Oil</u>	<u>Reported As</u>	<u>Concentration</u>	<u>Reference</u>
Starfish (<u>Asterina exigua</u>)	None	No Kill, 24 hrs	500- 1,000 ppm	(32)
Abalone (<u>Haliotis midae</u>)	None	Behavioral Stress, 6 hrs	> 10- 500 ppm	"
Rock Lobster (<u>Fasus lalandii</u>)	None	No Kill, 24 hrs	500 ppm	"
Periwinkles (<u>Oxystele variegata</u>)	None	No Kill, 24 hrs	10,000 ppm	"
Pacific northern onchovy (<u>Engraulis mordax</u>)	None	118 hrs TL _m	10 ppm	(35)
Sailfin Molly (<u>Poecilia latipinna</u>)				
With 10X So. La. Crude	Oil	All alive, 24 hrs	1,000 ppm	(23)
		All dead, 24 hrs	10,000 ppm	"
Oysters	None	No effects, 8 days	8,000 ppm	"
Atlantic salmon parr	None	No Kill, 96 hrs	500 ppm	"
Herring	None	142 hrs TL _m	500 ppm	"
Bluegill	None	96 hrs TL _m	398 ppm	(33)
Yellow Peach	None	96 hrs TL _m	398 ppm	"

COREXIT 8666

<u>MANUFACTURER</u>	Enjay Chemical Co. 60 West 49 Street New York, New York 10020
<u>COST</u>	\$3.50 to \$3.90/gal.
<u>AVAILABILITY</u>	Major ports and cities in U. S.
<u>PRODUCT DESCRIPTION</u>	Same as Corexit 7664 except contains aliphatic hydrocarbon solvent.
<u>SPECIFIC GRAVITY</u>	0.840 @ 60° F
<u>FLASH POINT</u>	185° F (T.O.C.)
<u>VISCOSITY</u>	25 Cs @ 32° F 57 Cs @ 0° F 50 SSU @ 100° F
<u>SOLUBILITY</u>	Disperses in water
<u>SHELF LIFE</u>	Unlimited
<u>OTHER</u>	Pour point 80° F
<u>HUMAN HAZARD</u>	Avoid eye and skin contact
<u>MANUFACTURER'S USE RECOMMENDATIONS</u>	
<u>Application Method</u>	Spray full strength as a thin film. Agitate. Reacts immediately.
<u>Dosage</u>	Dispersant to oil ratio 1:10 to 1:100 by volume.
<u>Use Limitations</u>	Use on light and heavy liquid distillate, residual and crude oils. Not for use in potable water supplies.
<u>REMARKS</u>	Manufacturer reports product particularly effective for heavy viscous fuel and crude oils. Product will disperse 10 to 25 its own volume of oil.

Spill Experience:

Incident

Tanker "Arrow", Nova Scotia, Canada - Very limited use with unknown results.

"Delian Appollon", Tampa Bay, Florida - Used on shore. Effectiveness not reported.

Toxicity Tests:

<u>Species</u>			<u>Reference</u>
Sailfin molly (<u>Poecilla latipinna</u>)	24 hr, No Kill	10,000 ppm	(24)
Zebra fish (<u>Brachydanio rerio</u>)	24 hr, No Kill	20,000 ppm	(12)
	96 hr, Non-toxic	10,000 ppm	(14)

TOXICITY DATA ON COREXIT 8666 (24)

BY MARINE BIOLOGICAL ASSOCIATION OF THE U.K., PLYMOUTH

	<u>Number of Gobies (<i>Gobius minutus</i>) dead</u> <u>Number of Gobies tested</u>			
<u>Corexit 8666 after</u>	<u>24 hrs.</u>	<u>48 hrs.</u>	<u>72 hrs.</u>	<u>96 hrs.</u>
Control	0/10	0/10	1/10	1/10
10,000 ppm	0/10	0/10	0/10	0/10
5,000 ppm	0/10	1/10	1/10	2/10
<u>Corexit 8666 + Oil</u>				
<u>ppm</u>				
2000 + 8000 (4000)	0/10	2/10		
1000 + 4000 (1700)	0/10	0/10		
500 + 2000 (.930)	0/20	0/20		
2000 + 8000 (2000)	0/10	2/10	2/10	3/10 (5 survivors poor)
1000 + 4000 (1000)	0/10	1/10	2/10	5/10
500 + 2000 (500-1000)	0/10	0/10	0/10	0/10

	<u>Number of Shrimp (<i>Crangon crangon</i>) dead</u> <u>Number of Shrimp tested</u>			
1000 + 4000	0/10	7/10 (3 survivors poor)		
500 + 2000	1/10	4/10	7/10	7/10
200 + 800	0/10	2/10	3/10	4/10
100 + 400 (200)	0/15	1/15	5/15	6/15

NOTES: 1. Number in parenthesis represents actual oil measured in suspension.
Note comparison to concentration of oil added.

2. Oil used was Kuwait crude residue after topping at 250° C.

TOXICITY DATA ON COREXIT 8666⁽²⁴⁾

From Sprague, J. B., "Progress Report on Toxicity of Corexit and/or Bunker C Oil". Fisheries Board of Canada (March 2, 1970).

Extensive tests on Corexit 8666 alone and with oil were initiated as a result of its proposed use following the ARROW spill in Nova Scotia. These tests included:

- . Pollack in sea water at about 3-5° C.
- . Tilapia (a tropical fish) in half sea water at 23° C.
- . Salmon in fresh water at 4° C and 15° C.
- . Shore crab in sea water at 4° C.
- . Winter flounders at 4° C.
- . Lobsters at 4° C.

Some typical results included:

- . 1000 ppm Corexit 8666 did not kill Pollack or Tilapia after two days.
- . 1000 ppm Corexit 8666 did not kill salmon or shore crab after six days.
- . 50,000 ppm Corexit 8666 + Bunker C was lethal threshold to beach-living marine crustacean (*Gammarus oceanicus*).
- . 1000 ppm Corexit 8666 + 1000 ppm Bunker C was slowly lethal to small salmon and killed same in 2-4 days; one of two shore crabs died after 4 days, the other survived 6 days.

DI-CHEM 320

<u>MANUFACTURER</u>	Diversified Chemicals Corp. 8100 Electric Avenue Stanton, California 90680
<u>COST</u>	\$2.15/gal. (55 gal. drum)
<u>AVAILABILITY</u>	F.O.B. Stanton, California
<u>PRODUCT DESCRIPTION</u>	Anionic - 26%; water diluent 50%
<u>SPECIFIC GRAVITY</u>	1.035 @ 60° F
<u>FLASH POINT</u>	Non-flammable
<u>SOLUBILITY</u>	Soluble in water
<u>SHELF LIFE</u>	More than two years
<u>OTHER</u>	Storage @ 30° F to 120° F
<u>HUMAN HAZARD</u>	Avoid prolonged skin contact

MANUFACTURER'S USE RECOMMENDATIONS

<u>Application Method</u>	Apply by high pressure spray (500-2000 psi) with positive displacement pump and eductor diluting 50 times with water. Agitate. Reacts immediately.
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<u>Dosage</u>	Oil to dispersant ratio 1:5 to 1:50 by volume
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<u>Use Limitations</u>	Recommended for use on light and heavy distillate, residual and crude oils.
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<u>REMARKS</u>	Manufacturer reports 100% of oil dispersed. One ppm disperses five ppm oil. No separation of oil when 5 cc of oil and 50 to 5000 ppm dispersant were mixed with 95 cc of water.
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REFERENCE (14)

Toxicity Tests:
Species

No effects with tropical fish @ 50 ppm

Reference

(25)

DISPERSE-OIL

<u>MANUFACTURER</u>	Pepper Tank Cleaning Co. 2000 McKinley Avenue National City, California 92050
<u>COST</u>	\$1.20 to \$1.25/gal.
<u>AVAILABILITY</u>	F.O.B. National City, California
<u>PRODUCT DESCRIPTION</u>	A concentrated mixture of water-based synthetic detergents and surface active agents fortified with highly active phosphates.
<u>SPECIFIC GRAVITY</u>	1.030 @ 60° F
<u>FLASH POINT</u>	Non-flammable
<u>SOLUBILITY</u>	Soluble in water. Compatible with petroleum solvents.
<u>SHELF LIFE</u>	One year (at least)
<u>OTHER</u>	Store above 32° F Freezes at 32° F without separation
<u>HUMAN HAZARD</u>	Non-toxic
<u>MANUFACTURER'S USE RECOMMENDATIONS</u>	
<u>Application Method</u>	Apply by high pressure (300 psi) sprayer, with eductor, diluting 4 to 6 times with sea water for Bunker C, and diluting 2 times with sea water for diesel oil. May also be applied as foam, although effectiveness is decreased. Agitate. Reacts immediately.
<u>Dosage</u>	Dispersant to oil ratio 1:1 to 1:4 by volume for Bunker C. 1:6 to 1:10 by volume for diesel and JP-4.
<u>Use Limitations</u>	Recommended for use on light and heavy distillate, residual and crude oils. Not effective on heavy asphalt residuals. Not for use in potable water supplies.

Spill Experience:
Incident

November 1968 - 86,000 gallons of Bunker C in San Diego Bay dispersed with 21,000 gallons of product. Numerous spills (80-100/yr) of distillate and Navy special in San Diego Bay⁽¹⁴⁾. Effectiveness not determined.

Toxicity Tests:
Species

Reference

Mummichog (<u>Fundulus heteroclitus</u>)	24 hr TL _m 42 ppm	(25)
	48 hr TL _m 42 ppm	
	96 hr TL _m 40 ppm	

DISPERSOL OS

<u>MANUFACTURER</u>	ICI America, Inc. 151 South Street Stamford, Connecticut 06904
<u>COST</u>	\$2.76/gal.
<u>PRODUCT DESCRIPTION</u>	Nonionic polyethanoxo compound approximately 10%; isopropanol diluent approximately 90%.
<u>SPECIFIC GRAVITY</u>	0.796 @ 68° F
<u>FLASH POINT</u>	53° F (Abel C.C.) Highly inflammable
<u>VISCOSITY</u>	1 cp @ 68° F
<u>SOLUBILITY</u>	Active agent insoluble in water. Completely soluble in oil.
<u>SHELF LIFE</u>	Unlimited
<u>OTHER</u>	Store between 23° F - 140° F Boiling point: 179.6° F Pour point - free flowing down to -5° C
<u>HUMAN HAZARD</u>	Harmful to eye tissue. Concentrations of isopropanol greater than 400 ppm by volume are unsatisfactory for working conditions. Explosive limits by volume in air: Lower 2% Upper 12% Vapor is heavier than air.
<u>MANUFACTURER'S USE RECOMMENDATIONS</u>	
<u>Application Method</u>	Spray undiluted. Spraying equipment must be grounded. During use there should be no smoking, sparks or open flames.
<u>Dosage</u>	1 gallon per 20/yd ² of slick, 250 gallons/acre. Dispersant to oil ratio 1:2 to 1:10 by volume.
<u>Use Limitations</u>	Recommended for use on light and heavy distillate, residual and crude oils.

Toxicity Tests:

<u>Species</u>		<u>Reference</u>	
Brown Shrimp	LD ₅₀ 3000/10,000 ppm	(14)	
Sea Shrimp	LD ₅₀ 1%	(25)	
Gobies (<u>Gobius minutus</u>)	No survival 24 hrs 1,000 ppm	(24)	
	6 of 10 dead 48 hrs 500 ppm		
	5 of 10 dead 72 hrs 200 ppm		

F.O. 300-B

F.O. 300-H*

<u>MANUFACTURER</u>	Fine Organics, Inc. 205 Main Street Lodi, New Jersey 07644
<u>COST</u>	\$1.80/gal.
<u>AVAILABILITY</u>	F.O.B. Lodi, New Jersey
<u>PRODUCT DESCRIPTION</u>	Synthetic emulsion degreasers. Nonionics, 10%; aromatic hydrocarbons, 41%; aliphatic hydrocarbon, 49%. Also contains couplers and inhibitors.
<u>SPECIFIC GRAVITY</u>	0.875
<u>FLASH POINT</u>	180° F (C.O.C.) for 300-B 210° F (C.O.C.) for 300-H
<u>VISCOSITY</u>	> 0.5 poises
<u>OTHER</u>	Storage @ 0° F to 140° F for 300-B @ 0° F to 180° F for 300-H

MANUFACTURER'S USE RECOMMENDATIONS

<u>Application Method</u>	Spray undiluted. Agitate. May be diluted with fuel oil, fresh or salt water.
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<u>Dosage</u>	Dispersant to oil ratio 1:2 by volume.
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<u>Use Limitations</u>	Recommended for light and heavy distillate, residual and crude oils.
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<u>REMARKS</u>	Used on local harbor spills, Newark Bay, Passaic River, Delaware River, 1966-1968 ⁽¹⁴⁾ . Effectiveness not determined.
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*Formula identical except for a higher boiling aliphatic hydrocarbon which results in higher flash point. Results will be equal to 300-B.

Toxicity Tests:

<u>Species</u>		<u>Reference</u>
Steelhead minnow fingerlings	96 hrs TL _m 65.0 ppm	(6)
Pacific oyster larvae	Toxic 4.0 ppm	(6)
<u>Crassostrea gigas</u>	Non-toxic 1.0 ppm	

FOILZOIL

MANUFACTURER Sea-Air Chemical Corp.
32-00 Borden Avenue
Long Island City, New York 11106

COST \$2.05/gal.

AVAILABILITY F.O.B. Long Island City, New York

PRODUCT DESCRIPTION Tank cleaner. Polyglycols (non-solvent)

SPECIFIC GRAVITY 1.02 @ 68° F

FLASH POINT Non-flammable

VISCOSITY Slightly more than water

SOLUBILITY Soluble in water

SHELF LIFE Unlimited

OTHER Keep from freezing

HUMAN HAZARD Non-toxic

MANUFACTURER'S USE RECOMMENDATIONS

Application Method Coarse spray - contact time varies. Can be sprayed diluted with equal quantity of water.

Dosage Dispersant to oil ratio 1:5 by volume or 10 gals/1000 ft² of oil slick.

Use Limitations Use on petroleum oils and distillate fuels.

REMARKS Manufacturer reports 96% of oil dispersed in field tests.

Toxicity Tests:

<u>Species</u>		<u>Reference</u>
Mummichog (<u>Fundulus heteroclitus</u>)	24 hr TL _m 42 mg/l	(13)
	96 hr TL _m 31 mg/l	(13)

(GAMLEN) D SOLVENT

MANUFACTURER Gamlen Chemical Co.
321 Victory Avenue
South San Francisco, California 94080

COST \$2.10/gal.

PRODUCT DESCRIPTION Tank and bilge cleaning solvent. Highly concentrated detergent containing kerosene.

SPECIFIC GRAVITY 0.870 @ 70° F

FLASH POINT > 150° F (C.O.C.)

OTHER Fire Pt.: 165° F (min.)
B.O.D. 864,000 mg/l (19)

HUMAN HAZARD Avoid eye and skin contact

APPLICATION METHOD Spray

REMARKS In lab tests 1:1 ratio emulsified 16.1% of Navy Special grade fuel oil(9).

Toxicity Tests:

<u>Species</u>			<u>Reference</u>
Pink shrimp (<u>Pandalus montagui</u>)	48 hr TL _m	11.5 mg/l	(3)
Brown shrimp (<u>Crangon crangon</u>)	48 hr TL _m	9.6 mg/l	"
Cockles (<u>Cardium edule</u>)	48 hr TL _m	38.8 mg/l	"
Daphnids (<u>Daphnia magna</u>)	24 hr TL _m	13.7 ppm	(19)
" " "	48 hr TL _m	2.9 ppm	"
" " "	72 hr TL _m	1.5 ppm	"
" " " w/crude oil	24 hr TL _m	24.4 ppm	"
" " " " " "	48 hr TL _m	10.7 ppm	"
" " " " " "	72 hr TL _m	9.1 ppm	"
Bluegills - Kills within 5 minutes @		10.0 ppm	"

GAMOSOL OIL SPILL REMOVER

<u>MANUFACTURER</u>	Gamlen Chemical Co. 321 Victory Avenue South San Francisco, California 94080 also 11 Broadway New York, New York 10017
<u>COST</u>	\$3.25/gal. (1-55 gal. drum)
<u>AVAILABILITY</u>	South San Francisco, California East Paterson, New Jersey Mobile, Alabama
<u>PRODUCT DESCRIPTION</u>	Tanker and bilge cleaning solvent. Polyglycols, 9%; polyethanol, 18%; aromatic hydrocarbons, 73%.
<u>SPECIFIC GRAVITY</u>	0.92 @ 60° F
<u>FLASH POINT</u>	> 150° F (C.O.C.)
<u>VISCOSITY</u>	43 S.S.U. @ 100° F
<u>SOLUBILITY</u>	Emulsifies in water
<u>SHELF LIFE</u>	Unlimited
<u>OTHER</u>	Fire point: 155° F Store @ 0° to 125° F
<u>HUMAN HAZARD</u>	Avoid eye or skin contact
<u>MANUFACTURER'S USE RECOMMENDATIONS</u>	
<u>Application Method</u>	Spray as a solid jet, undiluted, through a small jet nozzle under pressure or dilute 5 to 10 times with water. Immediate reaction.
<u>Dosage</u>	Dispersant to oil ratio 1:6 to 1:10 by volume.
<u>Use Limitations:</u>	For use on light and heavy distillate, residual and crude oils. Minimal effects @ 28° F.
<u>REMARKS</u>	Manufacturer reports 95% of oil dispersed. Product meets specification of MIL-S-A22864 (ships). In lab tests at 1:1 ratio emulsified 20.8% ⁽⁹⁾ and 26.7% ⁽¹⁶⁾ of Navy Special grade fuel oil (referred to as Gamosol at time of tests). Principal oil spill emulsifier stocked by Royal Navy at time of Torrey Canyon incident. Used by Royal Navy in England and Australia.

Spill Experience:

Incident

Anne Mildred Brøvig, February 1966 - Effectiveness undetermined

Torrey Canyon, March 1967 - Effectiveness undetermined

Toxicity Tests:

<u>Species</u>		<u>Reference</u>
Mummichog (<u>Fundulus heteroclitus</u>)	24 hr TL _m 6.4 mg/l	(13)
	96 hr TL _m 6.4 mg/l	(13)
Zebra fish (<u>Brachydanio rerio</u>)		
No survival.....	24 hr @ 15 ppm	(12)
Pink shrimp (<u>Pandalus montagui</u>)	48 hr TL _m 12.5ppm	(3)
Brown shrimp (<u>Crangon crangon</u>)	48 hr TL _m 8.8ppm	(3)
Shore crabs (<u>Carcinus maenas</u>)	48 hr TL _m 20.4ppm	(3)
Cockles (<u>Cardium edule</u>)	48 hr TL _m 15.8ppm	(3)

GOLD CREW DISPERSANT

<u>MANUFACTURER</u>	Ara Chem, Inc. P. O. Box 5031 San Diego, California 92105
<u>COST</u>	\$2.50 - \$2.75/gal.
<u>AVAILABILITY</u>	F.O.B. San Diego, California
<u>PRODUCT DESCRIPTION</u>	Concentrated water-based nonionics and lesser quantity of arly-sulfonates.
<u>SPECIFIC GRAVITY</u>	1.035 @ 68° F
<u>FLASH POINT</u>	Non-flammable
<u>VISCOSITY</u>	300 cp @ 68° F
<u>SOLUBILITY</u>	Soluble in water
<u>SHELF LIFE</u>	Unlimited
<u>OTHER</u>	Store @ 0° F to 180° F
<u>HUMAN HAZARD</u>	Avoid eye or open-cut contacts. Non-irritating to skin.

MANUFACTURER'S USE RECOMMENDATIONS

<u>Application Method</u>	Spray in a hard coarse spray, diluted 80 times with water @ 150 to 175 psi pressure using Ara-Chem System *which includes injector pump, 200-300 gpm spray pump and two 1 1/2" spray nozzles. No other agitation required.
<u>Dosage</u>	Dispersant to oil ratio 1:5 to 1:15 by volume.
<u>Use Limitations</u>	Use on light and heavy distillate, residual and crude oils up to semi-solid weathered state at any temperature. Not recommended for beach cleaning although product is claimed quite effective for this purpose.
<u>REMARKS</u>	Manufacturer reports 100% of oil dispersed. One part product to 30 parts oil in lab tests.

*The Ara Chem System cuts a 60-foot swath through the oil slick at boat speeds of 3 to 6 mph with dispersant usage of 1/2 to 3 bbls/hr. The system is continuous, requiring no prior mixing of dispersant.

At 1:1 ratio emulsified 27.1% Navy Special fuel oil⁽⁹⁾.

Spill Experience:

Incident

San Diego Bay, California - 8 years experience on U. S. Navy Oil Spills.

Santa Barbara, California (Feb. 1969). Effectiveness not reported.

Toxicity Tests:

Species

Reference

Fundulus parvipinnis 24 hr TL_m 128 ppm

(18)

96 hr TL_m 128 ppm

HEMCO NO. 2

MANUFACTURER Hemisphere Marine Chemicals Co., Inc.
300 Main Street
Orange, New Jersey 07050

COST \$2.75/gal.

AVAILABILITY F.O.B. Orange, New Jersey
also
Halifax, N.S.; Portland, Maine; and Gulf Coast;
Caribbean Islands and Canal Zone

PRODUCT DESCRIPTION Aromatic solvent type emulsifier

SPECIFIC GRAVITY 0.895 @ 60° F

FLASH POINT 160° F (C.O.C.)

OTHER Solvent is not biodegradable

MANUFACTURER'S USE RECOMMENDATIONS

Application Method Spray undiluted. Contact time, 15 to 20 minutes
before agitation. Educted - dilute 24 to 49 times
with water for cleaning beaches and rocks.

Dosage Varies

Use Limitations For use on oil polluted beaches and harbor waters
from -70° F to 140° F.

Spill Experience:

Incident

Ocean Eagle, San Juan, Puerto Rico (March 1968).
Halifax, Nova Scotia by Atlantic Salvage and Dredging Co.
Palm Beach, Florida by Spencers Boatyard.
West Palm Beach, Florida by Florida Diesel Co. (1966-1969).
New York Harbor by William J. Snee Co. (1970).

Effectiveness not reported on above.

Toxicity Tests:

<u>Species</u>			<u>Reference</u>
Silversides (<u>Atherinomorus stipes</u>)	6 hrs TL ₁₀₀	100 ppm	(14)
Moharra (<u>Eucinostomus argenteus</u>)	6 hrs TL ₁₀₀	27 ppm	(14)
	24 hrs all survived	10 ppm	(14)

**HOLL-CHEM #622
OIL SPILL DISPERSANT**

MANUFACTURER Holl-Chem, Inc.
502-A Maritime Building
Seattle, Washington 98104

COST \$3.15 - \$3.30/gal.

AVAILABILITY F.O.B. Seattle, Washington 98104

PRODUCT DESCRIPTION Polyglycols, 23%; alkyl-aryl sulphonates,
14.5%; aromatic petroleum solvent, 62.5%.

SPECIFIC GRAVITY 0.958 @ 60° F

FLASH POINT 205° F (C.O.C.)

SOLUBILITY Soluble in water

SHELF LIFE Unlimited

OTHER Store @ 0-140° F

MANUFACTURER'S USE RECOMMENDATIONS

Application Method Spray. Agitate immediately.

Dosage Dispersant to oil ratio 1:10 by volume but varies.

Use Limitations Use @ 40° F or above on light and heavy distillate
residual and crude oil. Not effective on weathered
crudes. Not for beach cleaning.

REMARKS Manufacturer reports 99% effectiveness and 10 years
experience of product use in Puget Sound and
coastal waters from Alaska to Oregon.

Lab tests rated product as 2 on a scale 1 (low) to
4 (high) tested visually on medium weight crude
oil (API Gravity 29.9)⁽¹⁷⁾.

Toxicity Tests:

<u>Species</u>		<u>Reference</u>
Steelhead minnow	96 hr TL _m 3.2 mg/l	(6)
Pacific oyster larvae - Toxic	0.1 ppm	(6)
<u>Crassotrea gigas</u> - Non-toxic	0.01 ppm	(6)

IGEPAL CO-430

<u>MANUFACTURER</u>	GAF Corporation 140 West 51 Street New York, New York 10020
<u>COST</u>	\$1.28 to \$1.78/gal.
<u>AVAILABILITY</u>	Linden, New Jersey and Calvert City, Kentucky
<u>PRODUCT DESCRIPTION</u>	Nonionic. Ethoxylated nonyphenal (44% ethylene oxide), no solvent.
<u>SPECIFIC GRAVITY</u>	1.02 @ 77° F
<u>FLASH POINT</u>	500 - 600° F (O.C.)
<u>VISCOSITY</u>	175-250 cp @ 77° F
<u>SOLUBILITY</u>	Insoluble but dispersible in water.
<u>SHELF LIFE</u>	Unlimited
<u>OTHER</u>	No limit on storage temperatures.

MANUFACTURER'S USE RECOMMENDATIONS

<u>Application Method</u>	Eduction @ 2 to 5% concentration.
<u>Dosage</u>	Dispersant to oil ratio 1:33 to 1:100 by volume.
<u>Use Limitations</u>	Use on light and heavy distillate, residual and crude oils.

REFERENCE (14)

IGEPAL CO-530

<u>MANUFACTURER</u>	GAF Corporation 140 West 51 Street New York, New York 10020
<u>COST</u>	\$1.30 to \$1.82/gal.
<u>AVAILABILITY</u>	Linden, New Jersey and Calvert City, Kentucky
<u>PRODUCT DESCRIPTION</u>	Nonionic. Ethoxylated nonyphenal (54%, ethylene oxide), no solvent.
<u>SPECIFIC GRAVITY</u>	1.04 @ 77° F
<u>FLASH POINT</u>	480-510° F (O.C.)
<u>VISCOSITY</u>	175-250 cp @ 75° F
<u>SOLUBILITY</u>	Insoluble but dispersible in water.
<u>SHELF LIFE</u>	Unlimited
<u>OTHER</u>	No limit on storage temperatures.

MANUFACTURER'S USE RECOMMENDATIONS

<u>Application Method</u>	Eduction @ 2 to 5% concentration.
<u>Dosage</u>	Dispersant to oil ratio 1:33 to 1:100 by volume
<u>Use Limitations</u>	Use on light and heavy distillate, residual and crude oils.

REFERENCE (5) (14)

ISOMAL 265

<u>MANUFACTURER</u>	Johnson-March Corp. 3rd and Berks Street Philadelphia, Pennsylvania 19122
<u>COST</u>	\$2.44/gal. (0.28/lb. in 500 lb. drum)
<u>AVAILABILITY</u>	F.O.B. Philadelphia, Pennsylvania 19122
<u>PRODUCT DESCRIPTION</u>	Sulfonated ester, 65%; water, 20%.
<u>SPECIFIC GRAVITY</u>	8.7 lbs/gal @ 78° F
<u>FLASH POINT</u>	ca 400° F (C.O.C.)
<u>SHELF LIFE</u>	Unlimited
<u>OTHER</u>	Store @ ambient temperatures.

MANUFACTURER'S USE RECOMMENDATIONS

<u>Application Method</u>	Spray undiluted or diluted three times with sea water, mineral spirits or kerosene. Agitate immediately.
<u>Dosage</u>	Dispersant to oil ratio 1:1000 to 1:5000 by volume.
<u>Use Limitations</u>	Light oils and fresh crudes.

REFERENCE (14)

JANSOLV-60
JANSOLV-60 W*

<u>MANUFACTURER</u>	Sunshine Chemical Corp. P. O. Box 2041 West Hartford, Connecticut 06117 also P. O. Box 5534 Jacksonville, Florida 32207
<u>COST</u>	\$2.00/gal.
<u>AVAILABILITY</u>	F.O.B. Jacksonville, Florida; West Hartford, Connecticut; and Highland Park, Illinois.
<u>PRODUCT DESCRIPTION</u>	Nonionic water-based surfactants and petroleum-based solvent.
<u>SPECIFIC GRAVITY</u>	0.95 @ 75° F
<u>FLASH POINT</u>	154° F (T.O.C.)
<u>VISCOSITY</u>	35 sec. @ 75° F, Ford No. 4 Cup
<u>SOLUBILITY</u>	Soluble in water
<u>SHELF LIFE</u>	Four years
<u>OTHER</u>	Store Jansolv 60 @ 32° F to 250° F Store Jansolv 60 W @ -10° F to 250° F 5-day BOD - 350,000 mg/l ⁽¹⁵⁾
<u>HUMAN HAZARD</u>	Non-toxic. Threshold limit 500 ppm in air.
<u>MANUFACTURER'S USE RECOMMENDATIONS</u>	
<u>Application Method</u>	Spray or educt by fire hose diluted 33 to 100 times with water. Reacts immediately.
<u>Dosage</u>	Varies, depending on oil spilled.
<u>Use Limitations</u>	Use on light and heavy distillate, residual and crude oils. Not effective on sandy beaches.
<u>REMARKS</u>	At 1:1 ratio emulsifies 91.4% of Navy Special grade fuel oil ⁽⁹⁾ .

*Same as Jansolv 60 except for additive to allow use to -10° C.

Spill Experience:
Incident

Ocean Eagle, San Juan, Puerto Rico. Effectiveness unknown.

Toxicity Tests:

<u>Species</u>				<u>Reference</u>
Steelhead minnow fingerlings	96 hr TL _m	35.5 mg/l		(6)
Mummichog (<u>Fundulus heteroclitus</u>)	24 hr TL _m	60 mg/l		(13)
	96 hr TL _m	27 mg/l		(13)
Fathead minnow (<u>Pimephales promelas</u>)	96 hr TL _m	9.5 mg/l		(17)
Pacific oyster larvae (<u>Crassostrea gigas</u>)	Toxic	0.8 ppm		(6)
	Non-toxic	0.4 ppm		
Silversides (<u>Atherinomorus stipes</u>)	6 hr TL ₁₀₀	50 ppm		(20)
	18 hr TL ₀	10 ppm		(20)
Moharra (<u>Eucinostomus argenteus</u>)	6 hr TL ₁₀₀	27 ppm		(20)

**LCP-12
OIL SLICK DISPERSER**

<u>MANUFACTURER</u>	Crain Industrial Products Corp. P. O. Box 34233 Farmers Branch, Texas 75234 also P. O. Box 1062 2411 Swiss Avenue Dallas, Texas 75221
<u>COST</u>	\$2.30 - \$2.80/gal.
<u>AVAILABILITY</u>	F.O.B. Farmers Branch, Texas
<u>PRODUCT DESCRIPTION</u>	Octyl-phenoxy-polyethoxy-ethanol, blended with other ingredients
<u>SPECIFIC GRAVITY</u>	8.3 lbs/gal.
<u>FLASH POINT</u>	Non-flammable
<u>VISCOSITY</u>	Slightly viscous
<u>SOLUBILITY</u>	Soluble in water
<u>OTHER</u>	Freezing point, approximately 0° C
<u>HUMAN HAZARD</u>	Non-toxic

MANUFACTURER'S USE RECOMMENDATIONS

Application Method Spray diluted 3 times with water on light oil slicks. Spray undiluted on thick slicks or heavy oils. Agitate. Reacts immediately.

Dosage For use on light and heavy oils and sludges.

Toxicity Tests:

Species		Reference
Mummichog	(<u>Fundulus heteroclitus</u>)	24 hr TL _m 140 mg/l (13)
"	" "	96 hr TL _m 140 mg/l "
Daphnids	(<u>Daphnia magna</u>)	24 hr TL _m 694 mg/l (19)
"	" "	48 hr TL _m 290 mg/l "
"	" "	96 hr TL _m 204 mg/l "
"	" " w/crude oil	24 hr TL _m 370 mg/l "
"	" " " " "	48 hr TL _m 275 mg/l "
"	" " " " "	96 hr TL _m 102 mg/l "

**MAGIC POWER OIL
DISPERSENT OD #1**

<u>MANUFACTURER</u>	Lawton Specialty Co., Inc. P. O. Box 44 Lawton, Oklahoma 73501
<u>COST</u>	\$3.35/gal.
<u>AVAILABILITY</u>	F.O.B. Lawton, Oklahoma or Dallas, Texas
<u>PRODUCT DESCRIPTION</u>	Nonionic. Contains wetting agents and emulsifiers in a naptha solvent.
<u>SPECIFIC GRAVITY</u>	0.84 @ 75° F
<u>FLASH POINT</u>	176° F (C.O.C.)
<u>VISCOSITY</u>	1-6 cp @ 75° F
<u>SOLUBILITY</u>	Emulsifies in water
<u>SHELF LIFE</u>	1 year (possibly longer)
<u>OTHER</u>	5-day BOD @ 20° C - 880 mg/l ⁽¹⁵⁾ . Store @ 20° F to 140° F.
<u>HUMAN HAZARD</u>	None when used diluted. Estimated threshold limit for inhalation 300 to 350 ppm at 60 to 80° F.

MANUFACTURER'S USE RECOMMENDATIONS

<u>Application Method</u>	Spray diluted 1 to 5 times with water. Agitate. Reacts immediately.
<u>Dosage</u>	Dispersant to oil ratio 1:10 to 1:2000 by volume.
<u>Use Limitations</u>	Use on light and heavy distillate, residual and crude oils.

Toxicity Tests:

<u>Species</u>	<u>Reference</u>
Fathead minnow (<u>Pimephales promelas</u>) 96 hr TL _m 14.0 ppm	(15)

MAGNUS OIL SPILL DISPERSER

<u>MANUFACTURER</u>	Magnus Chemical 400 South Avenue Garwood, New Jersey 07027
<u>COST</u>	\$2.85/gal.
<u>AVAILABILITY</u>	Inventory at thirteen locations.
<u>PRODUCT DESCRIPTION</u>	Alkyl-aryl-benzene, nonionic wetting agents, petroleum diluent and odor masking (3%), stabilizing and combining agents.
<u>SPECIFIC GRAVITY</u>	0.892 @ 60° F
<u>FLASH POINT</u>	170° F
<u>VISCOSITY</u>	30.8 seconds Zahn cup No. 1 @ 60° F
<u>SOLUBILITY</u>	Emulsifies in water
<u>SHELF LIFE</u>	Unlimited
<u>OTHER</u>	pH 8.0. Store at 0° to 130° F. Freezing point 0° C.
<u>HUMAN HAZARD</u>	Avoid eye or skin contact. 500 ppm maximum for inhalation.

MANUFACTURER'S USE RECOMMENDATIONS

<u>Application Method</u>	Apply undiluted as a heavy droplet spray. Do not fog or mist chemicals as it reduces efficiency. The product can be applied by low volume (0-3 gpm), low pressure (10-30 psi) pump, or by air driven drum pump; a lube pump, or pressure-pot top sprayer. May also be educted at 3 to 5% by volume.
<u>Dosage</u>	Dispersant oil ratio at 50° F. 1: 8 to 1:10 by volume for Bunker C. 1: 3 to 1: 5 by volume for weathered crude. 1:20 by volume for distillate fuels. Contact time 10-20 minutes for penetration.
<u>Use Limitations</u>	For use on gasoline, kerosene, heating oil, jet fuel, Bunker C, other distillate fuels and crude oil. <u>Not</u> a beach cleaner. Best results at 50° F and above. Not effective on heavy asphalt residues.

REMARKS

Manufacturer reports product passes all tests of MIL-Spec C 22864A (Ships).

At 1:1 ratio 36.6% of Navy Special Fuel oil was emulsified in lab tests⁽⁹⁾.

Spill Experience:

Incident

(General Colocotronis) Eleuthera Island, Bahamas - 150 drums used. Effectiveness not determined.

Ocean Eagle, San Juan, and Ensenada Harbors, Puerto Rico - Ineffective.

Albany, New York - 50,000 gallon heavy oil spill. Effectiveness unknown.

Norfolk, Virginia - used by Industrial Marine Service, Inc. after physical removal of most of the oil - Effectiveness unknown.

Toxicity Tests:

<u>Species</u>			<u>Reference</u>
Pinfish (<i>Lagodon rhomboides</i>)	48 hr TL _m	26.9 ppm	(25)
Mummichog (<i>Fundulus heteroclitus</i>)	48 hr TL _m	10 ppm	(14)
" " "	24 hr TL _m	175 ppm	(13)
" " "	96 hr TL _m	43 ppm	"
Zebra fish (<i>Brachydanio rerio</i>)			
1 of 5 survived	24 hrs @	40 ppm	(12)
Marine fish (<i>Gambusia</i>)			
4 of 21 dead	24 hrs @	1 ppm	(23)
6 of 21 dead	24 hrs @	15 ppm	"
16 of 21 dead	24 hrs @	30 ppm	"

NOTE: Two other Magnus products not recommended by manufacturer for dispersing oil spills on water are two degreasers - Magsol 3 and 701.

MET AQUACLENE 100

<u>MANUFACTURER</u>	Metropolitan Petroleum Petrochemicals Co., Inc. 24 Caven Point Road Jersey City, New Jersey 07304
<u>COST</u>	\$3.75/gal.
<u>AVAILABILITY</u>	F.O.B. Jersey City, New Jersey (> 50 miles)
<u>PRODUCT DESCRIPTION</u>	Nonionic - Blend of alkanolamides - 100%
<u>SPECIFIC GRAVITY</u>	1.004 @ 60° F
<u>FLASH POINT</u>	350° F (P.M.C.C.)
<u>VISCOSITY</u>	135 SSF @ 70° F 185 SSF @ 40° F
<u>SOLUBILITY</u>	Completely soluble in water
<u>SHELF LIFE</u>	Unlimited
<u>OTHER</u>	pH 9.8. Freezing point 25° F. Store @ 15° to 200° F. 5-day BOD @ 20° C - 840,000 mg/l ⁽¹⁵⁾ .
<u>HUMAN HAZARD</u>	Non-toxic

MANUFACTURER'S USE RECOMMENDATIONS

<u>Application Method</u>	Spray full strength or dilute with water, down to 4% solution. Agitate. Reacts immediately.
<u>Dosage</u>	Dispersant to oil ratio 1:1 to 1:12 by volume.
<u>Use Limitations</u>	Use on light and heavy distillate, residual and crude oils at all temperatures.

<u>REMARKS</u>	Manufacturer reports 100% oil dispersion, at 1:1 ratio with No. 6 oil (20 mls) in 400 ml water, 30 sec. agitation, 1-12 hours standing time.
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Spill Experience:

Incident

Used on several small spills in New England. It is the prescribed and inventoried chemical along the St. Lawrence Seaway. Approved for use in reservoir for potable water supply by Dept. of Health in Massachusetts in 1967. Used on Bunker C oil spill at Gulf Oil Co., Philadelphia, Pennsylvania in January 1970. Product was not effective after trying three times to disperse oil. Air temperature was 20° F, water temperature approximately 35° F. The dispersant seemed to remain on top of oil slick with no emulsification after fire hose agitation. Dispersant had to be warmed prior to use⁽²⁷⁾.

Toxicity Tests:

<u>Species</u>				<u>Ref.</u>
Fathead minnow (<u>Pimephales promelas</u>)	96 hr TL _m	25.0 ppm		(15)
" " " " w/oil	96 hr TL _m	42.0 ppm		"
Mummichog (<u>Fundulus heteroclitus</u>)	24 hr TL _m	110 mg/l		(13)
" " "	96 hr TL _m	32 mg/l		"
Fathead minnow (<u>Pimephales promelas</u>)	96 hr TL _m	50 ppm		(14)
Softshell clam (<u>Mya arenaria</u>)	96 hr TL _m	50 ppm		(33)
Mummichog (<u>Fundulus heteroclitus</u>)	96 hr TL _m	44 ppm		"
Winter flounder (<u>Psuedo pluronectus</u>)*	96 hr TL _m	20 ppm		"
Lobster (<u>Homarus americana</u>)	96 hr TL _m	46 ppm		"
Edible mussel (<u>Mytilus edulis</u>)*	96 hr TL _m	40 ppm		"
Atlantic Silversides	96 hr TL _m	25 ppm		"

*tentative subject to revision

OD-2

MANUFACTURER Crain Industrial Products Corp.
P. O. Box 34223
Farmers Branch, Texas

COST \$2.45 - \$2.95/gal.

AVAILABILITY F.O.B. Farmers Branch, Texas

PRODUCT DESCRIPTION Anionic

SPECIFIC GRAVITY Density 8.5 lbs/gal.

FLASH POINT Non-flammable

SOLUBILITY Soluble in water

HUMAN HAZARD Non-toxic

MANUFACTURER'S USE RECOMMENDATIONS

Application Method Spray under pressure through small nozzle
diluted 3 times with water. Contact time
20-30 minutes. For heavy oils apply undiluted.

Dosage Dispersant to oil ratio 1:6 by volume

REMARKS Union Oil Co. reported 1:3 or 1:4 dispersant to
oil ratio produced light emulsion which was stable
48 hours⁽¹⁴⁾.

Toxicity Tests:

<u>Species</u>		<u>Ref.</u>
<u>Fundulus parvipinnis</u>	96 hr TL _m 118 ppm	(18)
Mummichog (<u>Fundulus heteroclitus</u>)	24 hr TL _m 55 mg/l	(13)
" "	96 hr TL _m 54 mg/l	"

OIL SPILL ERADICATOR X-1-11

MANUFACTURER Xzit Chemical Company
56 Newark Street
Hoboken, New Jersey 07030

COST \$3.30 - \$3.81/gal.

AVAILABILITY F.O.B. Hoboken, New Jersey

SPECIFIC GRAVITY 0.980 @ 68° F

FLASH POINT None (C.O.C.)

VISCOSITY 150 cp (Room Temp.)

SOLUBILITY Insoluble in water

SHELF LIFE Unlimited

OTHER Store @ 50° F to 122° F

MANUFACTURER'S USE RECOMMENDATIONS

Application Method Spray undiluted 10 to 50 times with water.
Contact time - 30 minutes.

Dosage Dispersant to oil ratio 1:10 to 1:50 by volume.

Use Limitations Minimum temperature for use 50° F. Use on
light and heavy distillate residual and crude oils.
Recommended for beach cleaning.

Spill Experience: Incident

No. 5 Fuel Oil cleaned from Bermuda Beach near Princess Hotel. Manufacturer reported all oil was dispersed and the beach sand completely cleaned.

Toxicity Tests: Species

		<u>Reference</u>
Salmon	40% dead 96 hrs 20 ppm	(23)
Herring	10% dead 120 hrs 5 ppm	"
	60% dead 120 hrs 10 ppm	"

NOTE: In this study conducted by Fisheries Research Board of Canada the above toxicity data is for XZIT which may be Oil Spill Eradicator X-1-11.

REFERENCE (14)

(PETROLITE) W-1439
(TRET-O-LITE)

<u>MANUFACTURER</u>	Petrolite Corporation Tretolite Division 369 Marshall Avenue St. Louis, Missouri 63119 also 2 West 4th Street New York, New York 10017
<u>COST</u>	\$2.90/gal.
<u>AVAILABILITY</u>	F.O.B. St. Louis, Missouri and Brea, California. Distribution points: New Orleans, Louisiana; Houston, Texas; and Philadelphia, Pennsylvania.
<u>PRODUCT DESCRIPTION</u>	Tank cleaner. Contains acylamide, 44%; water, 26%; dipropylene alcohol, 10%; isopropanol, 20%.
<u>SPECIFIC GRAVITY</u>	0.976 @ 21° C
<u>FLASH POINT</u>	94° F (open cup)
<u>VISCOSITY</u>	77 SSU @ 100° F
<u>SOLUBILITY</u>	Soluble in water
<u>SHELF LIFE</u>	Unlimited
<u>OTHER</u>	Pour point > 10° F
<u>HUMAN HAZARD</u>	Non-toxic
<u>MANUFACTURER'S USE RECOMMENDATIONS</u>	
<u>Application Method</u>	Spray diluted 1 to 4 times with water by volume. May also be used undiluted. Agitate. Reacts immediately.
<u>Dosage</u>	Dispersant to oil ratio 1:5 to 1:10 by volume.
<u>Use Limitations</u>	Primarily for tank cleaning ⁽¹⁰⁾ . Recommended for light and heavy distillate, residual and crude oils.
<u>REMARKS</u>	Manufacturer reports approximately 100% of oil dispersed by laboratory tests. Laboratory tests rated W-1439 as 2 on a scale of 1 (high) to 4 (low). Visual observations used for

comparison with 10 other dispersants. Tested
against medium weight crude oil (A.P.I. Gravity
29.9°)(14).

.Toxicity Tests:

<u>Species</u>	<u>Ref.</u>
Steelhead minnow fingerlings	96 TL _m 35.5 mg/l (6)
Zebra fish (<u>Brachydanio rerio</u>)	0 of 4 survived 24 hrs @ 10 ppm (12)
Pacific oyster larvae	Toxic conc. 1.5 mg/l (6)
(<u>Crassotrea gigas</u>)	Non-toxic conc. 0.8 mg/l "

(PETROLITE) WF-30

<u>MANUFACTURER</u>	Petrolite Corporation Tretolite Division 369 Marshall Avenue St. Louis, Missouri 63119
<u>COST</u>	\$2.00/gal. - 55 gal. drum
<u>AVAILABILITY</u>	F.O.B. St. Louis, Missouri and Brea, California.
<u>PRODUCT DESCRIPTION</u>	50% Aryl sulfonate - 50% aromatic solvent
<u>SPECIFIC GRAVITY</u>	0.94 @ 75° F
<u>FLASH POINT</u>	136° F (open cup)
<u>VISCOSITY</u>	74.7 SSU @ 100° F
<u>SOLUBILITY</u>	Dispersible in water
<u>SHELF LIFE</u>	Unlimited
<u>OTHER</u>	Store @ 40° to 120° F
<u>HUMAN HAZARD</u>	Avoid skin contact

MANUFACTURER'S USE RECOMMENDATIONS

<u>Application Method</u>	Spray - followed by agitation. Contact time - variable, depending on age of oil.
<u>Dosage</u>	Dispersant to oil ratio 1:5 to 1:20 by volume.
<u>Use Limitations</u>	Recommended for use on light and heavy distillates, residuals and crude oils.

POLYCLENS (MOLTOKLAR)*

<u>MANUFACTURER</u>	Polycell Products, Ltd. Broadwater Road Welwyn Garden City Hertfordshire, United Kingdom also Cadix, Great Britain Ltd. and Cadix-Natre of Antwerp
<u>COST</u>	\$0.67 to \$1.09/gal.
<u>AVAILABILITY</u>	England
<u>PRODUCT DESCRIPTION</u>	Paint brush cleaner. Contains polyglycols, 10%; petroleum naptha, 90%.
<u>SPECIFIC GRAVITY</u>	0.87 @ 50° F
<u>FLASH POINT</u>	116° F to 120° F (A.C.C.)
<u>SOLUBILITY</u>	Emulsifies in water
<u>OTHER</u>	Store below 104° F
<u>MANUFACTURER'S USE RECOMMENDATIONS</u>	
<u>Application Method</u>	Spray undiluted
<u>Dosage</u>	Dispersant to oil ratio 1:2 to 1:4 by volume.
<u>Use Limitations</u>	Effective on oils with viscosity <6000 secs.
<u>REMARKS</u>	Manufacturer reports 100% emulsification of oil. At 1:10 ratio emulsified 54% HD-SAE 20 motor oil(1).

*In Germany, Polyclens is known as Moltoklar (Marine Engineer, p. 474, January 1961 (U.K.))

Spill Experience:

Incident

"Esso Portsmouth" - Milford Haven, U. K. (1961)

Anne Mildred Brøvig, North Sea (February 1966)⁽⁸⁾

Effectiveness not reported on the two above incidents.

Toxicity Tests:

<u>Species</u>		<u>Reference</u>
Pink shrimp (<u>Pandalus montagui</u>)	48 hr TL _m 8.5 ppm	(3)
Brown shrimp (<u>Crangon crangon</u>)	48 hr TL _m 15.7 ppm	"
Shore crabs (<u>Carcinus maenas</u>)	48 hr TL _m 23.2 ppm	"
Cockles (<u>Cardium edule</u>)	48 hr TL _m 70.0 ppm	"

POLYCOMPLEX A-11 AND A 11 D*

<u>MANUFACTURER</u>	Guardian Chemical Corp. 41-45 Crescent Street Long Island City, New York 11101
	<u>Sole International Distributor:</u> Ocean-Wide Marine Supply Co. Box 827 Huntington, New York 11743
<u>COST</u>	\$3.75/gal. \$3.80/gal. plus \$14.00/dr. on west coast
<u>AVAILABILITY</u>	F.O.B. Long Island City, New York. Inventory at Santa Barbara, Gulf Coast, Boston, Chicago and Miami.
<u>PRODUCT DESCRIPTION</u>	A water-based nonionic oil complexing blend of alkanolamides. Also described as amino-amido complex with 52% water.
<u>SPECIFIC GRAVITY</u>	1.005
<u>FLASH POINT</u>	370° F (O.C.) Auto-ignition temp. 400° F
<u>VISCOSITY</u>	150-160 cp at room temp.
<u>SOLUBILITY</u>	Soluble in water
<u>SHELF LIFE</u>	Unlimited
<u>OTHER</u>	May freeze below 32° F. pH 9.5 - 9.8. Boiling point: 370° F.
<u>HUMAN HAZARD</u>	None to operators. Threshold limit 500 ppm plus.
<u>MANUFACTURER'S USE RECOMMENDATIONS</u>	
<u>Application Method</u>	Spray diluted 4 times with sea water at 60-100 psi. Agitate after 3 to 5 minutes reaction time.
<u>Dosage</u>	Dispersant to oil ratio 1:7 to 1:12 by volume. More required for heavy oils.
<u>Use Limitations</u>	Most effective with #2 to #5 fuel oils, but is not effective for Bunker C.

*Polycomplex A-11 is a water solution of Polycomplex A. A-11 contains 47-49% of active agents - 51-53% water. A-11 D contains 33% of active agents - 67% water.

REMARKS

Manufacturer reports all visible oil dispersed.

Sun Oil Co., Philadelphia, reports 1:8 ratio effective for crude and fuel oils.

Gulf Oil Co. reports 1:10 ratio effective.

Spill Experience:

Incident

Ocean Eagle, San Juan, Puerto Rico, March 1968 - Ineffective

Santa Barbara, Union Oil Co. (247 bbls. used)

February-March 1969 - Not determined.

Toxicity Tests:

Species

See attached sheets

SUMMARY OF TOXICITY TESTS ON POLYCOMPLEX A-11

<u>Test Organism</u>	<u>Reported As</u>	<u>Concentration</u>	<u>Reference</u>
Mummichog (<u>Fundulus heteroclitus</u>)	24 hr TL _m 96 hr TL _m	40 mg/l 40 mg/l	(13)
Fathead minnow (<u>Pimephales promelas</u>)	96 hr TL _m	13.0 ppm	(17)
Steelhead minnow (<u>Fingerling</u>)	96 hr TL _m	13.0 ppm	(6)
<u>Fundulus parvipinnis</u>	24 hr TL _m 96 hr TL _m	225 134	(18)
Zebra fish (<u>Brachydanio rerio</u>)	24 hr (none of 5 survived)	30 ppm	(17)
Moharra (<u>Eucinostomus argenteus</u>)	18 hr TL ₀ 6 hr TL ₃₃ 12 hr TL ₁₀₀ 6 hr TL ₁₀₀	5 ppm 10 ppm 27 ppm 100 ppm	(20) " " "
Silversides (<u>Artherinomorus stipes</u>)	18 hr TL ₁₀₀ 12 hr TL ₃₃ 6 hr TL ₁₀₀	5 ppm 10 ppm 100 ppm	" " "
Herring (<u>Harengula clupei</u>)	75% showed loss of balance @	5 ppm	"
Sergeant major (<u>Abudefduf saxatilis</u>)	18 hr TL ₀	5 ppm	"
Brine shrimp (<u>Artemia salina</u>)			
With Navy #4 fuel (diesel) oil	72 hr TL ₁₀₀ 8 hr TL ₁₀₀	100 ppm 500 ppm	(21) "

SUMMARY OF TOXICITY TESTS ON POLYCOMPLEX A-11 (Cont'd)

<u>Test Organism</u>		<u>Reference</u>
Killifish (<u>Fundulus diaphanus</u>)	All affected in 20 hrs @ 100 ppm	(21)
Killifish (<u>Fundulus heteroclitus</u>)	None of 5 survived 18 hrs @ 33 mg/l	(22)
Marine fish (<u>Gambusia</u>)	12 of 22 dead in 24 hrs @ 15 ppm None of 21 survived 24 hrs @ 30 ppm	(23) "
Clams (<u>Mercinaria mercinaria</u>)	When tested at 0, 83, 107, 335, 670 and 1005 mg/l, the following was observed: At the 0.0 control concentration, various numbers of clams were observed pumping and no deaths occurred. Only once at the lowest concentration (83 mg/l) was one clam observed not pumping. At 48 hours, deaths started to occur; with several clams dying at the three highest concentrations. This is meaningful as clams can or are supposed to stay alive in a hostile environment for weeks at a time.	(22)
Commercial oyster	The oysters were exposed to Polycomplex and Navy #4 Fuel Oil at 1:9 ratios in a flowing seawater system for 96 hours with the following results: <div style="margin-left: 40px;"> @ 400 ppm - shell growth decreased 99% (approx.) @ 200 ppm - " " " 65% @ 100 ppm - " " " 65% @ 50 ppm - " " " 50% </div> When placed in clean flowing seawater after testing, all oysters, at all concentrations tested, recovered.	(21)

RIDZLIK

<u>MANUFACTURER</u>	Ashland Chemicals Industrial Chemicals & Solvents Division 8 East Long Street Box 2219 Columbus, Ohio 43216
<u>COST</u>	\$1.50/gal. - 55 gal. drum
<u>AVAILABILITY</u>	F.O.B. 50 locations in U. S.
<u>PRODUCT DESCRIPTION</u>	Contains a highly concentrated water-based surfactant.
<u>SPECIFIC GRAVITY</u>	0.9799 @ 60° F
<u>FLASH POINT</u>	95° F (T.O.C.)
<u>VISCOSITY</u>	3.99 cs @ 100° F
<u>SOLUBILITY</u>	39.1 SUS @ 100° F
<u>SHELF LIFE</u>	Stable for long periods in proper containers.
<u>OTHER</u>	Pour point 0° F Freeze point 0° F Store above 0° F
<u>HUMAN HAZARD</u>	Very low

MANUFACTURER'S USE RECOMMENDATIONS

<u>Application Method</u>	Sprayed or sprinkled. Educted at rate of 1 quart per 100 gals. of water for large slicks. Can be used with fire fighting foam eductors.
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<u>Use Limitations</u>	Recommended for distillate and crude oils. Not specifically recommended for use on Bunker C. Minimum water temperature of 10° F.
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Toxicity Tests:

<u>Species</u>		<u>Reference</u>
Opal eyed perch	72 hr TL _m 34.4 ppm	(25)
(<u>Girella nigracans</u>)	Average 24-72 hr TL _m 36.4 ppm	"

SEAMULSO E

MANUFACTURER Turco Chemische Producten N.V.
Verl. Blokkenweg 12
Ede, Holland

COST \$2.17/gal. in Holland

PRODUCT DESCRIPTION Aromatic diluent - 70%

SPECIFIC GRAVITY 0.94

FLASH POINT 151° F P.M.

VISCOSITY 5 cp @ 25° C

SOLUBILITY Emulsifiable in water

SHELF LIFE Unlimited

HUMAN HAZARD Threshold limit of 250 ppm

MANUFACTURER'S USE RECOMMENDATIONS

Application Method Spray undiluted. Contact time 15 to 30 minutes before agitation.

Dosage About 2.5 to 12.5 gal/100 ft² of surface.

Use Limitations For use on light and heavy distillate, residual and crude oil.

REMARKS Manufacturer reports product will completely emulsify in time all oil and tar.

REFERENCE (14)

SKANEX S-102

<u>MANUFACTURER</u>	Scandinavian Oil Service Stora Badhusgatan 20 S-41121 Gothenburg, Sweden
	<u>Domestic Representative:</u> Surface Separator Systems, Inc. 103 Mellor Avenue Baltimore, Maryland 21228
<u>COST</u>	\$3.64/gal. (1-55 gal. drum)
<u>AVAILABILITY</u>	F.O.B. Gothenburg, Sweden
<u>PRODUCT DESCRIPTION</u>	Polyglycolethers (3), 10%; naptha diluent, 90% (includes aromatics (maximum), 20%)
<u>SPECIFIC GRAVITY</u>	0.79
<u>FLASH POINT</u>	153° F (P.M.)
<u>SOLUBILITY</u>	Emulsifies in water
<u>SHELF LIFE</u>	Unlimited
<u>HUMAN HAZARD</u>	Avoid eye and skin contact.
<u>MANUFACTURER'S USE RECOMMENDATIONS</u>	
<u>Application Method</u>	Spray. Agitate. Reacts immediately.
<u>Dosage</u>	Dispersant to oil ratio 1:2 to 1:10 by volume.
<u>Use Limitations</u>	For use on light and heavy distillate, residual and crude oils at temperatures greater than 38° F in sea water (not fresh water).
<u>REMARKS</u>	Used by Swedish Coast Guard to control several spills. Effectiveness not reported.

SLIX

<u>MANUFACTURER</u>	Amerace-Esna Corp. Chemical Specialties Division 74 Hudson Avenue Tenafly, New Jersey 07670
<u>COST</u>	\$2.85 - \$3.07/gal. (1-55 gal. drum)
<u>AVAILABILITY</u>	F.O.B. Tenafly, New Jersey and Los Angeles, California
<u>PRODUCT DESCRIPTION</u>	Blend of nonionic and anionic surfactants, 33.8%; alkaline silicate, 3% ⁽²⁵⁾ ; 10-15% silicates and hydrotropes ⁽⁵⁾ . Also, nonionic alkyl-phenoxy ethoxy-ethanol, 45% with water diluent ⁽¹⁴⁾ .
<u>SPECIFIC GRAVITY</u>	1.046 @ 68° F
<u>FLASH POINT</u>	Does not burn
<u>SOLUBILITY</u>	Soluble in water
<u>SHELF LIFE</u>	Unlimited
<u>OTHER</u>	pH 11.5. Keep from freezing.
<u>HUMAN HAZARD</u>	Possible dermatitis from prolonged contact.
<u>MANUFACTURER'S USE RECOMMENDATIONS</u>	
<u>Application Method</u>	Spray diluted 1 to 4 times with sea water. For eduction dilute 19 to 32 times.
<u>Dosage</u>	Dispersant to oil ratio 1:20 by volume, with greater ratio for thin slicks. Use 1 gal/100 ft ² .
<u>Use Limitations</u>	For use on light and heavy distillate, residual and crude oils at temperatures between 50° to 80° F. Not for use on shores.
<u>REMARKS</u>	Manufacturer reports 100% of oil emulsified - most efficient conditions. Dispersant to oil ratio 1:10 gave 70% emulsifi- cation of HD-SAE 20 motor oil ⁽¹⁷⁾ .
<u>NOTE</u>	Available in England from: Safety Cleaning Solvents Ltd. P. O. Box 10 Egham, Surrey, England ⁽¹¹⁾

Spill Experience:

Incident

Anne Mildred Brøvig, Feb. 1966⁽⁸⁾, North Sea - crude oil

Albacape, 1966, New York Harbor - 2,000 gallons used

Effectiveness not determined on the two above incidents.

Toxicity Tests:

<u>Species</u>			<u>Reference</u>
Pink shrimp (<u>Pandulus montagui</u>)	48 hrs TL _m	12.1 ppm	(3)
Brown shrimp (<u>Crangon crangon</u>)	48 hrs TL _m	114.5 ppm	"
Shore crabs (<u>Carcinus maenas</u>)	48 hrs TL _m >	150 ppm	"
Gockles (<u>Cardium edule</u>)	48 hrs TL _m	12.7 ppm	(13)
Mummichog (<u>Fundulus heteroclitus</u>)	24 hrs TL _m	16 mg/l	"
Zebra fish (<u>Brachydanio rerio</u>)	No survival @	10 ppm	(12)
Bluegill	96 hrs TL _m	10.5 ppm	(33)
Yellow Peach	96 hrs TL _m	3.2 ppm	"

SPILL-X

<u>MANUFACTURER</u>	Pacific Chemical 4501 Shilshole N.W. Seattle, Washington 98107
<u>COST</u>	\$3.45/gal. (1-55 gal. drum)
<u>AVAILABILITY</u>	F.O.B. Seattle, Washington
<u>PRODUCT DESCRIPTION</u>	Primarily a degreaser
<u>SPECIFIC GRAVITY</u>	0.914 - 0.92 @ 68° F
<u>FLASH POINT</u>	220° F (C.O.C.)
<u>SHELF LIFE</u>	Two years
<u>OTHER</u>	Store @ 0° - 120° F
<u>MANUFACTURER'S USE RECOMMENDATIONS</u>	
<u>Application Method</u>	Spray undiluted. Agitate.
<u>Dosage</u>	Varies with conditions
<u>Use Limitations</u>	For use on light and heavy distillate, residual, and crude oil at any temperature.
<u>REMARKS</u>	Rated 2 on lab test and 1 on field tests on a scale of 1 (low) to 4 (high). Tested visually against 10 other dispersants. Medium weight crude oil used (A.P.I. Gravity 29.9°)(17).
<u>OTHER</u>	At 1:1 ratio 41.1% of Navy Special Fuel oil emulsified ⁽⁹⁾ .

SURFLO RD 282

<u>MANUFACTURER</u>	National Lead Company Baroid Division P. O. Box 1675 Houston, Texas 77002	
<u>COST</u>	\$3.25/gal.	
<u>AVAILABILITY</u>	F.O.B. Houston, Texas	
<u>PRODUCT DESCRIPTION</u>	Oxyalkylated ester, 40%; oxyalkylated alcohol, 10%; esters, 2.5%; water diluent, 37.5%; alcohol diluent, 10%.	
<u>SPECIFIC GRAVITY</u>	0.997 A 65° F	
<u>FLASH POINT</u>	168° F (T.O.C.)	
<u>VISCOSITY</u>	275 SSU @ 70° F	
<u>SOLUBILITY</u>	Soluble in water	
<u>SHELF LIFE</u>	Unlimited	
<u>OTHER</u>	Store @ -10° F to 150° F	
<u>HUMAN HAZARD</u>	Contact is not hazardous unless specific allergies develop. Contains no known chemicals known to be particularly toxic by inhalation.	
<u>MANUFACTURER'S USE RECOMMENDATIONS</u>		
<u>Application Method</u>	Spray undiluted. Dilute 19 to 400 times with water for larger slicks.	
<u>Dosage</u>	Dispersant to oil ratio 1:10 to 1:100 by volume.	
<u>Use Limitations</u>	Recommended for light and heavy distillate, residual and crude oils. Not recommended for use in potable water supplies.	
<u>REMARKS</u>	Manufacturer reports 1 ml keeps 10 mls of oil dispersed in 90 mls of sea water for 24 hours.	
Toxicity Tests:		
<u>Species</u>		<u>Reference</u>
Black mollies	No Kill, 24 hrs @ 100 ppm	(14)

Spill Experience:

Incident

Lake Union, Seattle, Washington - spill by Washington Natural Gas Co. (14)

Willamette River, Portland, Oregon - several spills cleaned up by Shaver Transportation, Portland, Oregon (14).

Sitka Harbor, Alaska - used on spill on harbor and on beaches (14).

Puget Sound, Bremerton, Washington - several spills by Puget Sound Navy Yard (14)

Toxicity Tests:

<u>Species</u>			<u>Reference</u>
Steelhead minnow fingerlings	96 hr TL _m	35.5 ppm	(6)
Pacific oyster larvae	Toxic	1.5 ppm.	"
(<u>Crassotrea gigas</u>)	Non-toxic	0.4 ppm	"

TALENT

<u>MANUFACTURER</u>	Wyandotte Chemicals Corp. J. B. Ford Division Wyandotte, Michigan 48192
<u>COST</u>	\$3.15/gal.
<u>AVAILABILITY</u>	Manufactured at five plants in the United States and Canada
<u>PRODUCT DESCRIPTION</u>	Heavy duty liquid syndet for use with sea water. Contains nonionic detergents and water diluent.
<u>SPECIFIC GRAVITY</u>	1.03
<u>FLASH POINT</u>	200° F (P.M.C.C.)
<u>VISCOSITY</u>	5.0 cp @ 68° F
<u>SOLUBILITY</u>	Miscible with water
<u>SHELF LIFE</u>	Unlimited
<u>OTHER</u>	Store @ 0° to 140° F
<u>HUMAN HAZARD</u>	Non-toxic to operators

MANUFACTURER'S USE RECOMMENDATIONS

<u>Application Method</u>	Spray undiluted. Agitate. Reacts immediately.
<u>Dosage</u>	Dispersant to oil ratio 1:1 to 1:40 by volume, depending on viscosity of oil.
<u>Use Limitations</u>	Recommended for small spills of distillate fuel or other light oils.
<u>REMARKS</u>	In lab test at a 1:1 ratio, emulsified 16.3% of Navy special fuel oil ⁽⁹⁾ .

Toxicity Tests:

<u>Species</u>		<u>Reference</u>
Goldfish	TL _m 45 ppm	(14)

TEOC 444

<u>MANUFACTURER</u>	Teoc, Inc. P. O. Box 513 1100 Victory Drive Westwago, Louisiana 70094
<u>COST</u>	\$3.30/gal. in ten drum lots
<u>AVAILABILITY</u>	F.O.B. Westwago, Louisiana
<u>PRODUCT DESCRIPTION</u>	Nonionic surfactants and aliphatic solvent.
<u>SPECIFIC GRAVITY</u>	0.846 @ 75° F
<u>FLASH POINT</u>	104° F (T.C.C.)
<u>SOLUBILITY</u>	Complete dispersion in water
<u>OTHER</u>	Store @ less than 212° F
<u>HUMAN HAZARD</u>	Threshold limit value of 500 ppm for inhalation.
<u>MANUFACTURER'S USE RECOMMENDATIONS</u>	
<u>Application Method</u>	Spray undiluted. Dilute 3 times with water for plane spraying or in strong winds.
<u>Dosage</u>	Dispersant to oil ratio of 1:10 for average light crudes found in South Louisiana.
<u>Use Limitations</u>	Contact time varies. The finer the spray, the more effective will be application. Recommended for use on Bunker C and fresh crude oil.
<u>REMARKS</u>	Manufacturer reports 100% effectiveness. The heavier the oil the poorer is the effectiveness. "Dead" oil or old pit oil may not be dispersed.
<u>REFERENCE</u>	(14)

TEOC 777

<u>MANUFACTURER</u>	Teoc, Inc. P. O. Box 513 1100 Victory Drive Westwago, Louisiana 70094
<u>COST</u>	\$3.30/gal. in ten drum lots
<u>AVAILABILITY</u>	F.O.B. Westwago, Louisiana
<u>PRODUCT DESCRIPTION</u>	Nonionic 37.3% aliphatic diluent - 62.7%
<u>SPECIFIC GRAVITY</u>	0.837 @ 75° F
<u>FLASH POINT</u>	104° F (T.C.C.)
<u>SOLUBILITY</u>	Complete dispersion in water
<u>OTHER</u>	Store @ less than 212° F
<u>HUMAN HAZARD</u>	Threshold limit value 500 ppm for inhalation
<u>MANUFACTURER'S USE RECOMMENDATIONS</u>	
<u>Application Method</u>	Spray undiluted. For plane spraying or application in strong winds dilute 1:3 by volume with water.
<u>Dosage</u>	Dispersant to oil ratio 1:20 by volume, but varies with changing conditions.
<u>Use Limitations</u>	Contact time varies. The finer the spray the more effective will be the application. Recommended for use on Bunker C and fresh crude oil.
<u>REMARKS</u>	Manufacturer reports 100% effectiveness. The heavier the oil, the poorer is the effectiveness. "Dead" oil or old pit oil may not be dispersed.
<u>REFERENCE</u>	(14)

TYFOSOL 80

MANUFACTURER National Research and Chemical Company
1250 Cerise Avenue
Hawthorne, California 90250
also
30 East 42nd Street
New York, New York 10001

COST \$5.00/gal. in five drum lots

PRODUCT DESCRIPTION Polyglycols, 6%; amines, 11%; nonionics, 40%.
Also described as a blend of amineamido sulphonates and alkanolamide-type detergents.

SPECIFIC GRAVITY 0.945 @ 20° F

FLASH POINT 150° F (C.O.C.)

SOLUBILITY Emulsifies in water

SHELF LIFE One year or more

HUMAN HAZARD Non-toxic to personnel.

MANUFACTURER'S USE RECOMMENDATIONS

Application Method Spray undiluted

Dosage Dispersant to oil ratio of 1:33 to 1:50 by volume should emulsify Bunker C.

Use Limitations Recommended for use on light and heavy distillate, residual, and crude oils.

REMARKS Passes MIL-C-22230 tests

Toxicity Tests:

<u>Species</u>		<u>Reference</u>
Mummichog (<u>Fundulus heteroclitus</u>)	24 hr TL _m 13.5 mg/l	(13)
	96 hr TL _m 13.5 mg/l	"

(WYANDOTTE) SPILL REMOVER*

<u>MANUFACTURER</u>	Wyandotte Chemicals Corporation J. B. Ford Division Wyandotte, Michigan 48192
<u>COST</u>	\$2.55/gal. (1-55 gal. drum)
<u>AVAILABILITY</u>	F.O.B. Los Angeles, California; Stroudsburg, Pennsylvania; Atlanta, Georgia; Wyandotte, Michigan; and Venezuela
<u>PRODUCT DESCRIPTION</u>	Polyglycols, 33%; and aromatic solvents
<u>SPECIFIC GRAVITY</u>	0.9
<u>FLASH POINT</u>	160° F (T.C.C.)
<u>VISCOSITY</u>	5.5 cps @ 68° F
<u>SOLUBILITY</u>	Emulsifies in water
<u>SHELF LIFE</u>	Unlimited
<u>OTHER</u>	Store @ 0° F to 140° F. 5-day BOD @ 20° C 630,000 mg/l ⁽¹⁵⁾
<u>HUMAN HAZARD</u>	Relatively non-toxic
<u>MANUFACTURER'S USE RECOMMENDATIONS</u>	
<u>Application Method</u>	Sprinkle or spray undiluted in a solid stream using a low pressure nozzle. Agitate. Contact time, 3 to 20 minutes for heavy fuel oils and crude. Atomizing or fogging nozzles not recommended.
<u>Dosage</u>	Dispersant to oil ratio 1:5 by volume. For Bunker C or Navy Special 1:3 by volume.
<u>Use Limitations</u>	Use on light and heavy distillate, residual and crude oils in both fresh and sea water.
<u>REMARKS</u>	Manufacturer reports product passes requirements of MIL-S-22864-A (Ships). Disperses approximately 5 times its weight in oil. Dispersant to oil ratio of 1:10 emulsified 70% of HD-SAE 20 motor oil ⁽¹⁾ .

*Same or similar to Casol except flash point⁽²⁵⁾.

Toxicity Tests:

<u>Species</u>		<u>Reference</u>
Fathead minnow (<u>Pimephales promelas</u>)	96 hr TL _m 5.6 ppm	(15)
Goldfish (Estimated)	TL _m 15 ppm	(14)

SECTION B

SECTION B

The following dispersant products are listed in
Section B:

ACTUSOL	CLOCK 06:39
ACTUSOL T-776	COB
AFCO #5350	COLD CLEAN
ACTEMUL	COMPOUND RICHONAGE YLA
ACTEMUL U.C.	CONCO EMULSIFIER 700
AMEROID DREWCLEAN 522	CON-O-1571
AMWAY INDUSTROCLEAR	C-REINIGER
ANTI-OIL TS 3	CRONAX (OIL SPILL)
ANTI-OIL TS 5	CW SOLVENT
AQUANIX	DART DBC PLUS
AQUATREAT	DECK GLO
ASCAL SUPER 7-11	DEGREASER 80 G
ATLAS 1901	DEGRECO
AUTOMATIC TANK WASH	DERMOL
BAROID SLIX-5	D.G. 04
BASIC-H	DI-CHEM 322
BASAL AD 6	DI-CHEM 325
BD-30	DI-CHEM 400
BERGEN	DISPERSITE 110
BIG RED	DISPERSAL
CESCO	DISOLVOL
CEJER APC	DISSOLVO
CIRRASOL	DREW SC 96
CHEVRON NI-O	DREW TANK CLEANER NO. 4
CLEANOSOL	DUNHAM D-166
CLEANER - 8671	ELIMAX

EMSOL	KLEARFAC AA270
ESSO F-6155	KLEARFAC AA420
EMULSIFIER K	KLEARFAC AB270
E-147 (SHANNON)	KELITE A-108-1
E-314	KILL-SPILL-D-166
FASOLV	KOR-14
FINA SOL	K-RITE 300
FINA TAR SOLVENT	KURI-CLEAN "SD"
FINA TAR SOLVENT E.S.	LIX 336
FINA-UNISOL	LIQUID CONCENTRATE
F.O. 399	LISSAPOL N.X.
GREESKILLA 3	MABEC-PP5
GULF AGENT 822	MABEC-21T
GULFSIL DE-GREASER	MAGNA
HAMCO	MAGNUS MARINE DISPERSER
HEPACOLITH	MARINE CLEANER 8551
HOUGHTOSAFE 112	MARINE CLEANER 8555
HOUGHTOSOLV	MARITEC OIL SPILL REMOVER
HOUGHTON-DETERGENT	METCLENESPECIAL
HYDRO-GAMOSOL	METCLENES
H-4000	METSPERE
ICI SURFACTANT	MIGHTY MATE
IMC-SWS	MILCHEN MIL-EMULSIFIER
IGEPAL RC 520	MILCHEN PPS
JAY	MURCO-OSE #2
KLEARFAC AA040	NAVEE 42

NAVITONE

NEOS AB

NORSEMEN 67

NORSEMEN 69

NYSTOL O.S.E. #79

OIL & GREASE REMOVER

OIL & GREASE REMOVER

OIL AND SPILL ERADICATOR

OIL EX

OIL GO

OIL MEGA

OIL SLICK EMULSIFIER #5189

OIL SPILL

OIL SPILL DISPERSER

OIL SPILL REMOVER #1

OIL SPILL REMOVER #2

OSR-7348

OXANE

OXANEEZ

PARDAG HEAVY DUTY

PENTRON-D

PENTRON TC-30

PERMAG #41

PERO-KLEAN No. 801

PERO-KLEAN No. 805

PERO-KLEAN No. 818

PETRO-BAN

PILOT OIL SPILL ERADICATOR

P.O. 576

POLY-ZYME

PRODUCT 20215

RETZLOFF 1-4016-P

S-1

S-5

SANTOMERSE ME-B

SLURRY

SEA CLEAN 70

SEA GREEN 50 A

SEA GREEN 70

SEA SWEEP

SELF RINSE

SEPTEX

SHIP CLEAN

SILLARIT

SKANEX QUICK

SLICKAWAY

SLIPCLEAN

SLICKGONE I

SLICKGONE #2

SNOWDRIFT

SP 162

STREP 33

STRUKTOL

SURFACTANT 8851

SURFEMUL #5

SWABY

TANK-GLO

TCC-569 (Crain)

TEEPOL

TERGITOL 15-S-5

TERGITOL 15-S-9

TIP TOP CLEANER

TRACER-TECK

TRET-O-LITE

TRICON

TURCO

(TWELVE) 12 N DEGREASER

UNICO CONCENTRATE

UNISOL-FE

VECOM B-24

VISCO C-16-F

WEN-DON FORMULA 203

WHITTAKERS G.P. DEGREASANT

WYANDOTTE 20

ZIF

ACTEMUL

<u>MANUFACTURER</u>	Aetna Chemical Corp. Power Division East Paterson, New Jersey 07407
<u>PRODUCT DESCRIPTION</u>	Heavy-duty degreaser. Emulsifiers, wetting agents and solvents which are 99% aromatic.
<u>COST</u>	\$2.25/gal.
<u>SPECIFIC GRAVITY</u>	0.9639 @ 60° F
<u>FLASH POINT</u>	195° F (C.O.C.)
<u>FIRE POINT</u>	210° F (C.O.C.)
<u>SOLUBILITY</u>	Soluble in water
<u>OTHER</u>	pH 8.0
<u>POUR POINT</u>	-30° F
<u>APPLICATION METHOD</u>	Spray full strength or dilute 1 to 10 times with water.

ACTEMUL U.C.

<u>MANUFACTURER</u>	Aetna Chemical Corp.
<u>PRODUCT DESCRIPTION</u>	All-purpose degreaser. Nonionic - petroleum solvent and detergents.
<u>COST</u>	\$2.25/gal.
<u>SPECIFIC GRAVITY</u>	0.9639 @ 60° F
<u>FLASH POINT</u>	None (C.O.C.)
<u>POUR POINT</u>	5° F
<u>FIRE POINT</u>	None (C.O.C.)
<u>BOILING POINT</u>	95° C
<u>HUMAN HAZARD</u>	Avoid prolonged contact

ACTUSOL

MANUFACTURER W. R. Grace & Co.
Du Bois Chemical Division
Union Avenue & Du Bois
East Rutherford, New Jersey 07070

PRODUCT DESCRIPTION Contains vegetable oil soap, alkali and aliphatic solvent.

SPECIFIC GRAVITY 0.895 - 0.905

FLASH POINT 135° F (C.O.C.)

REFERENCE (25)

ACTUSOL T-776

MANUFACTURER W. R. Grace & Co.

COST \$2.50/gal. (10)

PRODUCT DESCRIPTION Nonionic surfactant, petroleum sulfonate, pine oil, cyclohexanol, and aliphatic solvent.

SPECIFIC GRAVITY (Bulk density) 8.25 lb/gal.

FLASH POINT 135° F

Toxicity Tests:

<u>Species</u>	<u>Ref.</u>
Steelhead minnow fingerling 96 hr TL _m 24.0 ppm	(6)

AFCO #5350*

MANUFACTURER Alex C. Ferguson Co., Inc.
Philadelphia, Pennsylvania 19104

COST \$2.40/gal.

REFERENCE (5)(26)(28)

*Also called AFCO OIL SPILL ERADICATOR

AMEROID DREWCLEAN 522

MANUFACTURER Drew Chemical Corp.

PRODUCT DESCRIPTION Degreaser. Contains emulsifiers, wetting agent and solvent with weak aromatic odor.

SPECIFIC GRAVITY 0.920 @ 20° C

FLASH POINT 168° F

CLOUD POINT 10° F

REFERENCE (25)

AMWAY INDUSTROCLEAN

MANUFACTURER Amway Corp.
Ada, Michigan 49301

PRODUCT DESCRIPTION Nonionic with trace of anionic

REFERENCE (29)

ANTI-OIL TS 3

MANUFACTURER German Reference (1)

ANTI-OIL TS 5

MANUFACTURER German Reference (1)

EFFECTIVENESS At D/O ratio of 1:10 emulsified 68% of HD-SAE 20 motor oil.

AQUANIX

MANUFACTURER Milchen, Inc.
Box 2211
Houston, Texas 77001

AQUATREAT

MANUFACTURER Carter Chemical Co.
250 Fulton Avenue
Hempstead, New York 11550

PRODUCT DESCRIPTION Physical and chemical characteristics identical
to Polycomplex.

REFERENCE (25)

ASCAL SUPER 7-11

MANUFACTURER German Reference

SPILL EXPERIENCE Used during Anne Mildred Brøvig Tanker incident
in North Sea.

REFERENCE (1)(8)(26)

ATLAS 1901

MANUFACTURER Atlas Preservative Co., Ltd.
Fraser Road
Erith, Kent, England

COST \$1.60/gal.

PRODUCT DESCRIPTION Solvent based

DOSAGE Dispersant to oil ratio 1:4 by volume

Toxicity Tests:

<u>Species</u>		<u>Ref.</u>
Pink shrimp (<u>Pandalus montagui</u>)	48 hr TL _m 87 ppm	(3)
Brown shrimp (<u>Crangon crangon</u>)	48 hr TL _m 120 ppm	"
Shore crabs (<u>Carcinus maenas</u>)	48 hr TL _m > 150 ppm	"
Cockles (<u>Cardium edule</u>)	48 hr TL _m 48 ppm	"

REFERENCE (3)(26)

AUTOMATIC TANK WASH

MANUFACTURER Magnus Chemical Co.

EFFECTIVENESS In lab test @ D/O ratio 1:1 emulsified 14% of
Navy Special grade fuel oil.

REFERENCE (16)

BAROID SLIX-5 DEGREASER

MANUFACTURER National Lead Co.
PRODUCT DESCRIPTION Contains glycol ether, solvents
REFERENCE (26)

BASIC-H

MANUFACTURER Shaklee Products
Hayward, California 94544
PRODUCT DESCRIPTION Nonionic concentrated water-based cleaning compound (not a detergent or soap)
SPECIFIC GRAVITY 1.03
FLASH POINT None
pH 6.5
REFERENCE (25)

BASAL AD 6

REFERENCE (4)(25)(26)

BD-30

MANUFACTURER Rohm & Haas Co.
Independence Mall West
Philadelphia, Pennsylvania 19105
PRODUCT DESCRIPTION Anionic surfactant

BERGEN OIL ON WATER REMOVER

MANUFACTURER Bergen Chemical Corp.
Back Bay
P. O. Box 371
Boston, Massachusetts 02117
REFERENCE (28)

BIG RED

MANUFACTURER

Texas Refinery Corp.
Fort Worth, Texas 76101

Suggested for use at Santa Barbara, California

REFERENCE (25)

CESCO

SPILL EXPERIENCE

Reportedly used in Lake Charles, Louisiana area

REFERENCE (25)

CEJER APC

MANUFACTURER

Cejer Co.
2545 Treedy Blvd.
South Gate, California 90280

Suggested for use at Santa Barbara, California

REFERENCE (25)

CIRRASOL

MANUFACTURER

Imperial Chemical Industries

Toxicity Tests:

Species

Ref.

Shrimp

TL_m 2000 ppm

(25)

MANUFACTURER

Chevron Chemical Co.
200 Bush Street
San Francisco, California 94101

REFERENCE (6)(26)

Toxicity Tests:

<u>Species</u>		<u>Ref.</u>
Steelhead minnow fingerling	96 hr TL _m 3.2 mg/l	(6)

CLEANOSOL

REFERENCE (3)(12)

Toxicity Tests:

<u>Species</u>		<u>Ref.</u>
Pink shrimp (<u>Pandulus montagui</u>)	48 hr TL _m 32 ppm	(3)
Brown shrimp (<u>Crangon crangon</u>)	48 hr TL _m 44 ppm	"
Shore crabs (<u>Carcinus maenas</u>)	48 hr TL _m 102 ppm	"
Cockles (<u>Cardium edule</u>)	48 hr TL _m 19 ppm	"
Zebra fish (<u>Brachydanio rerio</u>)	No survival 24 hr 15 ppm	(12)

CLEANER-8671

MANUFACTURER

Enjay Chemical Co.
60 West 49 Street
New York, New York 10020

REFERENCE (12)

Toxicity Tests:

<u>Species</u>		<u>Ref.</u>
Zebra fish (<u>Brachydanio rerio</u>)	None survived 24 hr @ 20 ppm	(12)

CLOCK 06:39

MANUFACTURER

Cleaning Compounds Corp.
999 Commercial Street
Palo Alto, California 94302

Suggested for use at Santa Barbara, California

REFERENCE (25)

COE

MANUFACTURER

Enjay Chemical Co.
Houston Chemical Plant
Stedman Street
Houston, Texas 77002

Suggested for use at Santa Barbara, California

REFERENCE (25)

COLD CLEAN

MANUFACTURER

Adair Equipment Co.
405 Century Building
Houston, Texas 77002

Distributor:

Rapid Supply Co. (same address)

PRODUCT DESCRIPTION

Cold water cleaner and oil emulsifier. Low level phosphate emulsifier which contains trisodium nitrilostriacetate.

FLASH POINT

Does not flash (C.O.C.)

BOD

20-day BOD @ 20° C, 3,200 to 3,600

APPLICATION METHOD

Dilute 100 times with water

Product was used on the Chevron Platform "C" blow-out as a safety precaution to reduce the flamability of the crude after the fire was extinguished.

Toxicity Tests:

Species

Fathead minnow (<u>Pimephales promelas</u>)	96 hr TL _m	138 ppm
Non-toxic (No Kill)	96 hr TL _o	120 ppm
Minnow (<u>Fundulus simulus</u>)	96 hr TL _m	220 ppm
Non-toxic (No Kill)	96 hr TL _o	180 ppm
Blue crab (<u>Callinectes sapidus</u>)	96 hr TL _m	500 ppm
Non-toxic (No Kill)	96 hr TL _o	450 ppm

REFERENCE (25)

COMPOUND RICHONAGE YLA

MANUFACTURER

Richardson Co.
100 New Street
Paterson, New Jersey 07510

REFERENCE (26)

CONCO EMULSIFIER 700

MANUFACTURER

Continental Chemical Co.
270 Clifton Blvd.
Clifton, New Jersey 07015

PRODUCT DESCRIPTION

Nonionic. 100% blend of surfactants for use in emulsifying low viscosity oils.

SP. GR.

1.02

REFERENCE (26)

CONCO EMULSIFIER K

MANUFACTURER

Continental Chemical Co.

PRODUCT DESCRIPTION

Basically nonionic with traces anionic, blend of surfactants.

CON-O-1571*

MANUFACTURER

Continental Chemical Co.

EFFECTIVENESS

At 1:1 ratio emulsified 11.2% of Navy Special Grade Fuel Oil.

REFERENCE (26)

*Product no longer available

C-REINIGER

MANUFACTURER

German Reference (1)

EFFECTIVENESS

At D/O ratio 1:10 emulsified 92% HD-SAE 20 motor oil.

CRONAX (OIL SPILL)

MANUFACTURER Atlas Chemical Industries, Inc.
1270 Avenue of the Americas
New York, New York 10020

REFERENCE (28)

CW SOLVENT

MANUFACTURER Gamlen Chemical Co.

COST \$1.80/gal.

PRODUCT DESCRIPTION Tank and bilge cleaning solvent.

EFFECTIVENESS In lab tests at 1:1 ratio emulsified 15.2% of Navy Special Grade Fuel Oil⁽⁹⁾.

Toxicity Tests:

<u>Species</u>		<u>Ref.</u>
Pink shrimp (<i>Pandalus montagui</i>)	48 hr TL _m 14.6 mg/l	(3)
Cockles (<i>Cardium edule</i>)	48 hr TL _m 69.5 mg/l	

NOTE: Other company products listed as tank and bilge cleaning solvents are Sea Clean and Sea Clean #2.

DART

MANUFACTURER Sea-Air Chemical Corp.
3200 Borden Avenue
Long Island City, New York 11101

COST \$1.45/gal. (1-55 gal. drum)

AVAILABILITY F.O.B. Long Island City, New York

PRODUCT DESCRIPTION Solvent emulsion degreaser for tank cleaning. Polyglycols and solvents. This product is Sea Air Chemical Corp. primary oil spill dispersant.

SPECIFIC GRAVITY 0.89

FLASH POINT 170° F (C.O.C.)

SOLUBILITY Emulsifies in water

SHELF LIFE Unlimited

Toxicity Tests:

<u>Species</u>		<u>Ref.</u>
Mummichog (<u>Fundulus heteroclitus</u>)	24 hr TL _m 44 mg/l	(13)
	96 hr TL _m 18 mg/l	"

DBC PLUS

MANUFACTURER Cultured Chemical Division
1139 West Struck Avenue
Orange, California 92667

Suggested for use at Santa Barbara, California

REFERENCE (25)

DECK GLO

MANUFACTURER Sea Air Chemical Corp.

PRODUCT DESCRIPTION Nonionic, 65% water. A tank wash.

EFFECTIVENESS In lab test @ D/O ratio 1:1 emulsified 39.2% of Navy Special Grade Fuel Oil.

SPECIFIC GRAVITY 1.017 @ 80° F

POUR POINT 30° F

REFERENCE (16)

DEGREASER 80 G

MANUFACTURER The Chemlan Co.
24 Smith Street
Biddleford, Maine 04005

PRODUCT DESCRIPTION Solvent/emulsifier. No. 2 fuel oil as solvent.

REFERENCE (25)

DEGRECO

MANUFACTURER Hampton Roads Chemical Corp.
P. O. Box 1848
Newport News, Virginia 23607

PRODUCT DESCRIPTION Contains emulsifiers in No. 2 fuel oil solvent.

REFERENCE (25)

DERMOL

REFERENCE (3)

Toxicity Tests:

<u>Species</u>		<u>Ref.</u>
Pink shrimp (<u>Pandalus montagui</u>)	48 hr TL _m 148 ppm	(3)
Brown shrimp (<u>Crangon crangon</u>)	48 hr TL _m 156 ppm	"
Shore crabs (<u>Carcinus maenas</u>)	48 hr TL _m 435 ppm	"
Cockles (<u>Cardium edule</u>)	48 hr TL _m 148 ppm	"

D. G. 04

MANUFACTURER Banner Chemical Products Corp.
46 Great Jones
New York, New York 10001

REFERENCE (26)(28)

DI-CHEM 322
DI-CHEM 325
DI-CHEM 400

MANUFACTURER Diversified Chemicals Corp.
8100 Electric Avenue
Stanton, California 90680

REFERENCE (26)

DISPERITE 110

MANUFACTURER O'Brien Industries, Inc.
1040 Bushwick Avenue
Brooklyn, New York 11201

REFERENCE (25)

DISPERSAL

MANUFACTURER Sea Air Chemical Co.

REFERENCE (28)

DISOLVOL

MANUFACTURER Sea Air Chemical Co.
PRODUCT DESCRIPTION Non-solvent emulsifier
SPECIFIC GRAVITY 1.068 @ 80° F
REFERENCE (25)

DISSOLVO

MANUFACTURER Sea Air Chemical Co.
PRODUCT DESCRIPTION Nonionic - 72% water
SPECIFIC GRAVITY 1.068 @ 80° F
EFFECTIVENESS In lab test @ D/O ratio 1:1 emulsified 19%
of Navy Special.
REFERENCE (16)

DREW SC 96*

MANUFACTURER Drew Chemical Corp.
EFFECTIVENESS At D/O ratio 1:10 emulsified 66% HD-SAE 20 motor
oil.
REFERENCE (1)

*Product no longer available

DREW TANK CLEANER NO. 4

MANUFACTURER Drew Chemical Corp.
REFERENCE (4)

DUNHAM D-166

MANUFACTURER Dunham Chemical Co.
20 Versey Street
New York, New York 10001

REFERENCE (25)

Toxicity Tests:

<u>Species</u>		<u>Ref.</u>
Mummichog (<u>Fundulus heteroclitus</u>)	24 hr TL _m 16 mg/l	(13)
	96 hr TL _m 16 mg/l	"

ELIMAX

MANUFACTURER German Reference (1)
EFFECTIVENESS At D/O ratio of 1:10 emulsified 80% of HD-SAE
20 motor oil.

EMSOL

MANUFACTURER Du Bois Chemical Division
PRODUCT DESCRIPTION Nonionic mineral oil sulfonate
SPECIFIC GRAVITY 0.84
FLASH POINT 135° F (C.O.C.)
REFERENCE (16)

ESSO F-6155

MANUFACTURER Esso Research & Engineering
Linden, New Jersey 07036

Toxicity Tests:

<u>Species</u>		<u>Ref.</u>
Pink shrimp (<u>Pandalus montagui</u>)	48 hr TL _m 8.6 ppm	(3)
Brown shrimp (<u>Crangon crangon</u>)	48 hr TL _m 9.6 ppm	"
Shore crabs (<u>Carcinus maenas</u>)	48 hr TL _m 17.5 ppm	"
Cockles (<u>Cardium edule</u>)	48 hr TL _m 63 ppm	"

EMULSIFIER K

MANUFACTURER Continental Chemical Co.
PRODUCT DESCRIPTION Refer to Conco Emulsifier K

E-147 (SHANNON)

MANUFACTURER Unknown
Suggested for use at Santa Barbara, California
REFERENCE (25)

MANUFACTURER Du Bois Chemical Division
PRODUCT DESCRIPTION Rust preventer, oil-based emulsifier
SPECIFIC GRAVITY 0.91
FLASH POINT 310° F
REFERENCE (6)

Toxicity Tests:

<u>Species</u>			<u>Ref.</u>
Steelhead minnow fingerling	96 hr TL _m	22.5 mg/l	(6)

FASOLV

MANUFACTURER National Laboratories
225 Summit Avenue
Montvale, New Jersey 07645

Suggested for use at Santa Barbara, California

REFERENCE (25)

FINA SOL

MANUFACTURER Petrofina (Great Britain, Ltd.)
50 Rockefeller Plaza
New York, New York 10001

PRODUCT DESCRIPTION Nonionic

FINA TAR SOLVENT

MANUFACTURER Petrofina (Great Britain, Ltd.)

REFERENCE (4)(25)(26)

FINA TAR SOLVENT E.S.

MANUFACTURER Petrofina (Great Britain, Ltd.)

SPILL EXPERIENCE Used off Bizerta, Italy after tanker spill

REFERENCE (25)(30)

FINA-UNISOL

MANUFACTURER Petrofina (Great Britain, Ltd.)

PRODUCT DESCRIPTION Nonionic

SPILL EXPERIENCE Used during Torrey Canyon incident

REFERENCE (25)(26)(30)

F. O. 399

MANUFACTURER Fine Organics, Inc.
205 Main Street
Lodi, New Jersey 07644

PRODUCT DESCRIPTION Concentrated dispersant. A combination of surface active agents, solvents, emulsifiers, couplers and inhibitors.

APPLICATION METHOD Spray, holding end of nozzle close to the surface of the water, and at a tangent to get a good chopping action.

REFERENCE (25)

GREESKILLA 3

MANUFACTURER Atlas Preservative Co., Ltd.

REFERENCE (25)(26)

GULF AGENT 822

MANUFACTURER

Gulf Research & Development Co.
P. O. Drawer 2038
Pittsburgh, Pennsylvania 15230

REFERENCE (26)

GULFSIL DE-GREASER

MANUFACTURER

Gulf Oil (Great Britain, Ltd.)
6 Grosvenor Place
London, S.W.I., England

REFERENCE (11)

HAMCO

MANUFACTURER

Hampton Road Chemical Corp.

REFERENCE (25)

HEPACOLITH

MANUFACTURER

German Reference

REFERENCE (1)

HOUGHTOSAFE 112

MANUFACTURER

Edgar Vaughan and Co., Ltd.
Legge Street
Birmingham 4, England

REFERENCE (4)(26)

HOUGHTOSOLV

MANUFACTURER

Edgar Vaughan and Co., Ltd.

REFERENCE (11)

HOUGHTON-DETERGENT

MANUFACTURER

Edgar Vaughan and Co., Ltd.

REFERENCE (30)

HYDRO-GAMOSOL

MANUFACTURER

Gamlen Chemical Co.

REFERENCE (12)

Toxicity Tests:

<u>Species</u>	<u>Ref.</u>
Zebra fish (Brachydanio rerio)	
no survival 24 hrs @ 80 ppm	(12)

H-4000

MANUFACTURER

Graphco, Inc.
Alamo, California 94507

PRODUCT DESCRIPTION Contains emulsifiers, detergents, wetting agents,
naptha solvent, chlorinated hydrocarbons.

FLASH POINT 175° F (C.O.C.)

FIRE POINT 202° F (C.O.C.)

REFERENCE (25)

ICI SURFACTANT

MANUFACTURER

I.C.I. America, Inc.

REFERENCE (26)

IMC-SWS

MANUFACTURER

I.M.C. Drilling Mud, Inc.
P. O. Box 22605
Houston, Texas 77027

Suggested for use at Santa Barbara, California

REFERENCE (25)(26)

MANUFACTURER G.A.F. Corporation

PRODUCT DESCRIPTION Nonionic

REFERENCE (5)

JAY

PRODUCT DESCRIPTION Anionic

REFERENCE (25)

KLEARFAC AA040

MANUFACTURER Wyandotte Chemicals Corp.
Wyandotte, Michigan 48192

PRODUCT DESCRIPTION Anionic - mono substituted ortho~~s~~ phosphate ester
surfactant active agent, % by weight (min.) 60%.

COST 30 - 40¢/lb. depending on quantity and grade⁽⁵⁾

SPECIFIC GRAVITY 1.112 @ 25° C/25° C

VISCOSITY 240 cps @ 25° C (Brookfield)

SOLUBILITY Disperses in water

POUR POINT 55° F

USE LIMITATIONS Dispersant to oil ratio 1:6 to 1:100 for crude
oils⁽⁵⁾

KLEARFAC AA270

MANUFACTURER Wyandotte Chemicals Corporation

PRODUCT DESCRIPTION Anionic - mono substituted ortho phosphate ester
surfactant active agent, % by weight (min.) 90%.

SPECIFIC GRAVITY 1.165 @ 25° C/25° C

VISCOSITY 5900 cps @ 25° C (Brookfield)

POUR POINT 25° F

KLEARFAC AA420

MANUFACTURER Wyandotte Chemicals Corporation

PRODUCT DESCRIPTION Anionic - mono substituted ortho phosphate ester
surfactant agent, % by weight (min.) 90%.

SPECIFIC GRAVITY 1.118 @ 25° C/25° C

VISCOSITY 2950 cps @ 25° C (Brookfield)

POUR POINT 20° F

KLEARFAC AB 270

MANUFACTURER Wyandotte Chemicals Corporation

PRODUCT DESCRIPTION Anionic - mono substituted ortho phosphate ester
surfactant active agent, % by weight (min.) 95%.

SPECIFIC GRAVITY 1.088 @ 25° C/25° C

VISCOSITY 800 cps @ 25° C (Brookfield)

POUR POINT 5° F

KELITE A-108-1

MANUFACTURER Kelite Chemical Corp.
1250 North Main Street
Los Angeles, California 90052

Suggested for use at Santa Barbara, California

REFERENCE (25)

MANUFACTURER Dunham Chemical Co.

PRODUCT DESCRIPTION Refer to Dunham D-166

KOR-14

MANUFACTURER Amalgamated Chemicals Corp.
P. O. Drawer 153
Orlando, Florida 32802

REFERENCE (25)

K-RITE 300

MANUFACTURER Winnie Engineering Corp.
Winnie, Texas 77665

PRODUCT DESCRIPTION A highly concentrated cold water emulsifier which
will dissolve asphalt. Suggested for use at
Santa Barbara, California.

REFERENCE (25)

KURI-CLEAN "SD"

Toxicity Tests:

Species

Ref.

Zebra fish (Brachydanio rerio)

None of 5 survived 24 hr @ 15 ppm (12)

MANUFACTURER The Lix Corporation
300 West 80 Street
Kansas City, Missouri

COST \$0.80/gal (1-55 gal drum)

AVAILABILITY F.O.B. Kansas City, Missouri

PRODUCT DESCRIPTION A water-based cleaning compound. Contains tetra
potassium pyro-phosphate, water, solvents,
coupling and wetting agents.

SPECIFIC GRAVITY 1.02 @ 70° F

FLASH POINT Does not burn

SHELF LIFE Unlimited

OTHER Store @ 32° F to 120° F

MANUFACTURER'S USE RECOMMENDATIONS:

Application Method No experience

Dosage Not known for oil spills

Use Limitations Recommended for cleaning shore surfaces coated
with Bunker C or distillate fuels. Applied
diluted 4 times with water.

REFERENCE (14)

LIQUID CONCENTRATE
SWABY
ZIF

MANUFACTURER Bestline Products, Inc.
1095 North Fifth Street
San Jose, California 95112

Suggested for use at Santa Barbara, California

REFERENCE (25)

LISSAPOL N. X.

MANUFACTURER I.C.I. America, Inc.

PRODUCT DESCRIPTION Nonionic, ethoxylated alkylphenol with 90% kerosene-naptha. Also referred to as anhydrous nonylphenol ethyleneoxide condensate.

REFERENCE Time, 90, P. 68, July 1967.

MABEC-PP5
and
MABEC-21T

REFERENCE (25)

MAGNA

MANUFACTURER Magna Corp.
1808 S. Bloomfield Avenue
Santa Fe Springs, California 90670

REFERENCE (25)

MAGNUS MARINE DISPERSER

MANUFACTURER Magnus Chemical Co.

PRODUCT DESCRIPTION Nonionic

EFFECTIVENESS In lab test @ D/O ratio 1:1 emulsified 63.3% Navy Special Grade fuel oil.

SPECIFIC GRAVITY 0.905 @ 80° F

POUR POINT 6° F

FLASH POINT 168° F (P.M.)

REFERENCE (16)

MARINE CLEANER 8551

MANUFACTURER Enjay Chemical Co.
60 West 49 Street
New York, New York 10020

PRODUCT DESCRIPTION Water-based concentrate

SPECIFIC GRAVITY 1.05 @ 60° F

FLASH POINT > 175° F (T.O.C.)

VISCOSITY 45 SSU @ 100° F
10 CS @ 32° F

Spill Experience:
Incident

"Esso Guildford", Casco Bay, Maine, August 9, 1969

Environmental Effects: Considerable quantities of seaweed were found dead or dying. Hard shell clams, mussels and barnacles were also found dead or dying. A kerosene odor was apparent in tidal pools and sand. Sand removed from a depth of 12" in a test pit had a strong kerosene odor. Tidal pools in and around the rocks on the shoreface were sterile and in some cases contained partially dispersed floating oil. Most of these had a detectable kerosene odor seven days after dispersant application.

MARINE CLEANER 8555

MANUFACTURER Enjay Chemical Co.

PRODUCT DESCRIPTION Blend of emulsifiers in a high-flash solvent

SPECIFIC GRAVITY 0.93 @ 60° F

FLASH POINT > 175° F (T.O.C.)

VISCOSITY 33.1 SSU @ 100° F
6.2 CS @ 32° F
14.3 CS @ 0° F

For spill experience refer to Marine Cleaner 8551

REFERENCE (25)

MARITEC OIL SPILL REMOVER

MANUFACTURER Maritec Corp.

PRODUCT DESCRIPTION In lab test at D/O ratio of 1:1 emulsified 33.6% of Navy Special Grade fuel oil. Nonionic.

SPECIFIC GRAVITY 0.955 @ 80° F

POUR POINT - 44° F

FLASH POINT 190° F (C.O.C.)

REFERENCE (16)

METCLENES SPECIAL
METCLENES HEAVY DUTY DEGREASER
METSPERES HEAVY DUTY CLEANER

MANUFACTURER Metropolitan Petroleum Petrochemicals, Inc.
Jersey City, New Jersey 07303

REFERENCE (25)(26)

MIGHTY MATE

MANUFACTURER Sea Air Chemical Co.

Toxicity Tests:

<u>Species</u>		<u>Ref.</u>
Mummichog (<u>Fundulus heteroclitus</u>)	24 hr TL _m 320 mg/l	(13)
	96 hr TL _m 300 mg/l	

MILCHEN MIL-EMULSIFIER
MILCHEN PPS

MANUFACTURER Milchen, Inc.

REFERENCE (26)

MURCO-OSE #2

MANUFACTURER Murray Chemical Co., Inc.
The Whiteclean Corp.
235 East 31st Street
New York, New York 10001

PRODUCT DESCRIPTION Liquid emulsifier

REFERENCE (31)

MURATTI PRODUCT

Toxicity Tests:

<u>Species</u>		<u>Ref.</u>
Moharra (Eucinostomus argenteus)	6 hr TL ₁₀₀ 50 ppm	(20)
	18 hr TL ₄₃ 27 ppm	"
	24 hr TL ₈₅ 27 ppm	"
	24 hr TL ₂₅ 10 ppm	"

Tested in Puerto Rico at time of "Ocean Eagle" incident.

MANUFACTURER Amerace-Esna Corp.

PRODUCT DESCRIPTION A blend of solvents, soap, water and alkaline salts. The principal solvent is a high KB aromatic petroleum hydrocarbon; the soap is of the rosin tall oil type.

COSTS \$1.80 - \$2.55/gal

SPILL EXPERIENCE Anne Mildred Brøvig (Feb. 1966) in North Sea

Toxicity Tests:

<u>Species</u>		<u>Ref.</u>
Mummichog (<u>Fundulus heteroclitus</u>)	24 hr TL _m 175 mg/l	(13)
	96 hr TL _m 175 mg/l	

NAVITONE

MANUFACTURER Amerace-Esna Corp.

PRODUCT DESCRIPTION Contains emulsifiers, detergents and solvents.

REFERENCE (25)

NEOS AB

Toxicity Tests:

<u>Species</u>		<u>Ref.</u>
Zebra fish (<u>Brachydanio rerio</u>)	24 hr @ 20 ppm	(12)
2 of 5 survived		

NORSEMEN 67

MANUFACTURER Norsemen Chemicals
 68, Store Kongensgade
 D.K. 1264, Copenhagen
 Denmark

PRODUCT DESCRIPTION A heavy duty oil degreaser. Nonionic in
 aromatic solvent.

SPECIFIC GRAVITY 0.89

FLASH POINT 63° C (PMCC)

VISCOSITY 1.60 cs @ 100° F

REFERENCE (25)

NORSEMEN 69

MANUFACTURER Norsemen Chemicals

PRODUCT DESCRIPTION Sea cleaner. Nonionic solvent emulsifier

SPECIFIC GRAVITY 0.84

FLASH POINT 3.43 cs @ 100° F

DOSAGE D/O ratio 1:5.5

REFERENCE (25)

NYSTOL OIL SPILL EMULSIFIER #79

MANUFACTURER Nystol Chemicals

 Conforms MIL-S-22864 (Amend. 2)

DOSAGE 1 gal/bbl-oil

REFERENCE (31)

OIL & GREASE REMOVER

MANUFACTURER German Reference

EFFECTIVENESS In lab test @ D/O ratio 1:10 emulsified 82%
of HD-SAE 20 motor oil.

REFERENCE (1)

OIL & GREASE REMOVER

MANUFACTURER E. F. Drew & Co.
(now Drew Chemical Corp.)

EFFECTIVENESS In lab test @ D/O ratio 1:1 emulsified 35.8%
of Navy Special.

SPECIFIC GRAVITY 0.901 @ 80° F

POUR POINT -26° F

FLASH POINT 164° F (P.M.)

REFERENCE (16)

OIL AND SPILL ERADICATOR

MANUFACTURER New Process Chemical Co.
350 Fifth Avenue
New York, New York 10001

PRODUCT DESCRIPTION Anionic.

EFFECTIVENESS In lab test @ D/O ratio 1:1 emulsified 56%
Navy Special.

SPECIFIC GRAVITY 0.891 @ 80° F

FLASH POINT 140° F (C.O.C.)

POUR POINT -12° F

REFERENCE (16)

OIL EX

MANUFACTURER German Reference⁽¹⁾
EFFECTIVENESS At D/O ratio of 1:10 emulsified 52% of HD-SAE
20 motor oil.

OIL GO

MANUFACTURER Casco Chemical Co.
R-88 High Street
Danvers, Massachusetts 01923

REFERENCE (26)

OIL MEGA

MANUFACTURER Clarkson Laboratories

REFERENCE (25)

OIL SLICK EMULSIFIER #5189

EFFECTIVENESS In lab test @ D/O ratio 1:1 emulsified 19.4%
Navy Special grade fuel oil.

REFERENCE (9)

OIL SPILL

MANUFACTURER Atlas Chemical Co.

REFERENCE (26)

OIL SPILL DISPERSER

MANUFACTURER

May be Magnus Product

EFFECTIVENESS

In lab test @ D/O ratio 1:1 emulsified 8.2% of Navy Special grade fuel oil.

REFERENCE (9)

OIL SPILL REMOVER #1

MANUFACTURER

May be Gamlen Product

EFFECTIVENESS

In lab test @ D/O ratio 1:1 emulsified 41.1% of Navy Special grade fuel oil.

REFERENCE (9)

OIL SPILL REMOVER #2

MANUFACTURER

May be Gamlen Product

EFFECTIVENESS

In lab test @ D/O ratio 1:1 emulsified 16.6% of Navy Special grade fuel oil.

REFERENCE (9)

OSR-7348

MANUFACTURER

Crain Industrial Products Co.

FLASH POINT

Non-flammable

Toxicity Tests:

Species

Ref.

Mummichog (Fundulus heteroclitus) 24 hr TL_m 100 mg/l
96 hr TL_m 57 mg/l

(13)

"

PENETONE X 138

MANUFACTURER Amerace-Esna Corp.

Toxicity Tests:

<u>Species</u>		<u>Ref.</u>
Mummichog (<u>Fundulus heteroclitus</u>)	24 hr TL _m 26 mg/l	(13)
	96 hr TL _m 24.5 mg/l	"

PENTRON-D
*PENTRON TC-30

MANUFACTURER Technical Division
Apollo Chemical Co.
250 Delaware Avenue
Clifton, New Jersey 07014

REFERENCE (26)

*A marine tank cleaner

PERMAG #41

MANUFACTURER Magnuson Products Corp.
50 Court Street
Brooklyn, New York 11201

In lab test @ D/O ratio 1:1 - fair to poor
results with Navy Special grade fuel oil.

REFERENCE (16)

PERO-KLEAN No. 801

MANUFACTURER The Perolin Co., Inc.
Empire State Building
New York, New York 10001

PRODUCT DESCRIPTION Marine cleaner. Heavy duty alkaline-solvent
type product.

FLASH POINT 200° F (C.O.C.)

REFERENCE (16)

OXANE

MANUFACTURER Foreign Reference

REFERENCE (4)(26)

OXANEEZ

MANUFACTURER Nopco Chemical Co.
60 Park Place
Newark, New Jersey 07102

REFERENCE (5)(26)

PARDAG HEAVY DUTY

REFERENCE (25)(26)

*PC-65 SUPERSLICK
PC-5
PC-6
PC-17
PC-50

MANUFACTURER White Chemicals Division
White Manufacturing Co.
1140 Lockwood Drive
Houston, Texas 77020

REFERENCE (26)

*PC-65 Superslick. Nonsolvent. \$2.75/gal. Diluted 1 to 10 times with water. Reference (25)(26).

PENETONE 867(16)

MANUFACTURER Amerace-Esna Corp.

Contains 68% water.

EFFECTIVENESS In lab test @ D/O ratio 1:1 emulsified 11.5%
Navy Special Grade fuel oil.

PERO-KLEAN No. 805

MANUFACTURER The Perolin Co., Inc.

EFFECTIVENESS In lab test @ D/O ratio 1:1, emulsified 14.3% of Navy Special grade fuel oil.

REFERENCE (16)

NOTE: Other Perolin Products: No. 802, Powder surfactant
No. 842, Liquid Alkaline Cleaner

PERO-Klean No. 818

MANUFACTURER The Perolin Co., Inc.

PRODUCT DESCRIPTION Nonionic - aromatic solvent emulsifier

COST \$3.10 - \$3.50/gal.

AVAILABILITY Worldwide

FLASH POINT 200° F

VISCOSITY ca 180° F

pH 7

APPLICATION METHOD Spray undiluted

HUMAN HAZARD Avoid eye or skin contact

EFFECTIVENESS One of the most effective of 5 products tested at dispersant to oil ratio 1:5 to 1:10 — most effective on fuel oils, Saskatchewan and Silurian crudes and least effective on Alberta, Leduc and Cambrion Crudes⁽¹⁷⁾.

At 1:10 D/O ratio Pero-Klean No. 818 emulsified 58% of HD-SAE 20 motor oil⁽¹⁾.

Toxicity Tests:

Species

Ref.

Fathead minnow (Pimephales promelas)

(Most toxic of 5 dispersants tested) 96 hr TL_m 53 ppm (17)

Imparts very intense odor to water. Threshold odor number at 1 ppm is > 200.

REFERENCE (17)

PETRO-BAN

MANUFACTURER Napasco Chemical Co.
P. O. Box 10532
New Orleans, Louisiana 70113

PRODUCT DESCRIPTION Oil spill remover. Solvent detergent emulsifier. Forms milky emulsion in water.

SPECIFIC GRAVITY 0.92 @ 60° F

FLASH POINT 155° F (C.O.C.)

VISCOSITY 43 SSU @ 100° F

FIRE POINT 160° F (C.O.C.)

REFERENCE (25)

PILOT OIL SPILL ERADICATOR

MANUFACTURER Pilot Chemical Co.
P. O. Box 12292
Norfolk, Virginia 23502

In lab test @ D/O ratio 1:1 emulsified 78.9% of Navy Special grade fuel oil⁽⁹⁾.

REFERENCE (9)(26)

P.O. 576

MANUFACTURER Clarkson Laboratories

EFFECTIVENESS In lab test @ D/O ratio 1:1 emulsified 16.7% of Navy Special grade fuel oil.

REFERENCE (16)

POLY-ZYME

MANUFACTURER Zurn Industries, Inc.
1801 Pittsburg Avenue
Erie, Pennsylvania 16512

REFERENCE (25)

PRODUCT 20215

MANUFACTURER Unknown

Toxicity Tests:

<u>Species</u>		<u>Ref.</u>
Moharra (<u>Eucinostomus argenteus</u>)	6-12 hr TL ₂₉ 20 ppm	(20)
	18-24 hr TL ₅₇ 20 ppm	"

Remarks: Tested in Puerto Rico at time of "Ocean Eagle" incident.

RETZLOFF 1-4016-P

MANUFACTURER Retzloff Chemical Co.
Houston, Texas 77002

PRODUCT DESCRIPTION Contains diesel fuel solvent

FLASH POINT 150° F (min.)

REFERENCE (25)(26)

S-1

MANUFACTURER Coastal Services, Inc.
343 Washington Square
Braintree, Massachusetts 02184

PRODUCT DESCRIPTION Same as Colloid 88. Also called Coastal Services 88.

REFERENCE (25)

S-5

MANUFACTURER Coastal Services, Inc.

PRODUCT DESCRIPTION A solvent based Colloid product.

REFERENCE (25)

SEA CLEAN 70

MANUFACTURER

The Perolin Co., Inc.

REFERENCE (12)

Toxicity Tests:

Species

Ref.

Zebra fish (Brachydanio rerio) No survival 24 hrs @ 20 ppm (12)

SEA GREEN 50 A

SEA GREEN 70

MANUFACTURER

Sea Light Mfg. Co., Ltd.
6th Floor, Kyoda Bldg. No. 1
1 Chrome
Hanchō Nihon Basli Chou Ku
Tokyo, Japan

REFERENCE (10)(26)

SEA SWEEP

MANUFACTURER

Eureka Chemical Co.
P. O. Box 1608
Olympia, Washington 98501

EFFECTIVENESS

On a scale of 1 (high) to 4 (low) was given a rating of 1. Was one of most effective of 11 products tested⁽⁶⁾.

Toxicity Tests:

Species

Pacific oyster larvae (Crassostrea gigas)

Toxic

1.5 ppm (6)

Non-toxic

0.8 ppm (")

SANTOMERSE ME-B
SLURRY

MANUFACTURER

Monsanto
Inorganic Chemicals Division
800 North Lindbergh Boulevard
St. Louis, Missouri 63166

REFERENCE (26)

SELF-RINSE

MANUFACTURER

New Process Chemical Co.

In lab test @ D/O ratio 1:1 emulsified 7.0% of
Navy Special grade fuel oil.

FLASH POINT

198° F (P.M.)

REFERENCE (16)

SEPTEX

MANUFACTURER

The Chemlan Co.

PRODUCT DESCRIPTION

Contains emulsifiers, penetrants and deodorizers
Primarily for opening clogged septic tank and
cesspool lines.

REFERENCE (25)(26)

SHIP CLEAN

MANUFACTURER

Amerace-Esna Corp.

REFERENCE (25)

SILLARIT

MANUFACTURER

German Reference⁽¹⁾

At D/O ratio of 1:10 emulsified 52% of HD-SAE
motor oil.

SKANEX QUICK
SKANEX S EMULSIFIER

MANUFACTURER Scandinavian Oil Service

REFERENCE (26)

SLICKAWAY

MANUFACTURER Mankana Chemical Co.
2324 Boston Street
Baltimore, Maryland 21224

REFERENCE (26)

SLIPCLEAN

MANUFACTURER Slip Trading Co.
34 Great St. Helen's Street
London, E.C. 3, England

PRODUCT DESCRIPTION Referred to as a rigwash detergent

REFERENCE (4)(11)(26)

(Dasic) SLICKGONE I

MANUFACTURER Dasic Chemicals Ltd.
Winchester Road
Romsey, Hampshire, England

PRODUCT DESCRIPTION Nonionic detergent

REFERENCE (4)

Spill Experience:
Incident

Torrey Canyon, March 1967. Effectiveness not determined.

Toxicity Tests:

<u>Species</u>		<u>Ref.</u>
Pink shrimp (<u>Pandalus montagui</u>)	48 hr TL _m 5.2 ppm	(3)
Brown shrimp (<u>Crangon crangon</u>)	48 hr TL _m 6.6 ppm	"
Shore crab (<u>Carcinus maenas</u>)	48 hr TL _m 35 ppm	"
Cockles (<u>Cardium edule</u>)	48 hr TL _m 32.4 ppm	"

SLICKGONE #2

MANUFACTURER Dasic Chemicals Ltd.

PRODUCT DESCRIPTION Nonionic detergent⁽⁴⁾ solvent based

COST \$2.30/gal.⁽²⁶⁾

DOSAGE Dispersant to oil ratio 1:10 by volume

Toxicity Tests:

<u>Species</u>		<u>Ref.</u>
Pink shrimp (<u>Pandalus montagui</u>)	48 hr TL _m 4.5 ppm	(3)
Brown shrimp (<u>Crangon crangon</u>)	48 hr TL _m 3.5 ppm	"
Shore crabs (<u>Carcinus maenas</u>)	48 hr TL _m 21.3 ppm	"
Cockles (<u>Cardium edule</u>)	48 hr TL _m 30.5 ppm	"
Zebra fish (<u>Brachydanio rerio</u>)	No survival 24 hr 25 ppm	"

SNOWDRIFT

MANUFACTURER Monsanto Inorganic Chemical Div.

PRODUCT DESCRIPTION Referred to as a beach cleaner

REFERENCE (4)

SP 162

MANUFACTURER B. P. Ltd.

REFERENCE (26)

STREP 33

MANUFACTURER W. and F. Walker Ltd.
Kirby, Liverpool
England

STRUKTOL

MANUFACTURER German Reference⁽¹⁾
At D/O ratio of 1:10 emulsified 86% of HD-SAE
20 Motor Oil.

SURFACTANT 8651

MANUFACTURER Enjay Chemical Company

Toxicity Tests:

<u>Species</u>	<u>Ref.</u>
Zebra fish (<u>Brachydanio rerio</u>)	
None Survived	24 hrs @ 10 ppm (12)

SURFEMUL #5

MANUFACTURER 3 C Chemical Corp.

REFERENCE (18)(26)

Toxicity Tests:

<u>Species</u>		<u>Ref.</u>
<u>Fundulus parvepinis</u>	24 hr TL _m 350 ppm	(18)
	96 hr TL _m 350 ppm	

TANK-GLO

MANUFACTURER Sea Air Chemical Co.

PRODUCT DESCRIPTION Nonionic -70% water.

EFFECTIVENESS In lab test @ D/O ratio 1:1 emulsified 25.2% of Navy Special Grade fuel oil.

SPECIFIC GRAVITY 1.075 @ 80° F

REFERENCE (16)

TCC-569 (Crain)

MANUFACTURER Crain Industrial Products Corp.

TEEPOL

PRODUCT DESCRIPTION Referred to as anionic detergent

REFERENCE (4)(30)

TERGITOL 15-S-5

MANUFACTURER Union Carbide Chemical Corp.

PRODUCT DESCRIPTION Nonionic

Toxicity Tests:

<u>Species</u>			<u>Ref.</u>
Mummichog (<u>Fundulus heteroclitus</u>)	24 hr TL _m	3.8 mg/l	(13)
	96 hr TL _m	3.8 mg/l	"

TERGITOL 15-S-9

MANUFACTURER Union Carbide Chemical Corp.

PRODUCT DESCRIPTION Nonionic

Toxicity Tests:

<u>Species</u>			<u>Ref.</u>
Mummichog (<u>Fundulus heteroclitus</u>)	24 hr TL _m	9.0 mg/l	(13)
	96 hr TL _m	7.8 mg/l	"

TIP TOP CLEANER

MANUFACTURER Dutch Pride Products
San Jose, California 95125

Suggested for use at Santa Barbara, California

REFERENCE (25)

TRACER-TECK

PRODUCT DESCRIPTION Nonionic

REFERENCE (25)

TRET-O-LITE E3453

MANUFACTURER Petrolite Corp.

REFERENCE (26)

TRICON

MANUFACTURER New Process Chemical Co.

PRODUCT DESCRIPTION Oil and spill eradicator (no longer available).
Anionic. 10% polyethylene glycol ether; 5% fatty acids; 2% alcohol; 63% petroleum solvents; 20% petroleum sulfonate.

SPECIFIC GRAVITY 0.891 @ 80°F

FLASH POINT 140°F (C.O.C.)

OTHER Pour Point - 12°F

EFFECTIVENESS At 1:1 ratio emulsified 66.6% of Navy Special Grade fuel oil⁽¹⁰⁾.

Toxicity Tests:

Species

Ref.

Striped bass Toxic at low concentrations (7)

TURCO

REFERENCE (25)

(TWELVE) 12 N DEGREASER

MANUFACTURER Timmons and Charles
110 Academy Street
Jersey City, New Jersey 07303

APPLICATION Spray @ D/O ratio 1:1

SPECIFIC GRAVITY 0.925

FLASH POINT 190°F

pH 6.6-6.8

REFERENCE (25)

UNICO CONCENTRATE

MANUFACTURER Universal Supply Co.

PRODUCT DESCRIPTION Concentrate. Nonionic, traces cationic.

REFERENCE (25)(26)(29)

Toxicity Tests:

<u>Species</u>	<u>Ref.</u>
<u>Fundulus parvipinnis</u>	24 hr TL _m 220 ppm (18)
	96 hr TL _m 220 ppm "

UNISOL-FE

MANUFACTURER May be Universal Supply Co.

REFERENCE (12)

Toxicity Tests:

<u>Species</u>	<u>Ref.</u>
Zebra fish (<u>Brachydanio rerio</u>)	
No survival	24 hr @ 20 ppm (12)

VECOM B-24

MANUFACTURER

German Reference (1)

EFFECTIVENESS

At D/O ratio 1:10 emulsified 50% of HD-SAE motor oil.

VISCO C-16-F

MANUFACTURER

Nalco Chemical Co.
Box 87
Sugar Land, Texas 77478

REFERENCE (26)

WEN-DON FORMULA 203

MANUFACTURER

Wen-Don Chemical Co.

REFERENCE (25)

WHITTAKERS G.P. DEGREASANT

MANUFACTURER

English Reference

REFERENCE (4)(26)

WYANDOTTE 20

MANUFACTURER

Wyandotte Chemical Corp.

Discontinued product used during "Ocean Eagle" incident, San Juan, Puerto Rico.

REFERENCE (25)

SECTION C

MANUFACTURER AND PRODUCT INDEX

<u>Manufacturer</u>	<u>Products</u>	<u>Section</u>
Adair Equipment Co. 405 Century Building Houston, Texas 77002	Cold Clean	B
Aetna Chemical Corp. Power Division East Paterson, New Jersey 07407	Actemul Actemul U.C.	B B
Alex C. Ferguson Co., Inc. Philadelphia, Pennsylvania 19104	AFCO #5350	B
Alken-Murray Corporation 111 Fifth Avenue New York, New York 10003	Alken O.S.D.	A
Amalgamated Chemicals Corp. P.O. Drawer 153 Orlando, Florida 32802	Kor-14	B
Amerace-Esna Corp. Chemical Specialties Division 74 Hudson Avenue Tenafly, New Jersey 07670	Slix Navee 42 Navitone Penetone 867 Penetone X138 Ship Clean	A B B B B B
Amway Corporation Ada, Michigan 49301	Amway Industroclean	B
Apollo Chemical Co. Technical Division 250 Delaware Avenue Clifton, New Jersey 07014	Pentron-D Pentron TC-30	B B
Ara Chem, Inc. P.O. Box 5031 San Diego, California 92105	Gold Crew Dispersant	A
Ashland Chemicals 8 East Long Street Columbus, Ohio 43216	Ridzlik	A
Atlas Chemical Industries, Inc. 1270 Avenue of the Americas New York, New York 10020	Cronax (Oil Spill) Oil Spill	B B
Atlas Preservative Co., Ltd. Fraser Road	Atlas 1901 Greeskilla 3	B B

<u>Manufacturer</u>	<u>Products</u>	<u>Section</u>
Banner Chemical Products Corp. 46 Great Jones New York, New York 10001	D. G. 04	B
B&B Chemical Co., Inc. Box 796 Miami, Florida 33166	B&B 2021-S B&B 2023	A A
Bergen Chemical Corp. Back Bay P.O. Box 371 Boston, Massachusetts 02117	Bergen Oil on Water Remover	B
The Besco Corporation 200 N. Myrtle Street Metairie, Louisiana 70004	Besco B-51 DT Besco D-Emulsion No. 100 Besco Slick - 440	A A A
Bestline Products, Inc. 1095 North Fifth Street San Jose, California 95112	Liquid Concentrate Swaby Zif	B B B
BP North America, Inc. 620 Fifth Avenue New York, New York 10020	BP-1002 BP-1100 SP-162	A A B
Carter Chemical Co. 250 Fulton Avenue Hempstead, New York 11550	Aquatreat	B
Casco Chemical Co. R-88 High Street Danvers, Massachusetts 01923	Oil Go	B
Cejer Co. 2545 Treedy Boulevard South Gate, California 90280	Cejer APC	B
The Chemlan Co. 24 Smith Street Biddleford, Maine 04005	Degreaser 80 G Septex	B B
Chevron Chemical Co. 200 Bush Street San Francisco, California 94101	Chevron NI-0	B
The Clarkson Laboratories 1450 Ferry Avenue Camden, New Jersey 08104	Blitz Oil Mega P.O. 576	A B B

<u>Manufacturer</u>	<u>Products</u>	<u>Section</u>
Cleaning Compounds Corp. 999 Commercial Street Palo Alto, California 94302	Clock 06:39	B
Coastal Services, Inc. 343 Washington Square Braintree, Massachusetts 02184	S-1 S-5	B B
Colloid Chemical Co. 31 Perkins Street Brockton, Massachusetts 02402	Colloid-88	A
Continental Chemical Co. 270 Clifton Boulevard Clifton, New Jersey 07015	Conco Emulsifier 700 Conco Emulsifier K Con-O-1571	B B B
Crain Industrial Products Corp. P.O. Box 34233 Farmers Branch, Texas 75234 also P.O. Box 1062 2411 Swiss Avenue Dallas, Texas 75221	LCP-12 OD-2 OSR-7348 TCC-569	A A B B
Cultured Chemical Division 1139 West Struck Avenue Orange, California 92667	DBC Plus	B
Dasic Chemicals Ltd. Winchester Road Romsey, Hampshire, England	Slickgone #1 Slickgone #2	B B
Diversified Chemicals Corp. 8100 Electric Avenue Stanton, California 90680	Di-Chem 320 Di-Chem 322 Di-Chem 325 Di-Chem 400	A B B B
Drew Chemical Corp. 522 Fifth Avenue New York, New York 10036	Ameroid Oil Spill Emulsifier #1 Ameroid Drewclean 522 Drew SL 96 Drew Tank Cleaner #4 Oil and Grease Remover	 A B B B B
Dunham Chemical Co. 20 Versey Street New York, New York 10001	Dunham D-166	B

<u>Manufacturer</u>	<u>Products</u>	<u>Section</u>
Dutch Pride Products San Jose, California 95125	Tip Top Cleaner	B
Edgar Vaughan and Co., Ltd. Legge Street Birmingham 4, England	Houghtosafe 112 Houghtosolv Houghton-Detergent	B B B
Enjay Chemical Co. 60 West 49th Street New York, New York 10020	Corexit 7664 Corexit 8666 Cleaner 8671 COE Marine Cleaner 8551 Marine Cleaner 8555 Surfactant 8651	A A B B B B B
Esso Research & Engineering Linden, New Jersey 07036	Esso F-6155	B
Eureka Chemical Co. P.O. Box 1608 Olympia, Washington 98501	Sea Sweep	B
Fine Organics, Inc. 205 Main Street Lodi, New Jersey 07644	F.O. 300-B F.O. 300-H F.O. 399	A A B
GAF Corporation 140 West 51st Street New York, New York 10020	Igepal Co-430 Igepal Co-530 Igepal Rc-520	A A B
Gamlen Chemical Co. 321 Victory Avenue So. San Francisco, California 94080	Gamlen D Solvent Gamosol Oil Spill Remover CW Solvent Hydro-Gamosol	A A B B
Graphco, Inc. Alamo, California 94507	H-4000	B
Guardian Chemical Corp. 41-45 Crescent Street Long Island City, New York 11101	Polycomplex A-11 Polycomplex A-11 D	A A
Gulf Oil (Great Britain, Ltd.) 6 Grosvenor Place London, S.W.I., England	Gulfsil De-Greaser	B
Gulf Research & Development Co. P.O. Drawer 2038 Pittsburgh, Pennsylvania 15230	Gulf Agent 822	B

<u>Manufacturer</u>	<u>Products</u>	<u>Section</u>
Hampton Roads Chemical Corp. P.O. Box 1848 Newport News, Virginia 23607	Degreco	B
Hemisphere Marine Chemicals Co., Inc. 300 Main Street Orange, New Jersey 07050	Hemco No. 2	A
Holl-Chem, Inc. 502-A Maritime Building Seattle, Washington 98104	Holl-Chem #622	A
ICI America, Inc. 151 South Street Stamford, Connecticut 06904	Dispersol OS Cirrasol ICI Surfactant Lissapol N.X.	A B B B
I.M.C. Drilling Mud, Inc. P.O. Box 22605 Houston, Texas 77027	IMC-SWS	B
Johnson-March Corporation 3rd and Berks Street Philadelphia, Pennsylvania 19122	Isomal 265	A
Kelite Chemical Corp. 1250 North Main Street Los Angeles, California 90052	Kelite A-108-1	B
Lawton Specialty Co., Inc. P.O. Box 44 Lawton, Oklahoma 73501	Magic Power Oil Dispersent OD #1	A
The Lix Corporation 300 West 80th Street Kansas City, Missouri 64114	Lix 336	B
Magna Corporation 1808 S. Bloomfield Avenue Santa Fe Springs, California 90670	Magna	B
Magnus Chemical Co. 400 South Avenue Garwood, New Jersey 07627	Magnus Oil Spill Disperser Automatic Tank Wash Magnus Marine Disperser	A B B B
Magnuson Products Corp. 50 Court Street Brooklyn, New York 11201	Permag #41	B

<u>Manufacturer</u>	<u>Products</u>	<u>Section</u>
Mankana Chemical Co. 2324 Boston Street Baltimore, Maryland 21224	Slickaway	B
Maritec Corp.	Maritec Oil Spill Remover	B
Metropolitan Petroleum Petrochemicals, Inc. 24 Caven Point Road Jersey City, New Jersey 07304	Met Aquaclene 100 Metclene Special Metclene Heavy Duty Degreaser Metspere Heavy Duty Cleaner	A B B B B
Milchen, Inc. Box 2211 Houston, Texas 77001	Aquanix Milchen Mil-Emulsifier Milchen PPS	B B B
Monsanto Inorganic Chemicals Division 800 North Lindbergh Boulevard St. Louis, Missouri 63166	Santomerse ME-B Slurry Snowdrift	B B B
Montgomery Chemical Company P.O. Box 187 Jenkintown, Pennsylvania 19046	Aquanex MC	A
Murray Chemical Co., Inc. The Whiteclean Corp. 235 East 31st Street New York, New York 10001	Murco-Ose #2	B
Nalco Chemical Co. Box 87 Sugar Land, Texas 77478	Visco C-16-F	B
Napasco Chemical Co. P.O. Box 10532 New Orleans, Louisiana 70113	Petro-Ban	B
Norsemen Chemicals 68, Store Kongensgade D.K. 1264, Copenhagen Denmark	Norsemen 67 Norsemen 69	B B
National Laboratories 225 Summit Avenue Montvale, New Jersey 07645	Fasolv	B

<u>Manufacturer</u>	<u>Products</u>	<u>Section</u>
National Lead Company	Surflo RD 282	A
Baroid Division	Baroid Slix-5	B
P.O. Box 1675	Degreaser	
Houston, Texas 77002		
National Research and Chemical Company	Tyfosol 80	A
1250 Cerise Avenue		
Hawthorne, California 90250		
also		
30 East 42nd Street		
New York, New York 10001		
Navada Enzymes, Inc.	Bacto-Zyme	A
3049 Riegel, Building C		
Las Vegas, Nevada 89012		
New Process Chemical Co.	Oil & Spill Eradicator	B
350 Fifth Avenue	Self Rinse	B
New York, New York 10001	Tricon	B
Nopco Chemical Co.	Oxaneez	B
60 Park Place		
Newark, New Jersey 07102		
Nystol Chemicals	Nystol Oil Spill	
	Emulsifier #79	B
O'Brien Industries, Inc.	Disperite 110	B
1040 Bushwick Avenue		
Brooklyn, New York 11201		
Pacific Chemical	Spill-X	A
4501 Shilshole N.W.		
Seattle, Washington 98107		
Pepper Tank Cleaning Co.	Disperse-Oil	A
2000 McKinley Avenue		
National City, California 92050		
The Perolin Co., Inc.	Pero-Klean No. 801	B
Empire State Building	Pero-Klean No. 805	B
New York, New York 10001	Pero-Klean No. 818	B
	Sea Clean 70	B
Petrofina (Great Britain, Ltd.)	Fina Sol	B
50 Rockefeller Plaza	Fina Tar Solvent	B
New York, New York 10001	Fina Tar Solvent E.S.	B
	Fina-Unisol	B

<u>Manufacturer</u>	<u>Products</u>	<u>Section</u>
Petrolite Corporation Tretolite Division 369 Marshall Avenue St. Louis, Missouri 63119	Petrolite W-1439 Petrolite WF-30 Tret-O-Lite	A A B
also 2 West 4th Street New York, New York 10017		
Pilot Chemical Co. P.O. Box 12292 Norfolk, Virginia 23502	Pilot Oil Spill Eradicator	B
Polycell Products, Ltd. Broadwater Road Welwyn Garden City Hertsfordshire, United Kingdom	Polyclens (Moltoklar)	A
Retzloff Chemical Co. Houston, Texas 77002	Retzloff 1-4016-P	B
Richardson Company 100 New Street Paterson, New Jersey 07510	Compound Richonage YLA	B
Rohm & Haas Company Independence Mall West Philadelphia, Pennsylvania 19105	BD-30	B
Scandinavian Oil Service Stora Badhusgatan 20 S-41121 Gothenburg, Sweden	Skanex S-102 Skanex Qucik	A B
<u>Domestic Representative:</u> Surface Separator Systems, Inc. 103 Mellor Avenue Baltimore, Maryland 21228		
Sea-Air Chemical Corp. 32-00 Borden Avenue Long Island City, New York 11106	Foilzoil Dact Deck Glo Dispersal Dissolvol Dissolvo Mighty Mate Tank Glo	A B B B B B B B

<u>Manufacturer</u>	<u>Products</u>	<u>Section</u>
Sea Light Mfg. Co., Ltd. 6th Floor, Kyoda Bldg. No. 1 1 Chrome Hancho Nihon Basli Chou Ku Tokyo, Japan	Sea Green 50 A Sea Green 70	B B
Shaklee Products Hayward, California 94544	Basic-H	B
Slip Trading Company 34 Great St. Helen's Street London, E.C. 3, England	Slipclean	B
Sunshine Chemical Corp. P.O. Box 2041 West Hartford, Connecticut 06117 also P.O. Box 5534 Jacksonville, Florida 32207	Jansolv-60 Jansolv-60 W	A A
Teoc, Inc. P.O. Box 513 1100 Victory Drive Westwego, Louisiana 70094	Teoc 444 Teoc 777	A A
Texas Refinery Corp. Fort Worth, Texas 76101	Big Red	B
3 C Chemical Corp.	Surfemul #5	B
Timmons and Charles 110 Academy Street Jersey City, New Jersey 07303	(Twelve) 12 N Degreaser	B
Turco Chemische Producten N.V. Verl. Blokkenweg 12 Ede, Holland	Seamulso E	A
Union Carbide Chemical Corp. 270 Park Avenue New York, New York 10001	Tergitol 15-S-5 Tergitol 15-S-9	B B
Universal Supply Company	Unico Concentrate	B
W. and F. Walker Ltd. Kirby, Liverpool England	Strep 33	B
Wen-Don Chemical Co.	Wen-Don Formula 203	B

<u>Manufacturer</u>	<u>Products</u>	<u>Section</u>
White Chemicals Division	PC-65 Superslick	B
White Manufacturing Company	PC-5	B
1140 Lockwood Drive	PC-6	B
Houston, Texas 77020	PC-17	B
	PC-50	B
Winnie Engineering Corp.	K-Rite 300	B
Winnie, Texas 77665		
W. R. Grace & Co.	Actusol	B
Du Bois Chemical Division	Actusol T-776	B
Union Avenue & Du Bois	Emsol	B
East Rutherford, New Jersey 07070	E-314	B
Wyandotte Chemicals Corp.	Casol	A
J. B. Ford Division	Talent	A
Wyandotte, Michigan 48192	Spill Remover	A
	Klearfac AA040	B
	Klearfac AA270	B
	Klearfac AA420	B
	Klearfac AB270	B
	Wyandotte 20	B
Xzit Chemical Company	Oil Spill Eradicator	
56 Newark Street	X-1-11	A
Hoboken, New Jersey 07030		
Zurn Industries, Inc.	Poly-Zyme	B
1801 Pittsburg Avenue		
Erie, Pennsylvania 16512		

SECTION D

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