1. Source of Submission (Name, Organization)

Enviroclean Products and Services LLC

2. Identity of Reagent (Chemical Name, common name, trade name)

Ethoxylated octylphenolic surfactants

3. MSDS and Technical Data Sheet for all substances included in attached. Also provided is an Aquatic Toxicity Report, laboratory certificate of analysis, and product usage guidance document

4. Number of Field-scale Applications to Date

greater than 100

5. Case Studies

Case studies attached

6. Brief Rationale for Inclusion in New WDR (should include duration on market, impact on groundwater quality, effectiveness, human health & safety)

Enviroclean is a non-toxic and biodegradable cleaning product and surfact for use in multiple applications in the environment and has proven to be a safe and effective product for treating source contamination through surfactant flushing and removal activities. The product has been implemented in over 100 sites and the product effectiveness is well documented (see attached case studies).

Enviroclean has been evaluated for biodegradability and toxicity. The product is safe for human health; the results of numerous mammalian toxicity studies conducted on octylphenol (OP) and octylphenol ethoxylates (OPE), along with an understanding of their occupational and consumer uses support the conclusion that human safety should not be a concern for these compounds.

MATERIAL SAFETY DATA SHEET

Product Name: ENVIROCLEAN

SECTION 1 MATERIAL IDENTIFICATION

PRODUCT NAME/DESCRIPTION: ENVIROCLEAN

DISTRIBUTED / MANUFACTURED BY:
ENVIRO CLEAN SERVICES, L.L.C.
PO BOX 721090
OKLAHOMA CITY, OK 73172

DATE: 5/27/2008
PHONE: 405-373-4545
EMERGENCY PHONE: 405-373-4548

SECTION 2 HAZARDOUS COMPONENTS

CHEMICAL NAME	%W/W	CAS NUMBER	OSHA (ACGIH) EXPOSURE LIMIT TLVs(ACGIH) TWA ppm	TWA mg/m3	STEEL ppm	STEEL mg/m3	Other1
Proprietary Blend Of Ethoxylated Octylphenolic Surfactants							
Non-ionic water based liquid blend, concentrate							

This product does not contain any hazardous ingredients
as defined by CERCLA, and California's Prop. 65.

SECTION 3 HEALTH HAZARDS

IRRITATION
- ☑ SKIN ☐ SEVERE ☑ MODERATE
- ☑ EYE ☐ SEVERE ☑ MODERATE ☐ MILD (TRANSIENT)

CORROSIVITY
- ☐ SKIN ☐ 4HRS. (DOT) ☐ 24 HRS. (CPSC
- ☐ EYE ☐ MAY CAUSE BLINDNESS

SENSITIZATION ☐ SKIN ☐ RESPIRATORY ☐ ALLERGEN OTHER: None Known

INHALATION EFFECTS ☐ NARCOTIC EFFECT ☐ CYANOSIS ☐ ASPHYXIANT OTHER: None Known

LUNG EFFECTS (SPECIFY):

None Known

OTHER (SPECIFY):

☐ REPEATED CONTACT SKIN DEFATTER

OTHER (SPECIFY): Pre-existing skin and eye disorders may be aggravated by contact with this product.

SECTION 4 FIRST AID

INGESTION

☐ INDUCE VOMITING ☐ DON'T INDUCE VOMITING ☐ GIVE PLENTY OF WATER ☑ GET MEDICAL ATTENTION

☑ NEVER GIVE ANYTHING TO AN UNCONSCIOUS PERSON

DERMAL

- [x] FLUSH WITH SOAP AND WATER
- [x] GET MEDICAL ATTENTION
- [x] CONTAMINATED CLOTHING - REMOVED AND LAUNDER
- [ ] CONTAMINATED SHOE - DESTROY

OTHER (SPECIFY):

None Known

EYE CONTACT

- [x] FLUSH WITH WATER FOR 15 MINUTES
- [x] GET MEDICAL ATTENTION

OTHER (SPECIFY):

Life and separate eyelids to aid in rinsing

INHALATION

- [ ] REMOVE TO FRESH AIR
- [ ] IF NOT BREATHING GIVE ARTIFICIAL RESPIRATION
- [ ] GIVE OXYGEN
- [x] GET MEDICAL ATTENTION

OTHER (SPECIFY):

None considered necessary.

SECTION 5 FIRE AND EXPLOSION DATA

CHARACTERISTICS:

FLASH POINT	>200 deg F
FLASH POINT METHOD(S)	NA
UPPER EXPLOSION LIMIT (UEL)	NA
LOWER EXPLOSION LIMIT (UEL)	NA
AUTOIGNITION TEMPERATURE	NA
FIRE HAZARD CLASSIFICATION (OSHA/NFPA)	0

EXTINGUISHING MEDIA

- [ ] WATER SPRAY
- [ ] WATER FOG
- [ ] WATER STREAM
- [ ] CO2
- [ ] DRY CHEMICAL
- [ ] ALCOHOL FOAM
- [ ] FOAM
- [ ] EARTH OR SAND
- [x] AS REQUIRED FOR FIRE BEING FOUGHT

SPECIAL FIRE FIGHTING PROCEDURES

- [ ] DON'T ENTER BUILDING
- [ ] ALLOW FIRE TO BURN
- [x] WATER MAY CAUSE FROTHING
- [ ] DON'T USE WATER
- [x] USE SELF-CONTAINED BREATHING APPRATUS

OTHER (SPECIFY): None Known

SPECIAL FIRE FIGHTING PROCEDURES

- [ ] DUST EXPLOSION HAZARD
- [ ] SENSITIVE TO SHOCK
- [ ] CONTAMINATION
- [ ] TEMPERATURE

OTHER (SPECIFY): None Known

SECTION 6 ACCIDENTAL RELEASE MEASURES

STEP TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED

- [x] FLUSH WITH WATER
- [x] ABSORB WITH SAND OF INERT MATERIAL
- [ ] NEUTRALIZE
- [ ] SWEEP OR SCOOP UP AND REMOVE
- [ ] KEEP UPWIND
- [x] PREVENT SPILLS
- [x] DISPOSE OF PROMTLY

OTHER (SPECIFY): Remove with vacuum truck or pump to storage/salvage vessel.

SECTION 7 HANDLING AND STORAGE

PRECAUTIONARY LABELING

- [x] WASH AFTER HANDLING
- [x] DON'T GET IN EYES, SKIN, CLOTHING
- [x] DON'T BREATHE DUST, VAPOR, GAS
- [x] KEEP CONTAINTER CLOSED
- [ ] KEEP AWAY FROM HEAT, SPARKS, AND OPEN FLAMES
- [x] STORE IN TIGHTLY CLOSED CONTAINERS
- [ ] DON'T STORE NEAR COMBUSTIBLES
- [x] KEEP FROM CONTACT WITH CLOTHING
- [ ] EMPTY CONTAINER MAY CONTAIN HAZARDOUS RESIDUE
- [ ] USE EXPLOSION PROOF EQUIPMENT

OTHER (SPECIFY):

Keep this and all chemicals out of reach of children.

OTHER HANDLING AND STORAGE CONDITIONS

Storage: 35 - 120 deg F Shelf Life: Unlimited unopened

SECTION 8 PERSONAL PROTECTION/EXPOSURE CONTROLS

VENTILATION REQUIREMENTS - ALWAYS KEEP EXPOSURE BELOW PERMISSIBLE EXPOSURE LIMITS

- [ ] CONSULT AN INDUSTRIAL HYGIENIST
- [x] LOCAL EXHAUST
- [ ] USE ADEQUATE VENTILATION
- [ ] CHECK FOR AIR CONTAMINANT

OTHER (SPECIFY): Not Known

EYE

- [ ] FACE SHIELD AND GOGGLES
- [x] SAFTEY GLASSES
- [ ] GOGGLES

HAND

- [ ] BUTYL RUBBER
- [x] POLYVINYL ALCHOHOL
- [x] POLYVINYL CHLORIDE
- [ ] POLY-ETHYLENE
- [x] NATURAL RUBBER
- [ ] NEOPRENE

OTHER (SPECIFY): None Known

RESPIRATORY

- [ ] SELF-CONTAINED
- [ ] SUPPLIED AIR
- [ ] CAN OR CARTRIDGE GAS OR VAPOR
- [ ] FILTER-DUST, FUME, MIST

OTHER (SPECIFY): Not required for normal use

OTHER PROTECTIVE EQUIPMENT

- [ ] RUBBER BOOTS
- [ ] APRON

OTHER (SPECIFY): Eye wash

SECTION 9 PERSONAL PROTECTION/EXPOSURE CONTROLS

PHYSICAL FORM	Clear Liquid
COLOR	Colorless unless dyed
ODOR	Nil (unless fragranced)
PH	8.5 +/- .25
VAPOR PRESSURE (mm Hg)	NA
VAPOR DENSITY (AIR = 1)	NA
BOILING POINT	NE
FREEZING/MELTING POINT	NE
SOLUBILITY IN WATER	100%
SPECIFIC GRAVITY (WATER = 1)	1.028 +/- .01
EVAPORATION RATE (BUTYLACETATE = 1)	>1 as compared to water
VISCOSITY (CPS)	9 CP
MOLECULAR WEIGHT	NE

NA = NOT APPLICABLE NE = NOT ESTABLISHED

SECTION 10 STABILITY AND REACTIVITY

STABILITY ☑ STABLE ☐ UNSTABLE

CONDITIONS CONTRIBUTING TO INSTABILITY

☐ THERMAL DECOMPOSITION ☐ PHOTO DEGRADATION ☐ POLYMERIZATION ☐ CONTAMINATION

OTHER (SPECIFY): None known

INCOMPATIBILITY - AVOID CONTACT WITH

☐ STRONG ACIDS ☐ STRONG ALKALIS ☐ STRONG OXIDIZERS

OTHER (SPECIFY): None Known

HAZARDOUS DECOMPOSITION PRODUCTS - THERMAL AND OTHER (LIST)

None Known

CONDITIONS TO AVOID

☐ HEAT ☐ OPEN FLAMES ☐ SPARKS ☐ IGNITION SOURCES

OTHER (SPECIFY): None Known

SECTION 11 TOXICOLOGICAL PROPERTIES

ACUTE TOXICITY EFFECTS DATA

Eyes: Moderate irritation

Skin: May aggravate pre-existing skin and/or eye disorders or conditions.

Ingestion: Moderate Irritation

Inhalation: None known

IRRITATION EFFECTS DATA

None Known

OTHER ACUTE EFFECTS

None Known

CHRONIC/SUBCHRONIC DATA

None Known

SECTION 12 ECOLOGICAL INFORMATION

ECOTOXICITY

None Known

ENVIRONMENTAL FATE

Not Known

ADDITION INFORMATION

None Known

SECTION 13 DISPOSAL CONSIDERATIONS

WASTE DISPOSAL METHOD

IN ACCORDANCE WITH FEDERAL, STATE AND LOCAL REGULATIONS.

SECTION 14 TRANSPORT INFORMATION

NON-HAZARDOUS

SECTION 15 REGULATORY INFORMATION

SARA (SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT):

SARA 302 EXTREMELY HAZARDOUS SUBSTANCES LIST:

NA

SARA 312 HAZARD CATEGORY:

NA

SARA 313 TOXIC CHEMICALS LIST:

NA

CERCLA (COMPREHENSIVE ENVIROMENTAL RESPONSE, COMPENSATION AND LIABILITY ACT:

NA

RCRA (RESOURCE CONSERVATION AND RECOVERY ACT) LISTED HAZARDOUS WASTES:

NA

CWA (CLEAN WATER ACT) LISTED SUBSTANCES:

NA

FDA (FOOD AND DRUG ADMINISTRATION):

NA

TOXIC SUBSTANCES CONTROL ACT (TSCA):

All ingredients are listed

NFPA HAZARD INFORMATION SIGN

0 HEALTH HAZARD (BLUE DIAMOND)

4 - DEADLY
3 - EXTREME DANGER
2 - HAZARDOUS
1 - SLIGHTLY HAZARDOUS
0 - NORMAL MATERIAL

0 REACTIVITY HAZARD (YELLOW DIAMOND)

4 - MAY DETONATE
3 - SHOCK AND HEAT MY DETONATE
2 - VIOLENT CHEMICAL CHANGE
1 - UNSTABLE IF HEATED
0 - STABLE

0 FIRE HAZARD (RED DIAMOND)

FLASH POINTS:
4 - BELOW 73 F
3 - BELOW 100 F
2 - BELOW 200 F
1 - ABOVE 200 F
0 - WILL NOT BURN

SPECIFIC HAZARD (WHITE DIAMOND)

OXY	OXIDIZER
ACID	ACID
ALK	ALKALI
COR	CORROSIVE
W	USE NO WATER

SECTION 16 INTERNATIONAL REGULATIONS

CANADA

DSL:

NA

WHMIS HAZARD CLASSIFICATIONS:

NA

WHMIS TRADE SECRET REGISTRY NUMBER(S):

NA

WHMIS HAZARDOUS INGREDIENTS:

NA

WHMIS SYMBOLS:

NA

EUROPEAN ECONOMIC COMMUNITY (EEC)

EINECS MASTER INVENTORY:

NA

EEC PRIMARY RISK SYMBOL:

NA

EEC RISK AND SAFETY PHRASES:

NA

THIS INFORMATION IS OFFERED IN GOOD FAITH AS TYPICAL VALUES AND NOT AS A PRODUCT SPECIFICATION. NO WARRANTY, EXPRESSED OR IMPLIED, IS HEREBY MADE. THE RECOMMENDED INDUSTRIAL HYGIENE AND SAFE HOLDING PROCEDURES ARE BELIEVED TO BE GENERALLY APPLICABLE. HOWEVER, EACH USER SHOULD REVIEW THESE RECOMMENDATIONS IN THE SPECIFIC CONTEXT OF THE INTENDED USE AND DETERMINE WHETHER THEY ARE APPROPRIATE.

PREPARED BY: Jeff Schulhoff

Enviro Clean 165 Aquatic Toxicity Results

August 20, 2003

The following analysis was performed on Neat Concentrate product:

Values expressed in Parts Per Million (PPM)

***Mysidopsis bahia* Survival**
Definitive 48 hr LC50

Toxicant	LC50 and 95% Confidence Interval (CI)
Standard Reference Toxicant (SRT) Sodium Dodecyl Sulfate LC50:	**3.37 ppm** with a 95% CI **2.91 – 3.76 ppm**
Product EC-165 Concentrate LC50:	**22.6 ppm** with a 95% CI **19.8 – 25.8 ppm**
10:1 Oil / Product Mixture 10:1 No.2 Fuel Oil / EC-165 Concentrate LC50:	**1.76 ppm** with a 95% CI **1.38 – 2.11 ppm**
Oil No. 2 Fuel Oil LC50:	**1.53 ppm** with a 95% CI **1.21 – 1.85 ppm**

***Menidia beryllina* Survival**
Definitive 96 hr LC50

Toxicant	LC50 and 95% Confidence Interval (CI)
Standard Reference Toxicant (SRT) Sodium Dodecyl Sulfate LC50:	**1.83 ppm** with a 95% CI **N/A.** (Graphical Method)
Product EC-165 Concentrate LC50:	**27.8 ppm** with a 95% CI **24.4 – 31.6 ppm**
10:1 Oil / Product Mixture 10:1 No.2 Fuel Oil / EC-165 Concentrate LC50:	**8.13 ppm** with a 95% CI **7.43 – 8.88 ppm**
Oil No. 2 Fuel Oil LC50:	**8.77 ppm** with a 95% CI **8.56 – 8.98 ppm**

Toxicity at Application Rates:

For determination of the product's toxicity at dilution, the toxicity value of the neat concentrate product is multiplied by its specific dilution factor to calculate the toxicity of the solution as applied. (i.e. 3% = 1:33, therefore the multiplier is 33 times the neat concentrate toxicity value) The following chart illustrates the calculated toxicity values of Enviro Clean 165 at various common working dilutions based upon the neat concentrate values expressed above for each test species:

Species	1% (1:99)	3% (1:33)	6% (1:16)
M. Bahia	**2,237.4 ppm**	**745.8 ppm**	**361.6 ppm**
M. Beryllina	**2,752.2 ppm**	**917.4 ppm**	**444.8 ppm**

Contact: Enviro Clean Products, LLC
1-800-477-2461
info@EnviroCleanServices.com

Certificate of Analysis
for
EnviroClean

P.O. Box 721090
Oklahoma City, OK 73172-1090
405.373.4545
405.373.4549 Fax

Email: info@envirocleanps.com

110 Airport Dr., Suite A
Wappingers Falls, NY 12590
800.477.2461
845.463.4573 Fax

Client Info: ENVIRONMENTAL ENTERPRISES
58485 Pearl Acres Road
Slidell, LA 70461
Attn: Mark O'Neil

The following analytical results have been obtained for the indicated sample which was submitted to this laboratory:

Sample ID: **MS06105**
Sample Description: NCP Analyses
Sample Collection Date: 08/18/03
Lab Submittal Date: 08/20/03

Location Code: ENVENT
Sample Collector: CLIENT
Sample Collection Time: 00:00
Lab Submittal Time: 09:45

Analyte	Method	Result	MDL	Units	Date	Time	Analyst
Arsenic	200.7	Not detected	0.002	mg/L	08/20/03	17:20	DEC
Cadmium	200.7	Not detected	0.001	mg/L	08/20/03	17:20	DEC
Chromium	200.7	0.012	0.005	mg/L	08/20/03	17:20	DEC
Copper	200.7	Not detected	0.002	mg/L	08/20/03	17:20	DEC
Cyanide	ASTM-D 2036-98	Not detected	0.1	mg/L	09/04/03	13:35	CRR
Specific Gravity	ASTM-D 1298-85(90)	1.028	0.01	---	09/04/03	13:50	CRR
Flash Point	ASTM-D 93-90	> 200 °F	1	F	08/25/03	14:45	RLT
Lead	200.7	Not detected	0.005	mg/L	08/20/03	17:20	DEC
Mercury	245.1	Not detected	0.0002	mg/L	08/20/03	17:20	CRR
Nickel	200.7	Not detected	0.005	mg/L	08/20/03	17:20	DEC
PCBs	608	See attached	---	ug/L	09/09/03	14:15	DEC
Pesticides	608	See attached	---	ug/L	09/09/03	14:15	DEC
pH	ASTM-D 1293-84(90)	8.63	0.01	SU	08/25/03	13:55	CRR
Pour Point	ASTM-D 97-87	-1.8 °C	0.2	C	09/02/03	14:30	RWC
Viscosity	ASTM-D 445-88	9	0.5	CP	08/30/03	14:10	RWC
Volatile Organics	601	See attached	--	mg/L	08/29/03	18:41	CRR
Zinc	200.7	0.082	0.002	mg/L	08/20/03	17:20	DEC

If you have any questions regarding these analyses or procedures, please contact:

Reviewed By: Rodney W. Culpepper
Rodney W. Culpepper
Laboratory Manager

Magnolia Scientific Services, Inc.

Report of Analytical Results

Pesticide/PCB - GC/ECD Analytical Data

Client: Environmental Enterprises
Lab Sample Number: MS06015
Date/Time Collected: 08/18/03 00:00
Pest/PCB Analysis: 09/09/03 14:15
Sample Matrix: Water

Sample Location: NCP Analyses

Component Name	Sample Results ug/L (ppb)	Component MDL ug/L (ppb)
alpha - BHC	ND	2.5
beta - BHC	ND	2.5
delta - BHC	ND	2.5
gamma - BHC (Lindane)	ND	2.5
Heptachlor	ND	2.5
Aldrin	ND	2.5
Heptachlor epoxide	ND	2.5
4,4' - DDE	ND	5.0
Dieldrin	ND	5.0
Endrin	ND	5.0
Endosulfan I	ND	2.5
Endosulfan II	ND	5.0
4,4' - DDD	ND	5.0
Endrin Aldehyde	ND	5.0
Endrin Ketone	ND	5.0
Methoxychlor	ND	2.5
4,4' - DDT	ND	5.0
Endosulfan Sulfate	ND	5.0
alpha - Chlordane	ND	2.5
gamma - Chlordane	ND	2.5
Toxaphene	ND	50.0
Chlordane	ND	50.0
Aroclor 1016	ND	50.0
Aroclor 1221	ND	50.0
Aroclor 1232	ND	50.0
Aroclor 1242	ND	50.0
Aroclor 1248	ND	50.0
Aroclor 1254	ND	50.0
Aroclor 1260	ND	50.0

Method Reference: EPA Method 608
MDL - Method Detection Limit
ND - Not Detected

39 King Road, Suite 1
Hattiesburg, MS 39402

phone: (601)264-5184
fax: (601)268-2030

Pesticide/PCB - GC/ECD Analytical Data

Sample Location: NCP Analyses

Client: Environmental Enterprises
Lab Sample Number: MS06015
Date/Time Collected: 08/18/03 00:00
Pest/PCB Analysis: 09/09/03 14:15
Sample Matrix: Water

Surrogate Recovery

Surrogate Compound	Recovery (%)	QA /QC
Decachlorobiphenyl	96.6	

Matrix Spike/Matrix Spike Duplicate Recovery

Matrix Spike Compound	MS (%)	MSD (%)	RPD (%)	QA / QC
Lindane	93	93	0.0	
Endrin	86	83	3.6	
4,4' DDT	94	87	7.7	
Heptachlor	97	95	2.1	
Aldrin	93	90	3.3	
Dieldrin	86	87	1.2	

All Data Validated by:

Rodney W. Culpepper
Laboratory Manager

Method Reference: EPA Method 608
MDL - Method Detection Limit
ND - Not Detected

39 King Road, Suite 1
Hattiesburg, MS 39402

phone: (601)264-5184
fax: (601)268-2030

Magnolia Scientific Services, Inc.

Report of Analytical Results

Volatile Organics - GC/MS Analytical Data

Client: Environmental Enterprises
Lab Sample Number: MS06105
Date/Time Collected:
Date/Time Analysis: 08/29/03 18:41
Sample Matrix: Liquid

Sample Location: NCP Analyses

Volatile Organics Component Name	Sample Results mg/L (ppm)	Component MDL mg/L (ppm)
Bromodichloromethane	ND	10
Bromoform	ND	10
Bromomethane	ND	10
Carbon Tetrachloride	ND	10
Chlorobenzene	ND	10
Chloroethane	ND	10
2-Chloroethylvinyl ehter	ND	10
Chloroform	ND	10
Chloromethane	ND	10
Dibromochloromethane	ND	10
1,2-Dichlorobenzene	ND	10
1,3-Dichlorobenzene	ND	10
1,4-Dichlorobenzene	ND	10
Dichlorodifluoromethane	ND	10
1,1-Dichloroethane	ND	10
1,2-Dichloroethane	ND	10
1,1-Dichloroethene	ND	10
trans-1,2-Dichloroethene	ND	10
1,2-Dichloropropane	ND	10
cis-1,3-Dichloropropene	ND	10
trans-1,3-Dichloropropene	ND	10
Methylene Chloride	ND	25
1,1,1,2-Tetrachloroethane	ND	10
Tetrachloroethene	ND	10
1,1,1-Trichloroethane	ND	10
1,1,2-Trichloroethane	ND	10
Trichloroethene	ND	10
Trichlorofluoromethane	ND	10
Vinyl Chloride	ND	10

Method Reference: EPA 601
MDL - Method Detection Limit
ND - Not Detected

39 King Road, Suite #1
Hattiesburg, MS 39402

phone: (601)264-5184
fax: (601)268-2030

Volatile Organics - GC/MS Analytical Data

Sample Location: NCP Analyses

Client: Environmental Enterprises
Lab Sample Number: MS06105
Date/Time Collected:
Date/Time Analysis: 08/29/03 18:41
Sample Matrix: Liquid

QA/QC RESULTS

Surrogate Recovery

Surrogate Compound	Recovery %
Dibromofluoromethane	106.9
Toluene-d8	96.2
4-Bromofluorobenzene	108.6

Matrix Spike/Matrix Spike Duplicate Recovery

Matrix Spike Compound	MS %	MSD %	RPD %
1,1-Dichloroethene	98.8	101.2	2.4
Benzene	98.4	102.8	4.4
Trichloroethene	101.4	102.2	0.8
Toluene	103.0	102.6	0.4
Chlorobenzene	101.6	100.0	1.6

All Data Validated by:

Rodney W. Culpepper
Laboratory Manager

Method Reference: EPA 601
MDL - Method Detection Limit
ND - Not Detected

39 King Road, Suite #1
Hattiesburg, MS 39402

phone: (601)264-5184
fax: (601)268-2030

ENVIRONMENTAL ENTERPRISES USA, INC.
58485 Pearl Acres Rd., Suite D
Slidell, Louisiana 70461
(985) 646-2787

Kit No. _____

CHAIN - OF - CUSTODY RECORD

Client: EE USA, INC. *Contact Person:* David Daniel

Address: 58485 Pearl Acres Rd. Slidell, LA 70461 *Phone#:* (985) 646-2787

P.O. # _____

FAX #: (985) 646-2810

E-mail: _____

Special Handling Request

( ) RUSH
( ) VERBAL
( ) OTHER

Lab Sample Description	Date Collected	Time Collected	No. of Containers	Analysis Request	S/R No.	Lab No.
EC-165 Concentrate 1:800ml	N/A	N/A	1	NCP Analysis	D	D-0003-03 1150610S

Collected By: N/A Date _____ Time _____

Received By: [signature] Date 8/20/03 Time 0945

Received By: _____ Date _____ Time _____

Relinquished By: Mark A. O'Neal Date 8/19/03 Time 10.25

Relinquished By: _____ Date _____ Time _____

Relinquished By: _____ Date _____ Time _____

EnviroClean 12
Degassing/Hydrocarbon Removal/Remediation Chemistry

Contents

	Page
SUMMARY	1
FLUID DESIGN	1
FIELD MIXING PROCEDURES	2
Mixing Concentrates	2
Quality Control Testing	2
MATERIAL REQUIREMENTS	2
Equipment Cleaning & Parts Washing	2
Soil Remediation	3
Emergency Response & Spill Cleanup	3
Degassing & Cleaning of Tanks & Equipment	3
Tank Bed Remediation	3
Chemical Pipeline Pigging	4
VOC Vapor Mitigation & Odor Control	4
Hard Surface Cleaning & Decontamination	4
Surface Washing & Shoreline Cleanup	4
Fire Fighting for Class A & B Fires	4
Contaminated Soil Excavation	4
PHYSICAL PROPERTIES	
Product Name	EnviroClean 12
Physical Form	Clear Liquid
Color	Colorless unless dyed
Specific Gravity (Water = 1)	1.028 +/- .01
Solubility in Water	100%
Freezing/Melting Point	NE
Flash Point (^{0}F)	>200^0 F
pH	8.5 +/- .25
Reportable Quantity (RQ)	None

Complete information on health hazards, protective equipment, handling precautions, environmental hazards and disposal is listed in the current EnviroClean 12 Material Safety Data Sheet (MSDS) for this product.

SUMMARY

EnviroClean 12 is a non-flammable, non-toxic, water-based, proprietary blend of non-ionic ethoxylated octylphenolic surfactants that has been specifically engineered as a cleanup/mitigation agent for a wide range of hydrocarbon products. EnviroClean 12 has been shown to be effective for quickly and effectively suppressing or completely eliminating VOCs, LEL's, benzene and low levels of H_2S and mercaptans in open or confined spaces.

EnviroClean 12 has been used for cleanup of hydrocarbon spills and soil remediation. In these applications, EnviroClean 12 effectively conditions (physically) the hydrocarbon such that the microbes that naturally occur can more readily consume it. It turns hydrocarbons into a nutrient source for the microbes. When sufficiently mixed with hydrocarbon and water, the EnviroClean 12 forms a homogeneous solution of hydrocarbon, EnviroClean 12 and water, which is very stable.

EnviroClean 12 is a concentrated product that readily biodegrades.

EnviroClean 12 is commercially available in 5-gallon units, 55-gallon drums, 275 and 330-gallon totes and bulk from Oklahoma City, Oklahoma, Wappingers Falls, New York, and Houston, Texas.

FLUID DESIGN

EnviroClean 12 is a proprietary blend of surfactants that needs to be diluted to be effective and it is very safe to workers and the environment. EnviroClean 12 does **not** contain caustic, therefore does not have the common harmful side effects associated with caustic based products. The product is designed for use as a degassing agent and a cleaner/degreaser for remediation. The product does not contain any enzymes or biomass itself. It works by conditioning the hydrocarbon so that the naturally occurring microbes (bacteria) are able to readily consume it. Through the application of the appropriate dilution and mixing, the EnviroClean 12 will capture the hydrocarbon and tie it up in a solution that is very stable. The formation of this solution results in extremely small particles that will not recoalesce. It is important to note that if EnviroClean 12 reaches its saturation point the oversaturated hydrocarbon will breakout of solution very quickly. This will allow for easy removal or reclamation of any hydrocarbon that is not preconditioned for remediation.

In addition to tying up the hydrocarbon in solution, the product is very effective when contacted with hydrocarbon vapors at suppressing volatile organic vapors, gases, and odors. Once combustible and flammable

hydrocarbon vapors are tied up in the resultant solution, the solution will be very difficult to ignite. It also accelerates the biodegradation process of the hydrocarbon, thereby enhancing recycling or reclamation of water.

EnviroClean 12 has been demonstrated to be effective on gas, oil, lube oil, hydraulic oil, most petroleum-based products, animal and vegetable oils, fats, and tallow oils. EnviroClean 12 cleans the heavy tar build-up, asphaltenes or oily residue from inside of tanks and vessels. Furthermore, once a surface has been cleaned with EnviroClean 12, the cleaned surface will resist the deposition of oily materials.

EnviroClean 12 can be used to cleanup oil spills whether in/on soil or hard surfaces. The first step in this process is to remove as much of the free oil as possible. This step is followed by contacting the contaminated surface appropriately with the proper dilution of EnviroClean 12 and water. The treatment solution will contact the hydrocarbon molecules and change their behavior such that they are now essentially water soluble. The large increase in interfacial surface area creates conditions that are favorable to degradation and consumption by bacteria and microbes. The product converts hydrocarbons into a very good nutrient source for bacteria and microbes.

EnviroClean 12 is typically fed at a concentration of 12.5%, depending on the nature of the hydrocarbon contamination problem. It can be diluted with most types of water – hard, soft or brackish water. The product has an unlimited shelf life when unopened. EnviroClean 12 is effective at ambient temperatures. However, the **effectiveness will increase as the temperature of the application is increased**. EnviroClean 12 does not require the use of steam, but has been shown to be very effective when injected into the steam (vapor) phase.

FIELD MIXING PROCEDURES

Mixing Concentrates

EnviroClean 12 is usually delivered as a concentrate and **must** be diluted with water to work properly. Cleaning solutions can be formulated by premixing or eduction. It is not necessary to provide high shear agitation when preparing a batch of cleaning solution since EnviroClean 12 is 100% soluble in water. It is recommended that when preparing the cleaning solution you first add the water into the mix container and then follow by the addition of EnviroClean 12. This will minimize foaming as the EnviroClean 12 and water form a homogeneous solution.

For premixing, the following procedure may be used:

1. Add the correct amount of water to the container.
2. Depending on the desired strength, add the correct amount of EnviroClean 12 to the container.
3. If the final solution is not a consistent pink color, mild agitation may be required until a consistent pink color is achieved.

Quality Control Testing

There is no easy field testing procedure to monitor the concentration of active ingredients in the EnviroClean 12 formulation. Visually the color changes from rose color to lighter pink as the product is further diluted. Effectiveness can also be predicted by quantifying the amount of hydrocarbon that is to be picked up. By observing the effluent from the use of EnviroClean 12, an adjustment in the cleaning solution concentration can be made. If it is observed that free oil is floating on the effluent solution, then the concentration should be increased.

MATERIAL REQUIREMENTS

For specific protocols and application rates, please refer to the product label or consult with the manufacturer or authorized distributor for additional guidance.

Equipment Cleaning & Parts Washing

EnviroClean 12 is very effective for equipment cleaning applications. EnviroClean 12 is used at light dilutions and has a significant “life of batch” as well as low foaming tendencies. The surfactants in EnviroClean 12 desorb and micro-emulsify grease and oil contamination and separate it from solids (metal shavings, grit, etc.) allowing them to settle without accumulating oily sludges. These factors make EnviroClean 12 ideal for spray wash systems as well as dip/agitating equipment. Some agitation or circulation of the fluid is required for thorough cleaning. For equipment cleaning applications, EnviroClean 12 is normally diluted to a 12.5% solution with water.

Soil Remediation

Calculate the volume of hydrocarbon contained in the contaminated area. It is important to determine accurately the depth of oil penetration into the soil. It will be important to agitate the soil to just below the depth of penetration. Once the estimate of hydrocarbon is known, the amount of the normal dilution of EnviroClean 12 for soil remediation is 8 parts water to 1 part EnviroClean 12 (12.5% solution). Mix the final solution to be used to treat the area into the soil thoroughly. Depending on the nature of the soil, this mixture should be mixed until consistent. This mixing can be accomplished using a metal rake or power roto-tiller. However, larger jobs may require a tractor, skidsteer with tiller attachment, or other equipment.

Once mixed, the naturally occurring bacteria in the soil will begin to consume the hydrocarbon, which has been put into a form that can be quickly consumed. The remediation process normally occurs over 4 to 12 weeks.

Samples can be taken and analyzed for Total Petroleum Hydrocarbons (TPH) to track the progress of the remediation. If the TPH were to appear to stabilize and not continue to decline, a second application of EnviroClean 12 may be required.

***Note*:** It can be helpful, but not required, to add a highly soluble, high nitrogen fertilizer such as Miracle Grow or Sam's Choice to the first treatment of the EnviroClean 12 solution.

The addition of bacteria is not typically required. The EnviroClean 12 solution will stimulate the activity level of the naturally occurring bacteria.

In the fall and winter, it helps to expedite the job if the treatment cell is covered with plastic between treatments. This tends to hold in heat and generate additional moisture.

Keeping the soil moist is an integral part of the clean up.

Emergency Response & Spill Cleanup

Small Spill Cleanup: Dilute EnviroClean 12 to a 12.5% solution. On small spills apply with 2 ½ gallon pressure sprayer or similar device. Cover the entire spill working in a circular motion from outside perimeter toward the center of the spill. After application of EnviroClean 12 has been completed, agitate spill area with forcible stream of water or broom and rinse thoroughly. EnviroClean 12 helps to reduce or eliminate any VOC concerns associated with the cleanup by micro-emulsifying the hydrocarbon on contact drastically reducing the LEL levels in a very short time frame. EnviroClean 12 also eliminates sheens.

On Roadways & Pavement: EnviroClean 12 can be applied with a pressure sprayer or applied through a foam eductor at a 12% setting. EnviroClean 12 will instantly stop the deterioration of asphalt by diesel or gas and eliminate slippery conditions. Dispose in accordance with local rules and regulations.

***Note*:** For use with absorbents, EnviroClean 12 will increase effectiveness by allowing the contaminate to more easily penetrate into the absorbent.

Degassing & Cleaning of Tanks & Equipment

EnviroClean 12 is effective for the degassing and cleaning of all types of petroleum storage tanks. For small tanks of less than 50,000 gallons, EnviroClean 12 should be utilized through a power washer normally at a dilution of 12.5% depending on the type of product within the vessel and the degree of contamination. Typically for flammables, a more concentrated solution is utilized to completely agitate the tank residue and to scour the wall of the vessel prior to and during pump out. Lower dilutions may be utilized for products not representing a vapor hazard. EnviroClean 12 is also effective for reducing H2S, Benzene and other VOC's.

Tank Bed Remediation

A common and effective means of mitigating the vapor hazard and remediating the tank bedding is to utilize a "flushing and recovery" technique with a diluted solution of EnviroClean 12. Typically a 12.5% solution of EnviroClean 12 and water is utilized in a batch process to treat the impacted portions of the tank floor area. Simply perforating the affected area with a "buster" or hole saw and allowing the EnviroClean 12 solution to flood the affected bedding will eliminate immediate, and future, recurrences of vapor generation. The process also serves to remediate the contamination by flushing entrained hydrocarbon out of the bedding for recovery and disposal, or re-processing. If necessary, the entire sub-floor area may be treated by saturating the zone of contamination and flushing the fluid to the sump, or other collection point, and recovering the rinsate for disposal. Depending upon the severity of the leak, and the resultant degree of subfloor contamination, the EnviroClean 12 solution can be applied so as to simply saturate the bedding

material, or it can be injected so as to flush and recover gross quantities of hydrocarbon.

Chemical Pipeline Pigging

As a general guideline, pump a slug of 12.5% solution and chase with water.

VOC Vapor Mitigation & Odor Control

EnviroClean 12 is typically applied at a concentration of 12.5% for vapor and/or odor control. Circulate the solution through a manway cannon or other device in order to provide sufficient saturation of the vapor space of the vessel that is being degassed. Check the vapor level of the tank before circulation begins. Circulate for about 2 hours and let the tank settle for about 2 hours. Check the vapor level in the tank. More than one circulation may be required for complete vapor suppression. The holding capacity of EnviroClean 12 may require sweetening or circulation with a fresh batch of product, depending on the amount of hydrocarbon vapors originally contained in the vessel.

Dilute EnviroClean 12 to a 12.5% solution. Coverage is normally at 3 to 4 square yards of surface area per gallon. Heavy contamination or mercaptan type odors may require a stronger solution of EnviroClean 12.

Typically, 1 gallon of EnviroClean 12 concentrate diluted to a 12.5% solution will render up to 6 gallons of petroleum product nonflammable when properly applied.

Hard Surface Cleaning & Decontamination

For heavy soiled oil and grease on hard surfaces: Mix a 12.5% solution of concentrate with clean water in quantity sufficient to cover contaminated area. Apply generous amounts with spray applicator, or equivalent and allow reasonable time for the surfactants in EnviroClean 12 to penetrate and break down the hydrocarbon and grime. Once applied, solution may be scrubbed or brushed in for stubborn soiling. Next, apply EnviroClean 12 at a 3% solution through a power washer (heated power wash system will expedite the process). Flush residue to containment and dispose of as local rules apply.

For lightly soiled or freshly oiled surfaces:

EnviroClean 12 may be used through any power washer or steam jenny currently available. Operating temperatures of 140 degrees F. will maximize effectiveness. Solution strengths of 12.5% should be used for decontamination duties. For small applications, a 12.5% solution (8 parts water and 1 part product) may be applied with a small pump sprayer and scrubbed or brushed into surface.

Surface Washing & Shoreline Cleanup

Dilute EnviroClean 12 to a 12.5% solution. On small spills, apply with pump sprayer or similar device. Cover entire spill, working in a circular motion, from outside perimeter toward the center of the spill. After application of EnviroClean 12 has been completed, agitate spill area with forcible stream of water or broom and rinse thoroughly.

On larger spills, specific applications and protocols should be developed taking into account local risks and considerations.

Fire Fighting for Class A & B Fires

Proportioning Rate:	12.5%
GPM Flow Rate:	95 – 110
PSI at Eductor:	200 or MFG's recommendations
Hose Length:	As per MFG's suggestion
Nozzle Type:	Standard adjustable or automatic
Coverage:	0.2 gpm per square foot
Nozzle Pattern:	Hard cone to coarse stream
Application:	Starting from the outside perimeter, using a stirring, mixing action.

Contaminated Soil Excavation

In most cases a 12.5% solution of EnviroClean 12 will be adequate to keep vapor emissions within acceptable limits. The EnviroClean 12 solution should be applied evenly to the soil surface in sufficient quantity to dampen the surface well. As a general rule, 1 gallon of solution will cover approximately 4 sq. yd. of soil surface area.

Product Usage Guide

Protocols, Procedures, & Application Rates

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Enviro Clean Products & Services reserves the right at any time to change the information without notice. Changes and technical updates will be added in subsequent editions of the documentation. Always for the latest information, please go to www.EnviroCleanPS.com.

Contents

1 Welcome 7
a. Introduction 8
b. Additional Resources and Case Studies 10
- EnviroClean 10
- OLFactor 11
- Paraffin Control 11

2 Oilfield Production and Operations 12
a. Paraffin Treatment 13
- Paraffin Control 13
- PCS-Solv 1 14
- PCS-Solv 2 15

b. Equipment Cleaning and Parts Washing 16
- EnviroClean / TF-3 16
- Enviro D-Grease 16

c. Soil and Groundwater Remediation 17
- EnviroClean / TF-3 17
- Peroxi-185, Peroxi-350, Peroxi-500 18

d. Insitu Saltwater Remediation 19
- SaltRelief™ 19
- MicroBind 20

e. Emergency Response and Spill Cleanup 21
- EnviroClean / TF-3 21
- RockOn 21

3 Petroleum Processing, Refining, and Distribution 22
a. Degassing and Cleaning of Tanks and Equipment 23
- EnviroClean / TF-3 23
- Enviro D-Grease 23

b. Tank Bed Remediation 24
- EnviroClean / TF-3 24

c. Chemical Pipeline Pigging 25
- EnviroClean / TF-3 25

d. VOC Vapor Mitigation and Control 26

- EnviroClean / TF-3 26

4 Industrial Cleaning 27

a. Hard Surface Cleaning and Decontamination 28
- EnviroClean / TF-3 28
- Enviro D-Grease 28

b. Aqueous Parts Cleaning 29
- Enviro-PW 29
- EnviroClean TA 29
- Enviro D-Grease 30

5 Soil and Groundwater Remediation 31

a. Insitu Free Product Recovery Enhancement 32
- EnviroClean / TF-3 32

b. Soil Flushing and Recovery 33
- EnviroClean / TF-3 33

c. Bioremediation Enhancement 34
- EnviroClean / TF-3 34

d. Insitu Saltwater Remediation 35
- SaltRelief™ 35
- MicroBind 36

6 Institutional Maintenance 37

a. Drainline Maintenance 38
- OLFactor 38

b. Carpet Cleaning and Deodorizing 39
- OLFactor 39

7 Emergency Response and Spill Cleanup 40

a. Flammable Vapor Suppression 41
- EnviroClean / TF-3 41

b. Surface Washing and Shoreline Cleanup 42
- EnviroClean / TF-3 42

c. Fire Fighting for Class A & B Fires 43
- EnviroClean / TF-3 43

8 Vapor and Odor Suppression 44

a. Contaminated Soil Excavation 45
- EnviroClean / TF-3 45
- OLFactor 45

b. Landfills and Composting Areas 46
- OLFactor 46

c. Commercial Animal Housing and Processing 47
- OLFactor 47

9 Appendices 48
- Above Ground Paraffin Treatment Data Sheet
- Downhole Paraffin Treatment Data Sheet 51
- Application of Paraffin Control for Downhole Production Well Treatment 52
- Application of Paraffin Control for Production Wells Containing Packers 53
- Application of OLFactor for Odor Neutralization at a Contaminated Excavation Site 54
- Exsitu Bioremediation of Mixed Hydrocarbon 55
- Application of EnviroClean for High Volume "Clean Service" Tanks 57
- Application of EnviroClean to Enhance "Stuck" Bioaugmentation 61
- EnviroClean Gas Condensate Bioremediation 62
- Hard Surface Spill Application Directions for EnviroClean 63
- EnviroClean Parking Lot Diesel Spill 64
- EnviroClean Remediation of a 300 bbl Crude Oil Spill 65
- Application of EnviroClean for Soil Vapor & Odor Control 66

- EnviroClean Vapor Mitigation and Ballast Flushing for JP8 Spill 67
- Exsitu and Insitu Bioremediation Using EnviroClean 68
- Industrial Cleaning Applications of EnviroClean 70
- Insitu HIT Free Product Recovery 71
- Shoreline Cleaning with EnviroClean as Surface Washing Agent 73
- Small Tank Cleaning and Degassing 74
- Application of EnviroClean for Vapor Mitigation and Remediation of Tank Bedding Contamination 75

1 Welcome

- Introduction 8
- Additional Resources and Case Studies 10
  - EnviroClean 10
  - OLFactor 11
  - Paraffin Control 11

Introduction

Thank you for choosing Enviro Clean Products & Services as your environmental and industrial chemical solutions partner.

This *Product Usage Guide* was designed to provide an overview of existing markets that utilize our products today and offer general procedures for applying products. A secondary purpose of this guide is to educate and communicate other potential uses of Enviro Clean products that customers may not be aware of today. Enviro Clean Products & Services will update this document as our products enter new markets. ***This guidance document is intended to give the environmental professional basic concepts and application procedures. This document does not take into account site specific information nor is it a substitute for any treatment analysis. Adjustments for site specific treatment are the duty of the environmental professional.***

This material is made available for use by professionals or persons having technical skills to be used at their own discretion and risk. Nothing herein is to be taken as a license to use products without the proper permits, approvals, etc. of the appropriate regulatory agencies. All products should be used in compliance with all federal, state and local rules and regulations.

The information and statements contained herein are believed to be reliable but are not to be construed as a warranty or representation for which we assume legal responsibility. Users should undertake verification and sufficient testing to determine the suitability for their own particular purpose of any information or products referred to herein. No warranty of fitness for a particular purpose is made. Always use Enviro Clean products in conformance with all applicable regulations.

Important Notes:

- In the case studies provided, the product "EnviroClean" was previously marketed and known as "EC-165." This change was done solely for marketing reasons and the formula was not altered.
- The products EnviroClean and TF-3 have been developed to provide the same features and benefits. However, TF-3 was formulated to be "globally compatible" for use overseas or in areas where the use of phenolic surfactants are not appropriate.

- EnviroClean RTU, mixed and blended using softened water at a 5% working dilution, designed to offer convenience for customers by coming "ready-to-use" and can be applied in situations where the EnviroClean concentrate is used. EnviroClean RTU is not listed on the U.S. E.P.A. NCP Product Schedule.

Additional Resources and Case Studies

Product: EnviroClean

The following application guides and case studies may be found on the Enviro Clean Products and Services homepage at:
www.EnviroCleanPS.com

EnviroClean Industrial Floor Cleaner

Industrial Cleaning Applications of EnviroClean

Application of EnviroClean for Vapor Mitigation and Remediation of Tank Bedding Contamination

Subsurface Surfactant Application for LNAPL Recovery Enhancement

Application of EnviroClean for Degassing and Cleaning of Product Storage Tanks and Other Vessels

Application of Surfactant for "High Intensity Targeted" Enhanced Free Product Recovery of Light Non-Aqueous Phase Liquids

Application for EnviroClean for High Volume "Clean Service" Tanks

Application of EnviroClean for Bioremediation of Hydrocarbon

Hard Surface Spill Application Directions for EnviroClean

Application of EnviroClean for Soil Vapor and Odor Control

Product: OLFactor

The following application guides and case studies may be found on the Enviro Clean Products and Services homepage at:
www.EnviroCleanPS.com

OLFactor - Carpet Rejuvenator/Pet Error/Odor Control

How OLFactor Works

OLFactor - Carpets, Upholstery and Floors Application Notes

OLFactor – Concrete, Wood and other Porous Surface Applications

OLFactor – Kennel Applications

Understanding How OLFactor Works

Product: Paraffin Control

The following application guides and case studies may be found on the Enviro Clean Products and Services homepage at:
www.EnviroCleanPS.com

Paraffin Bench Test

Application of Paraffin Control for Production Wells Containing Packers

Application of Paraffin Control for Downhole Production Well Treatment

2 Oilfield Production and Operations

- Paraffin Treatment 13
- Equipment Cleaning and Parts Washing 16
- Soil and Groundwater Remediation 17
- Insitu Saltwater Remediation 19
- Emergency Response and Spill Cleanup 21

Paraffin Treatment

Optional Product: Paraffin Control

General Procedure for Treatment:

For removing paraffin from perforations, downhole pump, flowlines and production equipment, batch treat the casing/tubing annulus with 5 to 10 gallons of Paraffin Control utilizing produced water. To dilute the solution downhole, immediately circulate well for 24 to 48 hours utilizing the well's pumping equipment. After circulating, turn the well back down the flowline. Periodic maintenance treatments will aid in keeping new paraffin from re-depositing.

Alternative Procedures for Treatment:

Alternative Downhole Treatment Method: Dilute Paraffin Control to a 1-2% solution in a 55 gallon drum. Continuously treat the well down the casing tubing annulus using a mounted chemical pump.

Formation Blockages: For paraffin blockages back in the formation, dilute Paraffin Control to a 5% solution and pump down the casing/tubing annulus with sufficient volume to cover all perforations. Displace through the perforations using the hydrostatic pressure of an additional 100 to 200 Bbls of formation water. After 24 – 48 hours, return the well to production.

Tank Bottoms—BS&W: For high BS&W in oil or for tank bottoms, pour 3 to 5 gallons of Paraffin Control into a 200 barrel tank, roll or circulate the tank, then let tank contents sit overnight.

Pipeline Treatment: For pipeline treatment, dilute Paraffin Control to an 8% solution. Utilize a metering pump to inject solution into line at 250 to 500 parts per million (ppm) as oil is pumped through the line.

Optional Product: PCS-Solv 1

General Procedure for Treatment (Circulation):

For removing paraffins and asphaltenes in pumping wells (i.e. tubing, rods, pump and surface equipment), use the following procedure:

1. Calculate tubing, casing and annular volume
2. Inject up to 1/2 tubing volume of PCS–Solv 1 into annulus.
3. Connect the tubing to the annulus
4. Circulate with bottom hole pump for 24 – 48 hours (depending upon depth of well)
5. After circulating, return the well to production.

Note: The above procedure will remove paraffin and asphaltene accumulations from the casing, tubing, rods and surface equipment. This prevents solubilized materials and insoluble fines from entering the formation causing further damage during a subsequent squeeze treatment.

Alternative Procedures for Treatment (Formation Squeeze):

For removing paraffins and asphaltenes from perforations and wellbore, use the following procedure:

1. Calculate tubing, casing and annular volumes. (Typical squeeze volumes are .5 – 2 Bbls of PCS–Solv 1 per foot of perforations).
2. With the tubing valve open, displace the squeeze volume of PCS–Solv 1 down the annulus to the perforations.
3. Close tubing valve and squeeze PCS–Solv 1 into the formation using a clean, formation compatible fluid. Do not over flush.
4. After the PCS-Solv 1 has been squeezed, shut the well in for 12-hours then return to production.

Note: A PCS–Solv 1 regular maintenance program is recommended. Batch treatments can be performed on a monthly basis, or 5 – 15 gallons may be used weekly through a pot down the backside of the well.

Optional Product: PCS-Solv 2

General Procedure for Treatment (Circulation):

For removing paraffins and asphaltenes in pumping wells (i.e. tubing, rods, pump and surface equipment), use the following procedure:

1. Calculate tubing, casing and annular volume
2. Inject up to 1/2 tubing volume of PCS–Solv 2 into annulus. *Optional to immediately chase with PCS–Solv 1 as a carrier fluid or supplement.*
3. Connect the tubing to the annulus.
4. Circulate with bottom hole pump for 24 – 48 hours (depending upon depth of well).
5. After circulating, return the well to production.

Note: The above procedure will remove paraffin and asphaltene accumulations from the casing, tubing, rods and surface equipment. This prevents solubilized materials and insoluble fines from entering the formation causing further damage during a subsequent squeeze treatment.

Alternative Procedures for Treatment (Formation Squeeze):

For removing paraffins and asphaltenes from perforations and wellbore, use the following procedure:

1. Calculate tubing, casing and annular volumes (Typical squeeze volumes are .5 – 2 Bbls of PCS–Solv 2 per foot of perforations).
2. With the tubing valve open, displace the squeeze volume of PCS–Solv 2 down the annulus to the perforations.
3. Close tubing valve and squeeze PCS–Solv 2 into the formation using a clean, formation compatible fluid (*optional to use PCS–Solv 1 as the carrier fluid).* Do not over flush.
4. After the PCS-Solv 2 has been squeezed, shut the well in for 12-hours then return to production.

Note: A PCS–Solv 2 regular maintenance program is recommended. Batch treatments can be performed on a monthly basis, or 5 – 15 gallons may be used weekly through a pot down the backside of the well.

Equipment Cleaning and Parts Washing

Optional Product: EnviroClean or TF-3

General Procedure for Treatment:

EnviroClean / TF-3 are very effective for equipment cleaning applications.
EnviroClean / TF-3 are used at light dilutions and have a significant "life of batch" as well as low foaming tendencies. The surfactants in EnviroClean / TF-3 desorb and micro-emulsify grease and oil contamination and separate it from solids (metal shavings, grit, etc.) allowing them to settle without accumulating oily sludges. These factors make EnviroClean / TF-3 ideal for spray wash systems as well as dip/agitating equipment. Some agitation or circulation of the fluid is required for thorough cleaning. EnviroClean / TF-3 are both concentrates that are to be used at a 6% solution with water.

Optional Product: Enviro D-Grease

General Procedure for Treatment:

Light Soil: Dilute 16 oz. of product to 1 gallon hot or cold water and spray or mop on surface. Allow contact time of 3 to 5 minutes and scrub gently. Rinse with clean water.

Tough Soil: Dilute 32 oz. of product to 1 gallon hot or cold water. Apply to area as above or may also be applied with brush or through power washer. Rinse thoroughly and dispose of as local rules may apply. Do not allow product to dry on surface prior to rinsing. Test surface prior to application.

Specific application or treatment protocols can be developed as needed. The available application guides or case studies may provide further assistance, or contact your local distributor or Enviro Clean Products and Services for any specific support.

Soil and Groundwater Remediation

Optional Product: EnviroClean or TF-3

General Procedure for Treatment:

1. If contaminated soil is deeper than 12 inches, excavate the soil and spread at the surface to a depth of 10-12 inches and then proceed with this protocol. If contaminated soil is 12 inches in depth or less, thoroughly mix and aerate the soil in place utilizing a roto-tiller or similar equipment. If soil is extremely oily or gummy, mix clean soil with oily soil to expedite clean up and to make it easier to work with.

2. Utilizing local soil or rock, build a small berm surrounding the treatment area to prevent rain water run off from the site.

3. To determine treatment volumes of EnviroClean/TF-3 solution, measure the square footage area of the treatment cell and divide that number by 27 to find cubic yards per foot of depth (i.e. treatment area is 100' x 50': 100 x 50 ÷ 27 = 185). Multiply that number x .06 to determine the amount of EnviroClean/TF-3 concentrate to utilize in the treatment (i.e. 185 x .06 = 11 gallons EnviroClean/TF-3 concentrate). Dilute the EnviroClean/TF-3 to approximately a 3% solution (32 to 1 or 352 gallons water to 11 gallons EnviroClean/TF-3). Spray the 3% EnviroClean/TF-3 solution over the entire treatment cell.

4. If, after a week, little to no rainfall has fallen, water the site thoroughly.

5. Wait another week and repeat steps 1 and 3, if needed.

6. Monitor and continue the treatment protocol until desired clean up levels are reached.

Notes:

It can be helpful to add a highly soluble, high nitrogen fertilizer such as Miracle Grow or Sam's Choice to the first 3% EnviroClean/TF-3 solution.

The addition of bacteria is not typically required. The EnviroClean/TF-3 solution will stimulate the activity level of the naturally occurring bacteria.

In the fall and winter, it helps to expedite the job if the treatment cell is covered with plastic between treatments. This tends to hold in heat and generate additional moisture.

Keeping the soil moist is an integral part of the clean up.

Optional Product: Peroxi-185, Peroxi-350, or Peroxi-500

General Procedure for Treatment:

Peroxi-185, Peroxi-350, and Peroxi-500 were all formulated primarily for the removal of hydrocarbon in soil and groundwater remediation. The Peroxi's are injected into or mixed with the impacted media in order to chemically oxidize the hydrocarbon, forming carbon dioxide and water as end products. Insitu oxidation uses contact chemistry of the oxidizing agent to react with the harmful constituents in both soil and groundwater.

Peroxi-185, Peroxi-350, and Peroxi-500 can also serve as an oxygen source for microbes in the subsurface to enhance biodegradation of contaminants.

Specific application or treatment protocols can be developed as needed. The available application guides or case studies may provide further assistance, or contact your local distributor or Enviro Clean Products and Services for any specific support.

Insitu Saltwater Remediation

Optional Product: SaltRelief™

General Procedure for Treatment:

1. For surface spills and contamination to 1' in depth, Disk or rip soil thoroughly.

2. Mix SaltRelief™ to a 3.25% solution (1-drum of SaltRelief™ to 40 Bbls fresh water).

3. Apply at a rate of 2-drums of SaltRelief™ (80 Bbls of solution) per acre of impacted soil.

4. Wait 2-days and disk or rip area thoroughly.

5. Water soil at a rate of 80 Bbls per acre.

6. Wait 5-days, water at a rate of 80 Bbls per acre.

7. Collect soil samples for confirmation of remediation or to detect hot spots.

Notes: Extremely high salt levels on extremely tight soil may require more than one treatment.

If contamination is deeper than 1-foot, call Enviro Clean Products & Services for further recommendations.

SaltRelief™ formerly known as SaltAway.

Optional Product: MicroBind

General Procedure for Treatment:

For contamination 1-foot or less, rototill or rip soil thoroughly. Insitu or exsitu are both viable options but treatment method should be site specific.

1. Utilize the table below to determine proper MicroBind dosage in relation to the soil contamination levels. When applying the MicroBind in solution, ensure adequate coverage and soaking time to maximize contact with the contaminated soil. *MicroBind is a "contact" product and must get in touch with the contaminated soil to be effective.*

TSS Levels, ppm	**MicroBind concentrate required; *(Gals per 1,000 gals of solution)***	**Gallons of MicroBind solution per acre-foot of impacted soil**
0 – 2,500	5	4,800 gallons of 0.5% solution
2,500 – 5,000	5	4,800 gallons of 0.5% solution
5,000 – 10,000	5	4,800 gallons of 0.5% solution
10,000 – 15,000	10	4,800 gallons of 1.0% solution
15,000 – 20,000	10	4,800 gallons of 1.0% solution
20,000 – 50,000	20	4,800 gallons of 2.0% solution
50,000 –100,000	30	4,800 gallons of 3.0% solution

2. After 60 – 90 days, collect soil samples for confirmation of remediation or to detect hot spots.

3. Retreat if necessary.

Notes:

Protocol may vary based upon site conditions such as soil type, soil compaction, soil use, vegetation, etc.

Extremely high salt levels or extremely tight soil may require more than one treatment.

If contamination is deeper than 1-foot, call Enviro Clean Products & Services for further recommendations.

Specific application or treatment protocols can be developed as needed.The available application guides or case studies may provide further assistance, or contact your localdistributor or Enviro Clean Products and Services for any specific support.

Emergency Response & Spill Cleanup

Optional Product: EnviroClean or TF-3

General Procedure for Treatment:

Small Spill Cleanup: Dilute EnviroClean/TF-3 to a 10% solution. On small spills apply with 2 ½ gallon pressure sprayer or similar device. Cover the entire spill working in a circular motion from outside perimeter toward the center of the spill. After application of EnviroClean/TF-3 has been completed, agitate spill area with forcible stream of water or broom and rinse thoroughly. EnviroClean/TF-3 helps to reduce or eliminate any VOC concerns associated with the cleanup by micro-emulsifying the hydrocarbon on contact drastically reducing the LEL levels in a very short time frame. EnviroClean/TF-3 also eliminates sheens.

Note: For use with absorbents, EnviroClean/TF-3 will increase effectiveness by allowing the contaminate to more easily penetrate into the absorbent.

On Roadways and Pavement: EnviroClean/TF-3 can be applied with a pressure sprayer or applied through a foam eductor at a 6% setting. EnviroClean/TF-3 will instantly stop the deterioration of asphalt by diesel or gas and eliminate slippery conditions. Dispose in accordance with local rules and regulations.

Optional Product: RockOn

General Procedure for Treatment:

RockOn was designed specifically for cleaning hydrocarbon residue and contamination off of rock or gravel surfaces typically found in the oil and gas industry (i.e. berms, pads, lease roads, etc.). For best results, spray RockOn at full strength on contaminated rock or surface. Allow contact time of 30 to 45 minutes. Rinse thoroughly with clean water.

For lighter applications, RockOn may be applied at a 50/50 dilution and used as described above. It is important to test all surfaces prior to application.

3 Petroleum Processing, Refining, and Distribution

- Degassing & Cleaning of Tanks & Equipment 23
- Tank Bed Remediation 24
- Chemical Pipeline Pigging 25
- VOC Vapor Mitigation and Control 26

Degassing & Cleaning of Tanks & Equipment

Optional Product: EnviroClean or TF-3

General Procedure for Treatment:

EnviroClean/TF-3 is effective for the degassing and cleaning of all types of petroleum storage tanks. For small tanks of less than 50,000 gallons, EnviroClean/TF-3 should be utilized through a power washer at dilutions between 2% and 6% depending on the type of product within the vessel and the degree of contamination. Typically for flammables, a 6% solution is utilized to completely agitate the tank residue and to scour the wall of the vessel prior to and during pump out. Lower dilutions may be utilized for products not representing a vapor hazard. EnviroClean/TF-3 is also effective for reducing H2S, Benzene and other VOC's.

Optional Product: Enviro D-Grease

General Procedure for Treatment:

Light Soil: Dilute 16 oz. of product to 1 gallon hot or cold water and spray or mop on surface. Allow contact time of 3 to 5 minutes and scrub gently. Rinse thoroughly with clean water and dispose of as local rules may apply.

Tough Soil: Dilute 32 oz. of product to 1 gallon hot or cold water. Apply to area as above or may also be applied with brush or through power washer. Rinse thoroughly with clean water and dispose of as local rules may apply. Do not allow product to dry on surface prior to rinsing. Test surface for compatibility prior to application.

Specific application or treatment protocols can be developed as needed. The available application guides or case studies may provide further assistance, or contact your local distributor or Enviro Clean Products and Services for any specific support.

Tank Bed Remediation

Optional Product: EnviroClean or TF-3

General Procedure for Treatment:

A common and effective means of mitigating the vapor hazard and remediating the tank bedding is to utilize a "flushing and recovery" technique with a diluted solution of EnviroClean/TF-3. Typically a 3% to 6% solution of EnviroClean/TF-3 and water is utilized in a batch process to treat the impacted portions of the tank floor area. Simply perforating the affected area with a "buster" or hole saw and allowing the EnviroClean/TF-3 solution to flood the affected bedding will eliminate immediate, and future, recurrences of vapor generation. The process also serves to remediate the contamination by flushing entrained hydrocarbon out of the bedding for recovery and disposal, or re-processing. If necessary, the entire sub-floor area may be treated by saturating the zone of contamination and flushing the fluid to the sump, or other collection point, and recovering the rinsate for disposal. Depending upon the severity of the leak, and the resultant degree of subfloor contamination, the EnviroClean/TF-3 solution can be applied so as to simply saturate the bedding material, or it can be injected so as to flush and recover gross quantities of hydrocarbon.

Specific application or treatment protocols can be developed as needed. The available application guides or case studies may provide further assistance, or contact your local distributor or Enviro Clean Products and Services for any specific support.

Chemical Pipeline Pigging

Optional Product: EnviroClean or TF-3

General Procedure for Treatment:

As a general guideline, pump a slug of 3% to 6% solution and chase with water.

Specific application or treatment protocols can be developed as needed. The available application guides or case studies may provide further assistance, or contact your local distributor or Enviro Clean Products and Services for any specific support.

VOC Vapor Mitigation and Control

Optional Product: EnviroClean or TF-3

General Procedure for Treatment:

Dilute EnviroClean/TF-3 to a 3% to 6% solution. Coverage is normally at 3 to 4 square yards of surface area per gallon. Heavy contamination or mercaptan type odors may require a stronger solution of EnviroClean/TF-3.

Typically, 1 gallon of EnviroClean/TF-3 concentrate diluted to a 3% to 6% solution will render up to 6 gallons of petroleum product nonflammable when properly applied.

Specific application or treatment protocols can be developed as needed. The available application guides or case studies may provide further assistance, or contact your local distributor or Enviro Clean Products and Services for any specific support.

4 Industrial Cleaning

- Hard Surface Cleaning / Decontamination 28
- Aqueous Parts Cleaning 29

Hard Surface Cleaning / Decontamination

Optional Product: EnviroClean or TF-3

General Procedure for Treatment:

For heavy soiled oil and grease on hard surfaces:
Mix a 6% solution of concentrate with clean water in quantity sufficient to cover contaminated area. Apply generous amounts with spray applicator, or equivalent and allow reasonable time for the surfactants in EnviroClean/TF-3 to penetrate and break down the hydrocarbon and grime. Once applied, solution may be scrubbed or brushed in for stubborn soiling. Next, apply EnviroClean/TF-3 solution at 1 – 2 % through a power washer (Note: heated power wash system will expedite the process). Flush residue to containment and dispose of as local rules apply.

For lightly soiled or freshly oiled surfaces:
EnviroClean/TF-3 may be used through any power washer or steam jenny currently available. Operating temperatures of 140 degrees F. will maximize effectiveness. Solution strengths of 1 – 2% may be used for lighter decontamination duties. For small applications, a 5% solution (16 oz. EnviroClean/TF-3 concentrate to 2.5 gallons water) may be applied with a small pump sprayer and scrubbed or brushed into surface.

Optional Product: Enviro D-Grease

General Procedure for Treatment:

Light Soil: Dilute 16 oz. of product to 1 gallon hot or cold water and spray or mop on surface. Allow contact time of 3 to 5 minutes and scrub gently. Rinse thoroughly with clean water and dispose of as local rules may apply.

Tough Soil: Dilute 32 oz. of product to 1 gallon hot or cold water. Apply to area as above or may also be applied with brush or through power washer. Rinse thoroughly with clean water and dispose of as local rules may apply. Do not allow product to dry on surface prior to rinsing. Test surface for compatibility prior to application.

Aqueous Parts Cleaning

Optional Product: Enviro-PW

General Procedure for Treatment:

Enviro-PW is designed specifically for the cleaning of grease and oil contaminated parts in spray wash units, dip agitating tanks, and ultrasonic cleaning systems. Enviro-PW must be diluted with water and used in a working dilution of 0.5% to 6% until complete cleaning of parts or desired result is achieved (specific cleaning applications often require different working dilutions). Enviro-PW has a significant "life of batch" as well as low foaming tendencies. The surfactants in Enviro-PW desorb and micro-emulsify grease and oil contamination and separate it from solids (metal shavings, grit, etc.) allowing them to settle without accumulating oily sludges. Some agitation or circulation of the fluid is required for thorough cleaning.

Optional Product: EnviroClean TA

General Procedure for Treatment:

EnviroClean TA is designed specifically for the cleaning of grease and oil contaminated parts in spray wash units, dip agitating tanks, and ultrasonic cleaning systems. EnviroClean TA must be diluted with water and used in a working dilution of 0.5% to 6% until complete cleaning of parts or desired result is achieved (specific cleaning applications often require different working dilutions). EnviroClean TA has a significant "life of batch" as well as low foaming tendencies. The surfactants in EnviroClean TA desorb and micro-emulsify grease and oil contamination and separate it from solids (metal shavings, grit, etc.) allowing them to settle without accumulating oily sludges. Some agitation or circulation of the fluid is required for thorough cleaning.

Optional Product: Enviro D-Grease

General Procedure for Treatment:

Light Soil: Dilute 16 oz. of product to 1 gallon hot or cold water and spray or mop on surface. Allow contact time of 3 to 5 minutes and scrub gently. Rinse thoroughly with clean water and dispose of as local rules may apply.

Tough Soil: Dilute 32 oz. of product to 1 gallon hot or cold water. Apply to area as above or may also be applied with brush or through power washer. Rinse thoroughly with clean water and dispose of as local rules may apply. Do not allow product to dry on surface prior to rinsing. Test surface for compatibility prior to application.

Specific application or treatment protocols can be developed as needed. The available application guides or case studies may provide further assistance, or contact your local distributor or Enviro Clean Products and Services for any specific support.

5 Soil and Groundwater Remediation

- Insitu Free Product Recovery Enhancement 32
- Soil Flushing and Recovery 33
- Bioremediation Enhancement 34
- Insitu Saltwater Remediation 35

Insitu Free Product Recovery Enhancement

Optional Product: EnviroClean or TF-3

General Procedure for Treatment:

EnviroClean/TF-3 is effective for the insitu solubilization and recovery enhancement of entrained Free Product Hydrocarbon in the subsurface to facilitate recovery or biodegradation. Dilutions of 2% v/v are typical for light ends (i.e. gasoline) while concentrations of 3% to 6% are effective for Diesel Range Organic (DRO's) and heavier oils. Applications vary, however the EnviroClean/TF-3 solution is injected into the contaminated zone followed typically by a recovery event.

Specific application or treatment protocols can be developed as needed. The available application guides or case studies may provide further assistance, or contact your local distributor or Enviro Clean Products and Services for any specific support.

Soil Flushing and Recovery

Optional Product: EnviroClean or TF-3

General Procedure for Treatment:

EnviroClean/TF-3 is effective for the insitu solubilization and recovery enhancement of entrained Free Product Hydrocarbon in surface and sub-surface soil to facilitate recovery or biodegradation. Dilutions of 2% v/v are typical for light ends (i.e. gasoline) while concentrations of 3% to 6% are effective for Diesel Range Organic (DRO's) and heavier oils. Applications vary, however the EnviroClean/TF-3 solution is injected into or flushed through the contaminated zone.

Specific application or treatment protocols can be developed as needed. The available application guides or case studies may provide further assistance, or contact your local distributor or Enviro Clean Products and Services for any specific support.

Bioremediation Enhancement

Optional Product: EnviroClean or TF-3

General Procedure for Treatment:

EnviroClean/TF-3 is effective for the enhancement of remediation of a wide range of hydrocarbon products in soil.

1. If contaminated soil is deeper than 12 inches, excavate the soil and spread at the surface to a depth of 10-12 inches and then proceed with this protocol. If contaminated soil is 12 inches in depth or less, thoroughly mix and aerate the soil in place utilizing a roto-tiller or similar equipment. If soil is extremely oily or gummy, mix clean soil with oily soil to expedite clean up and to make it easier to work with.
2. Utilizing local soil or rock, build a small berm surrounding the treatment area to prevent rain water run off from the site.
3. To determine treatment volumes of EnviroClean/TF-3 solution, measure the square footage area of the treatment cell and divide that number by 27 to find cubic yards per foot of depth (i.e. treatment area is 100' x 50': 100 x 50 ÷ 27 = 185). Multiply that number x .06 to determine the amount of EnviroClean/TF-3 concentrate to utilize in the treatment (i.e. 185 x .06 = 11 gallons EnviroClean/TF-3 concentrate). Dilute the EnviroClean/TF-3 to approximately a 3% solution (32 to 1 or 352 gallons water to 11 gallons EnviroClean/TF-3). Spray the 3% EnviroClean/TF-3 solution over the entire treatment cell.
4. If, after a week, little to no rainfall has fallen, water the site thoroughly.
5. Wait another week and repeat steps 1 and 3, if needed.
6. Monitor and continue the treatment protocol until desired clean up levels are reached.

Notes:

It can be helpful to add a highly soluble, high nitrogen fertilizer such as Miracle Grow or Sam's Choice to the first 3% EnviroClean/TF-3 solution.

The addition of bacteria is not typically required. The EnviroClean/TF-3 solution will stimulate the activity level of the naturally occurring bacteria.

In the fall and winter, it helps to expedite the job if the treatment cell is covered with plastic between treatments. This tends to hold in heat and generate additional moisture.

Keeping the soil moist is an integral part of the clean up.

Insitu Saltwater Remediation

Optional Product: SaltRelief™

General Procedure for Treatment:

1. For surface spills and contamination to 1' in depth, Disk or rip soil thoroughly.

2. Mix SaltRelief™ to a 3.25% solution (1-drum of SaltRelief™ to 40 Bbls fresh water).

3. Apply at a rate of 2-drums of SaltRelief™ (80 Bbls of solution) per acre of impacted soil.

4. Wait 2-days and disk or rip area thoroughly.

5. Water soil at a rate of 80 Bbls per acre.

6. Wait 5-days, water at a rate of 80 Bbls per acre.

7. Collect soil samples for confirmation of remediation or to detect hot spots.

Notes:

Extremely high salt levels on extremely tight soil may require more than one treatment.

If contamination is deeper than 1-foot, call Enviro Clean Products & Services for further recommendations.

SaltRelief™ formerly known as SaltAway.

Optional Product: MicroBind

General Procedure for Treatment:

For contamination 1-foot or less, rototill or rip soil thoroughly. Insitu or exsitu are both viable options but treatment method should be site specific.

1. Utilize the table below to determine proper MicroBind dosage in relation to the soil contamination levels. When applying the MicroBind in solution, ensure adequate coverage and soaking time to maximize contact with the contaminated soil. *MicroBind is a "contact" product and must get in touch with the contaminated soil to be effective.*

TSS Levels, ppm	**MicroBind concentrate required;*(Gals per 1,000 gals of solution)***	**Gallons of MicroBind solution per acre-foot of impacted soil**
0 – 2,500	5	4,800 gallons of 0.5% solution
2,500 – 5,000	5	4,800 gallons of 0.5% solution
5,000 – 10,000	5	4,800 gallons of 0.5% solution
10,000 – 15,000	10	4,800 gallons of 1.0% solution
15,000 – 20,000	10	4,800 gallons of 1.0% solution
20,000 – 50,000	20	4,800 gallons of 2.0% solution
50,000 –100,000	30	4,800 gallons of 3.0% solution

2. After 60 – 90 days, collect soil samples for confirmation of remediation or to detect hot spots.

3. Retreat if necessary.

Notes:

Protocol may vary based upon site conditions such as soil type, soil compaction, soil use, vegetation, etc.

Extremely high salt levels or extremely tight soil may require more than one treatment.

If contamination is deeper than 1-foot, call Enviro Clean Products & Services for further recommendations.

Specific application or treatment protocols can be developed as needed. The available application guides or case studies may provide further assistance, or contact your local distributor or Enviro Clean Products and Services for any specific support.

6 Institutional Maintenance

- Drainline Maintenance 38
- Carpet Cleaning & Deodorizing 39

Drainline Maintenance

Required Product: OLFactor

General Procedure for Treatment:

OLFactor may be directly added to waste water, grease traps, and other effluent lines for the mitigation of problematic odors. OLFactor should be added manually as needed or applied through a metering pump to maintain adequate treatment levels. OLFactor may also be used through any aspirated spray odor control systems used at many waste water treatment facilities or applied with pumps and spray hoses over the source point of odors.

Specific application or treatment protocols can be developed as needed. The available application guides or case studies may provide further assistance, or contact your local distributor or Enviro Clean Products and Services for any specific support.

Carpet Cleaning & Deodorizing

Required Product: OLFactor

General Procedure for Treatment:

Scrub, wipe, soak, and extract in whatever manner deemed necessary (i.e. carpet machine, washing machine, etc.)

General Cleaning: 1-2 ounce dilution per gallon

Medium Soil: 2-4 ounce dilution per gallon

Heavy Soil: 4-8 ounce dilution per gallon

Spot Cleaning: 2 ounce dilution per quart of water

Gum: straight solution

Sub-flooring: roll with concentrate

Wood floors: contaminated with urines and other malodors; paint or roll with straight concentrate

Concrete: can be cleaned with power washer or brush; pre-spray starting at a 1:5 dilution depending on the contamination.

Specific application or treatment protocols can be developed as needed. The available application guides or case studies may provide further assistance, or contact your local distributor or Enviro Clean Products and Services for any specific support.

7 Emergency Response & Spill Cleanup

- Flammable Vapor Suppression 41
- Surface Washing & Shoreline Cleanup 42
- Fire Fighting for Class A & B Fires 43

Flammable Vapor Suppression

Optional Product: EnviroClean or TF-3

General Procedure for Treatment:

Dilute EnviroClean/TF-3 to 3% or 6% solution (3% for diesel or fuel oils; 6% for gasoline, jet fuel or similar volatiles). Coverage is normally at 3 to 4 square yards of surface area per gallon of solution or 6-gallons of solution for each gallon of spilled fuel for total vapor suppression. Agitation of the solution into the fuel is a requirement to form a physical emulsion. This can be accomplished utilizing a rolling motion with a fire hose, agitating with a broom or other similar mixing actions. Heavy contamination or mercaptan type odors may require a stronger solution of EnviroClean/TF-3.

Specific application or treatment protocols can be developed as needed. The available application guides or case studies may provide further assistance, or contact your local distributor or Enviro Clean Products and Services for any specific support.

Surface Washing & Shoreline Cleanup

Optional Product: EnviroClean or TF-3

General Procedure for Treatment:

Dilute EnviroClean/TF-3 to a 2% solution. On small spills apply with 2.5 gallon pressure sprayer or similar device. Cover entire spill, working in a circular motion, from outside perimeter toward the center of the spill. After application of EnviroClean/TF-3 has been completed, agitate spill area with forcible stream of water or broom and rinse thoroughly.

On larger spills, specific applications and protocols should be developed taking into account local risks and considerations.

Notes:

EnviroClean is listed on the U.S. E.P.A. NCP Product Schedule as a Surface Washing Agent (Listed SW-#31). This listing does not mean that EPA approves, licenses, certifies, or authorizes the use of EnviroClean on an oil discharge. This listing means only that data have been submitted to EPA as required by subpart J of the National Contingency Plan § 300.915.

TF-3 is not listed by the U.S. E.P.A.

Specific application or treatment protocols can be developed as needed. The available application guides or case studies may provide further assistance, or contact your local distributor or Enviro Clean Products and Services for any specific support.

Fire Fighting for Class A & B Fires

Optional Product: EnviroClean or TF-3

General Procedure for Treatment:

Proportioning Rate:	6%
GPM Flow Rate:	95 – 110
PSI at Eductor:	200 or MFG's recommendations
Hose Length:	As per MFG's suggestion
Nozzle Type:	Standard adjustable or automatic
Coverage:	0.2 gpm per square foot
Nozzle Pattern:	Hard cone to coarse stream
Application:	Starting from the outside perimeter, using a stirring, mixing action.

Specific application or treatment protocols can be developed as needed. The available application guides or case studies may provide further assistance, or contact your local distributor or Enviro Clean Products and Services for any specific support.

8 Vapor & Odor Suppression

- Contaminated Soil Excavation 45
- Landfills & Composting Areas 46
- Commercial Animal Housing & Processing 47

Contaminated Soil Excavation

Optional Product: EnviroClean or TF-3

General Procedure for Treatment:

In most cases a 3% solution of EnviroClean/TF-3 will be adequate to keep vapor emissions within acceptable limits. Dilute EnviroClean/TF-3 concentrate with water at a ratio of 1 part EnviroClean/TF-3 to 33 parts water to make a 3% solution. The EnviroClean/TF-3 solution should be applied evenly to the soil surface in sufficient quantity to dampen the surface well. As a general rule, 1 gallon of solution will cover approximately 4 sq. yd. of soil surface area.

Optional Product: OLFactor

General Procedure for Treatment:

For odor suppression and to eliminate noxious odors, dilute OLFactor to a 5% solution (5 gallons of OLFactor mixed with 100 gallons of water) and apply to portions of the excavation through a foam unit, fire hose or other pump and hose system.

Specific application or treatment protocols can be developed as needed. The available application guides or case studies may provide further assistance, or contact your local distributor or Enviro Clean Products and Services for any specific support.

Landfills & Composting Areas

Required Product: OLFactor

General Procedure for Treatment:

Dilute OLFactor to a 5% solution (5 gallons of OLFactor mixed with 100 gallons of water) and apply to portions of the landfill or composting area through a foam unit, fire hose, or other pump and hose system.

Specific application or treatment protocols can be developed as needed. The available application guides or case studies may provide further assistance, or contact your local distributor or Enviro Clean Products and Services for any specific support.

Commercial Animal Housing & Processing

Required Product: OLFactor

General Procedure for Treatment:

Apply with power washer, mop, or brush. First time cleaning use 4-8 oz. per gallon.

May also be used as a shampoo to de-skunk.

Specific application or treatment protocols can be developed as needed. The available application guides or case studies may provide further assistance, or contact your local distributor or Enviro Clean Products and Services for any specific support.

9 Appendices

- Above Ground Paraffin Treatment Data Sheet 50
- Downhole Paraffin Treatment Data Sheet 51
- Application of Paraffin Control for Downhole Production Well Treatment 52
- Application of Paraffin Control for Production Wells Containing Packers 53
- Application for OLFactor for Odor Neutralization at a Contaminated Excavation Site 54
- Exsitu Bioremediation of Mixed Hydrocarbon 55
- Application of EnviroClean for High Volume "Clean Service" Tanks 57
- Application of EnviroClean to Enhance "Stuck" Bioaugmentation 61
- EnviroClean Gas Condensate Bioremediation 62
- Hard Surface Spill Application Directions for EnviroClean 63
- EnviroClean Parking Lot Diesel Spill 64
- EnviroClean Remediation of a 300 bbl Crude Oil Spill 65
- Application of EnviroClean for Soil Vapor & Odor Control 66
- EnviroClean Vapor Mitigation and Ballast Flushing for JP8 Spill 67
- Exsitu and Insitu Bioremediation Using EnviroClean 68

- Industrial Cleaning Applications of EnviroClean 70
- Insitu HIT Free Product Recovery 71
- Shoreline Cleaning with EnviroClean as Surface Washing Agent 73
- Small Tank Cleaning and Degassing 74
- Application of EnviroClean for Vapor Mitigation and Remediation of Tank Bedding Contamination 75

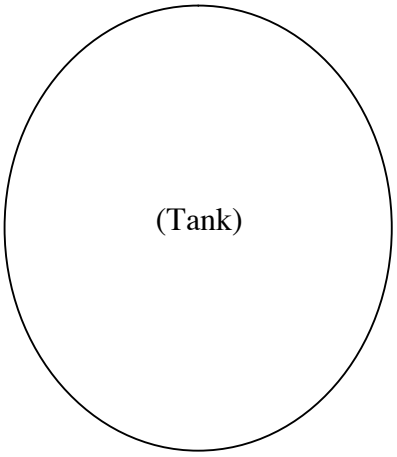
ABOVE GROUND PARAFFIN TREATMENT DATA

Instructions: Print & Fax Form

Paraffin from Tanks & Pipelines

General Condition of Tank _____
Tank Capacity in Barrels _____
Diameter _____ Height _____
Last Cleanded _____
BS&W _____
Depth of Paraffin/Sludge _____
Hourly Flow into Tank (in Bbls) _____

Pipeline Length _____
Pipeline Diameter _____
Approx. bph _____
Last Cleaned _____
BS&W _____



Indicate inlet, outlet position and size.
Indicate any plumbing on tank.

Company Information

Contact Name: _____
Company Name: _____
Company Address: _____
_____
Phone Number: _____ Fax: _____
Email Address: _____

For more information please contact your local distributor or:

Enviro Clean Products & Services
Oklahoma 405.373.4545 · 405.373.4549 (fax)
New York 800.477.2461 · 845.463.4573 (fax)
www.EnviroCleanPS.com
info@EnviroCleanPS.com

DOWNHOLE PARAFFIN TREATMENT DATA

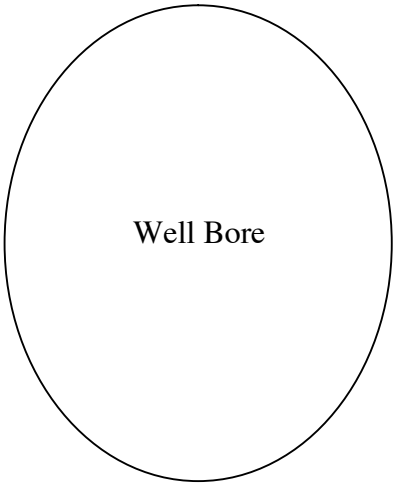
Instructions: Print & Fax Form

Technical Production Well Specifications

Well Depth (Ft.) _____
Casing Size _____ Tubing Size _____
Perforations _____
Standing Fluid Level _____ Pumped Down Fluid Level _____
Daily Production Levels:
Oil (bpd) _____ Water (bpd) _____ Gas (MCFGPD)_____
Backside Pressure _____ Oil Gravity _____
Packer Location, if any_____

Date and Type of Last Paraffin Treatment _____
_____

Comments: _____



Indicate Accessibility to Valve or Pot

Company / Well Location Information

Contact Name: _____
Company Name: _____
Company Address: _____
_____
_____
Phone Number: _____ Fax: _____
Email Address: _____

Well Name and Location: _____
Well Address: _____
_____

For more information please contact your local distributor or:

Enviro Clean Products & Services
Oklahoma 405.373.4545 · 405.373.4549 (fax)
New York 800.477.2461 · 845.463.4573 (fax)
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info@EnviroCleanPS.com

Application of *Paraffin Control* for Downhole Production Well Treatment

A production well in Central Oklahoma had significant problems with paraffin build-up. The build-up was so severe that it resulted in continual hot-oilings and a costly "stripping" of the well.

The noted well had been undergoing a hot oiling program once a month to attempt to remove the paraffinic build up. The well was 6000 feet deep and historically had production rates of 30 barrels of oil per day and 15 barrels of water per day. Due to the paraffin plating out constantly, production became costly to continue. Even with the hot oilings, the rod string & rod boxes were continually fouled and the tubing became plugged.

After the stripping, where the rods and tubing were removed joint by joint, the tubing and rods were steamed and put back in the well. Once installation was complete, 5 gallons of ***Paraffin Control*** was introduced through the "pot" down the backside of the tubing. The treatment was then circulated in the well for 24 hours and then the well was put back on production. The treatment was repeated in 45 days. After 90 days, the well was taken off line and the rod string was pulled for inspection. (*See Photo*)

The photo illustrates the ability to the ***Paraffin Control*** treatment to eliminate the plating out and deposition of Paraffin on the rod string and within the tubing. Historic production levels have been achieved and periodic treatment with ***Paraffin Control*** has eliminated hot oiling or other costly paraffin related well maintenance.

The ***Paraffin Control*** treatment keeps the wax in the oil and also coats the downhole tubing and rod string. This unique benefit doesn't allow the paraffin to plate out onto the production or distribution (i.e. pipeline) equipment. Additionally, the treatment circulated in the well removes deposits from the well bore, and from the near bore formation. This feature will increase production yields as well as eliminate tank bottoms and high water cut. Treatment is effective in both pumping and plunger lift wells.

For more information please contact your local distributor or:

Enviro Clean Products & Services
405.373.4545 OK
800.477.2461 NY
www.EnviroCleanPS.com
info@EnviroCleanPS.com

Application of *Paraffin Control*
For
Production Wells Containing Packers

Treating wells with packers in them can be difficult, but not impossible. The only feasible option is to pump down the tubing, displacing the product into the formation and allowing it to sit overnight before flowing or swabbing it back. For most wells, it is recommended that 500 gallons or more of a 3% solution of ***Paraffin Control*** be used. The solution is put it into the hole and then chased with 10 to 20 Barrels of formation water. If it is possible it is best to avoid over-displacement of all of the solution downhole. This will leave some of the product in the bottom of the hole allowing it to effectively clean some of the perforations that may be partially plugged. The overburden of the water will cause the product to slowly work its way into the perforations during the shut down period. After 24 hours, you can open the well back to the flow line. It is important to note that this process/treatment will in all likelihood temporarily kill the well since you are pumping into it. Therefore, unless the well builds pressure quickly, it will be required to swab the treatment fluids back before it will kick off.

Note: Utilizing formation water to mix the 3% solution should eliminate the possibility of water damaging the formation if it is water sensitive.

For more information please contact your local distributor or:

Enviro Clean Products & Services
405.373.4545 OK
800.477.2461 NY
www.EnviroCleanPS.com
info@EnviroCleanPS.com

Application of OLFactor for Odor Neutralization at a Contaminated Excavation Site

In June of 2004, remediation activities in an urban area within the State of New York required the excavation of a significant quantity of soil heavily impacted with coal tars, aged hydrocarbons, and other organic compounds. The remedial excavation and soil handling activities resulted in the emission of off gasses and noxious odors as the soils were manipulated. Additionally, the walls of the emerging excavation required treatment to suppress the odors coming from the site during downtime.

As a pilot treatment, 5 gallons of OLFactor was mixed with 100 gallons of water and applied to portions of the excavation through the existing foam unit on site.

It was noted that the heavy odors disappeared immediately upon application and the pleasant scent of OLFactor remained indicating thorough treatment. Additional OLFactor was then brought to the site for application during the remaining excavation activities and was applied as needed for odor suppression.

For more information please contact your local distributor or:

Enviro Clean Products & Services
405.373.4545 OK
800.477.2461 NY
www.EnviroCleanPS.com
info@EnviroCleanPS.com

Exsitu Bioremediation of Mixed Hydrocarbon
Oklahoma, USA

On February 28, 2002, Enviro Clean Services, LLC arrived on location to perform general environmental "housekeeping" clean up at numerous locations within a $C0_2$ plant in the Oklahoma panhandle. The various locations around the facility had experienced localized contamination by various types of hydrocarbon (i.e. condensate, used motor oil…).

One location of particular concern was in the vicinity of a pump located at the surface directly above an underground sump tank. The sump tank is located immediately southeast of the main control room. Additionally there were widespread areas of oil saturated soil and rock surrounding many of the CO2 pumps, engine rooms, tanks and other equipment. Utilizing a backhoe, small excavator, shovels, picks and other hand held tools, the oily soil and rock throughout the plant were excavated and moved to a biocell that was built inside of the south property line, south of the large flare tower.

As the oily soil was moved to the biocell, it was spread in 12-inch lifts. The excavated areas were then backfilled with clean rock. The buried sump tank is 4' in diameter and 20' long. The top of the tank is approximately 8' below ground surface (bgs). A malfunction had occurred with the overhead pump and an undetermined amount of condensate had spilled at the surface and much of it soaked into the soil above the tank. Excavation of the soil above the tank began by utilizing visual and olfactory senses to determine where the contaminated soil might end. This excavation alone covered an area approximately 12-15' wide, 20' long and 5' deep.

All excavated soil was moved to the biocell and spread in 12" lifts. On March 1, 2002, samples were pulled from the East, West and South walls at 3' bgs and 5' bgs and on the east, west and south floor of the excavation (See Sample Analysis Report dated 3/5/02). Based upon the Oklahoma Corporation Commission Remediation Index Table, the site is classified as a Category II site. With this characterization, both the east and west walls remained above regulatory limits for closure.

On March 11, 2002, Enviro Clean returned to the site and expanded the excavation to approximately 25 to 28' wide and 5' deep. The soil at 5' had little to no odor with the exception of soil in the southeast quarter of the excavation. A safety meeting was held on location and the decision was made to dig deeper than 5' bgs in the SE corner to attempt to determine depth of contamination. It was determined that workers were no longer allowed to enter the excavation. Utilizing an extend-a-hoe, soil was removed to a depth of 9' bgs. At that depth, a more granular, silty soil was encountered with a very strong hydrocarbon odor in it. The hole was deepened to a depth of 12' bgs and excavated soils still showed a strong hydrocarbon odor. The extend-a-hoe was moved to the west side of the excavation. Although the soil 5' bgs on the west side had no odor, a hole was dug to 9' bgs and the same silty soil was discovered with a strong hydrocarbon odor.

All excavated soil was moved to the biocell and spread to a depth of approximately 12 inches with an ultimate dimension of approximately 100'x150', or a calculated 555 cubic yards of material. No initial samples were pulled from the biocell itself and it was determined to use the analytical from the "sump" excavation as a base analytical starting point. The soil that had come from around the CO2 pumps, engine rooms, etc. was oil saturated, dark in color, with very low VOC's. The soil that originated from the excavation over the sump tank was lighter in color with very strong VOC odor. After thoroughly tilling all soils deposited in the biocell, the cell was subsequently treated with 1000 gallons of a 3% solution of EnviroClean utilizing a trailer mounted pump and mixing tank. The biocell was then left to undergo natural bioremediation of the hydrocarbon contamination similar to a land farming application. On March 27, 2002 Enviro Clean Services, LLC returned to the site and four composite samples were pulled from the biocell area. Each sample was composed of five grab samples taken from a single quadrant of the biocell.

The five grab samples were then thoroughly mixed, resulting in one composite sample for that quadrant. The four composite samples were sent for analysis of TPH-DRO, TPH-GRO and BTEX. Analysis (Sample Analysis Report dated 4/3/02) showed all samples to be non-detect for BTEX, one of the four showed 200 mg/kg for TPH-DRO while the other three were non-detect. Also one of the four showed 16 mg/kg for TPH-GRO while the other three were non-detect.

- Sample analysis for most all soil in the biocell showed non-detect for TPH DRO, TPH-GRO and BTEX and all soil was substantially below Category II closure levels.

On April 16, 2002, Enviro Clean Services, LLC returned to the site. Final spreading of gravel into all excavated areas around the plant was completed and soil from the biocell was hauled to the sump excavation and packed into the hole utilizing packers and moisture from water hoses. After all soil was moved from the biocell the berms were smoothed back across the site. Final compaction at the sump excavation was completed and gravel was spread and smoothed across the surface. At no time during the project was any contaminated soil removed from the site eliminating hauling & disposal costs as well as future liability. Upon completion of all environmental construction activity and site rehabilitation, the generator's field representative walked the site and approved the job's completion.

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Application of EnviroClean for High Volume "Clean Service" Tanks

This document will address the utilization of EnviroClean for the process of degassing and primary cleaning of high volume "clean product" service tanks (particularly gasoline and high volatiles) of various configurations (i.e. center sump / perimeter sump, "flat bottom" - fixed and floating roof)

These procedures will deal particularly with the contractor's use of EnviroClean for its sole intended purposes. All normal health & safety procedures, refinery / facility policies etc. regarding contractor activities should be followed. This guidance document is for review and use by trained professionals.

Scope & Setup Assessment

Prior to initiating tank work, it is imperative that the location of tank sump be identified. In all likelihood this will be the location at which any raw recoverable tank contents will be physically removed by the contractor with a "vac-truck", or other method, prior to further activity on the tank.

Additionally, the general condition of the tank, as relates to anticipated quantity of residual product, bottom scale..., should be determined (if tank valve was "pinched" properly during drawdown, only residual product should remain in tank - check with farm manager and/or operations). These items are important in that they ultimately determine project logistics as regards mobilization and setup of equipment.

Keep in mind that the concept of utilizing EnviroClean is to:

1) *Maximize the product's surfactant advantage for stripping and desorbing hydrocarbon and sludge from the interior surfaces of the tank*

2) *Take advantage of its unique encapsulating properties for vapor suppression to expedite manned entry to the tank.*

Project Setup

On the raw tank, once the contractor has drawn down recoverable contents and cavitation occurs at vac point/sump, a manway (preferably on the downwind side of tank) should be opened. Upon removal of manway, a temporary barrier should be applied over the opening (typically plastic sheeting and duct tape are effective - *see picture*).

Personnel in full ppe should examine bottom and interior surface of tank from manway if possible to determine level of product residual, sludge, scale... (vapor column is quite heavy and haze may not allow for visual even with reflective mirror.) The temporary barrier may be punctured and bottom sampled for depth and content manually without entry (i.e. stick tank). The tank manway is then prepared for introduction of EnviroClean solution. A small hole is cut in temporary manway barrier sufficient for introduction of pressure nozzle.

Methods of introducing the EnviroClean solution vary in terms of required equipment and expense. Typically, the most economical would be to utilize the facilities "fire flow" system if available. Most will provide 95 gpm and approx. 100 psi. In this instance, a fire hose with an adjustable (1%-6%) in-

line "foam" eductor is utilized with the EnviroClean concentrate staged near the manway (*see picture*). The nozzle should be adjustable and originally set for a solid stream *(be sure nozzle is flow rated compatible with eductor or eductor will not function). Minimum* of (three) personnel in full ppe are recommended for the application.

EnviroClean relies on physical agitation to encapsulate organic in solution.

Additionally, the distance to the center of a (150' d) floater requires a nozzle/flow combination to throw a solid stream at least (75'). It is beneficial to "charge the line" by discharging the nozzle off into the containment area until the stream runs slightly foamy indicating presence of EnviroClean and a functioning eductor. Also this will give an idea as to trajectory of stream...

If:
1) In "flat bottom" tanks, floor plating is visible or evident with minimal sludge content (i.e. "puddles and pockets" of residual product present) proceed to degassing stage of operation.

2) In "sump tanks", and "flat bottom" tanks with considerable quantities of sludge and residual product, contents are best flushed to sump location with EnviroClean solution and recovered from tank.

The recovered contents can be sent for disposal, or pumped to a "frac tank". Benefits of a frac tank are that the EnviroClean solution will allow for the phase separation of residual hydrocarbon and settling of solids from the aqueous solution. Once separation is achieved, the EnviroClean solution can be re-utilized in the tank or in other tanks if project scope dictates. In projects involving multiple tanks, or high quantities of sludge, considerable free product may be recovered for use or reprocessing by the facility. (*Note that as separation occurs, free clean product will accumulate as supernatant and vapor generation will recur in vessel. Address accordingly*)

Degassing / Cleaning

In degassing ***sump tanks***, (tanks with convex or concave floors) the degassing phase entails treating floor area by agitating the lowest point of the tank first and working outward so as to have any migrating product in the tank coming in contact with EnviroClean solution. Any EnviroClean solution recovered from flushing and separation operation should be reintroduced into tank prior to treatment and allowed to settle in sump area. Once the floor area is treated thoroughly agitate sump contents. Much of the vapor generating hydrocarbon would have been removed during a flushing phase; hence degassing stage of process occurs more rapidly and with less product and water requirements.

In degassing "***flat bottom***" tanks the process is similar, however the treated contents do not specifically migrate to one point inside the tank. In this case it is important to effectively agitate the entire floor area with a solid stream of solution. It is important to continuously move the nozzle so as to direct the stream throughout the tank interior ("*sleeping" on the nozzle such that the flow simply lands in one spot within the tank does not take advantage of the full capability of the solution regarding agitating the tank contents. This will only lead to a need to re-agitate with additional water*).

If pockets of product are visible in the tank they should be treated first as these are low spots where fluid will collect and mix. Additionally, tank walls can be sprayed down if necessary. As above, any recovered solution should be introduced into tank prior to treatment. Contents should be agitated thoroughly.

In the case of floating roof tanks where the roof is on its legs, there exists minimal headspace and the

introduction of solution should have trajectory which will allow for coverage to the center and perimeter of the tank without rebounding off the ceiling *(nozzle technique will be developed through personal experience of the personnel)*.

In either of the above cases, depending on the diameter of the tank, (primarily tanks in excess of 85'd) it may be necessary to remove second manway and proceed as above from other side of tank. (Recall that work was initiated on the "downwind" side to reduce fugitive vapor release in the event the second manway was to be opened. At this point the first manway may be re-sealed, however if approved, install "blower fan" and begin venting process from first open manway. Once floor area has been treated, solution may be flushed with pressure water to the "vac point" for recovery, separation or disposal.

Venting is allowed to continue until such time as LEL's and other vapor (i.e. benzene) are reduced to allow manned entry, and tank is certified.

*** From a logistic standpoint, site activities should be performed so as to accomplish flushing and degassing in a days work and to allow for venting overnight. Typically the next day, or two, will allow for entry and final prep work can be performed.*

If venting is not permitted, the thoroughly agitated contents may be left in the tank where reduced vapor equilibrium will be achieved and the monitored vapor concentration will reduce over time.

At this point, vapor should be reduced to the extent that a reasonable visual inspection can be made of the interior of the tank. Use a reflective mirror or other approved light beam source to scan tank interior. (*In a still tank, listen carefully to inside of tank, as a leaking pontoon or other abnormality may be disclosed.)*

Application Rates and Dilutions

The most common question is: "H*ow much EnviroClean concentrate is required to perform this process?*"
The answer is; it varies, but if the assessment of the tank's contents is accurate and the proper process is followed, only what is minimally required will be used.

Flushing Tank Bottom

Typically to flush sludge and product residue to a sump for recovery and separation, EnviroClean can be utilized at a dilution of 1% - 3% (if sludge constituents are high in tank water the higher concentration is recommended)

The actual determining factor will be how much water will be required to flush the tank contents to the sump for recovery.

For Instance: In a (75' d) center sump, fixed roof gasoline tank, it may take 1000 to 1200 gallons of pressure water to flush a moderate amount of sludge to the sump. In this case 1000 gallons of 1% EnviroClean = 990 gallons water with 10 gallons EnviroClean concentrate.

Degassing / Cleaning

The surfactants in EnviroClean penetrate rust & scale to desorb and encapsulate the hydrocarbon from both tank interior surfaces and the sludge. It is this feature which allows essentially one process to

complete both the degassing and primary cleaning portions of a tank project. In order to render a tank vapor free, EnviroClean is utilized at a 6% dilution.

As previously noted, degassing of sump tanks can be as simple as a final washdown of the tank interior with a 6% solution of EnviroClean in that a majority of the vapor generating hydrocarbon has been removed or previously treated during flushing phase.

Historical precedent indicates that "flat bottom" clean service tanks upwards of (150') diameter can be effectively treated with approximately (200) gallons of EnviroClean concentrate introduced properly as described. A rule of thumb would be to introduce (1) to (2) 55-gallon drums of EnviroClean at 6% through each manway with additional pressure water introduced for continued agitation.

As noted previously, EnviroClean relies on agitation to encapsulate hydrocarbon into the aqueous solution. Once sufficient EnviroClean and water is present, it is the *agitation component which becomes a prevailing factor*. Additional pressure water should be utilized to continue agitation, and at times, equipment which can recirculate the solution within the tank can produce very favorable results.

Economics

The actual worth, or value, of a clean service tank varies with every facility. For comparison purposes a reasonable assumption could be a figure of $ 75,000.00 per month to a facility, which equates to $2500.00 per day. It would be prudent then for a facility to reduce and eliminate as much out of service time as possible to enhance profitability without sacrificing safety.

The concept of utilizing EnviroClean to increase safety, expedite manned entry, and to accelerate all subsequent work schedule priorities, dramatically reduces the total out of service losses any facility faces and increases profitability. Additionally, the costs borne out of other options for degassing are not incurred (i.e. flooding with #2 oil to increase flash point - product needs to be reprocessed...and there are no tangible or finite time frames for process.)

Project activities can occur as rapidly as desired based upon work schedule policies and the amount and type of equipment available to perform the process. There are no "waiting periods" from the time the raw tank is available for work to ultimate entry and service. The notion that, for an essentially fixed up front cost a facility can practically guarantee a uniform and short term duration of out of service time for required tank work is rather appealing to any facility. Consider the number of priority days saved by the number of tanks and the cost savings and increased profitability can be dramatic in comparison to individual tank project costs. The use of EnviroClean can significantly reduce down time and out of service costs for many applications within a facility (pipeline purging, workover operations, tank degassing/cleaning, spill response, and site remediation).

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Application of EnviroClean to Enhance "Stuck" Bioaugmentation

In early September 2001, Enviro Clean Services was contacted concerning a small land farm area at a fuel processing facility south of Duncan, Oklahoma. Diesel contaminated soil had been moved to a site within the facility and spread to a 6 inch lift over an area approximately 75' x 100'. TPH-DRO levels had reportedly been reduced to approximately 500-600 mg/kg by the addition of bacteria and other remedial actions but could not be lowered any further from this point. Target closure level at the site was 50 mg/kg TPH-DRO. The remediation process that was utilized at the site to bring the sample analysis results below target levels was as follows:

September 21, 2001 – Enviro Clean Services arrived on location. After a tailgate safety meeting, the entire area was thoroughly rototilled using a hand operated industrial tiller. It was then treated utilizing 550 gallons of a 3% solution of EnviroClean. EnviroClean is an effective synthetic, biocatalyst which specifically stimulates degrader organisms and accelerates the rate of biodegradation of hydrocarbon contamination.

September 30, 2001 – Only marginal amounts of rain had fallen on the area over the past 9 days. Therefore, the site was watered with 500 gallons of fresh water taken from the water well on site.

October 23, 2001 - Two composite samples, one from the west end and one from the east end, were taken at the site in the following manner: For each sample, 5 grab samples were taken from evenly spaced locations within that half of the treatment area. These 5 samples were then thoroughly mixed together with 1 composite sample resulting from that half. As seen on the attached sample analysis reports, the TPH-DRO had been reduced to 57 mg/kg in the east half and 302 mg/kg in the west half.

November 1, 2001 – Enviro Clean Services arrived on location. After a tailgate safety meeting, the entire site was rototilled again and treated with 500 gallons of 3% EnviroClean solution. After treatment, the treated soil was covered with 10' to 15' wide strips of 6-mil clear poly sheeting, secured on the sides with cinder blocks and piled soil.

December 3, 2001 – Poly sheeting was pulled back in numerous locations and two composite samples were taken utilizing the same method as described on October 23. As seen on the attached sample analysis reports, the east half showed non-detect for TPH-DRO and the west half showed 21 mg/kg, both below the target closure limits.

December 21, 2001 – Enviro Clean Services returned to the site to remove all poly sheeting and cinder blocks.

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EnviroClean Gas Condensate Biroemediation

Southwest Louisiana, USA

The following is a text report for the on-site remediation of a release of condensate (35-40 gravity crude oil) in the State of Louisiana, USA. The project consisted of the application of EnviroClean as a synthetic, biocatalyst to initiate and enhance the natural biodegradation of the hydrocarbon contaminant. No additional microbial innoculants were used. The process relied on the biostimulation of indigenous hydrocarbon degrading organisms.

On January 3, 2002, 20 bbls of condensate were accidentally released from a Compressor System Accumulation tank in Cameron Parish, Louisiana. The condensate flowed down a small drainage ditch to the north and northeast, remaining inside of the gas compression facility. Sample analysis indicated that the condensate did not penetrate into the soil deeper than 5 inches below ground surface (bgs). The highest initial analytical readings came from sample #004 where the product had pooled and soaked into the ground. At that location, TPH DRO (Diesel Range Organics) was 1700 mg/kg, TPH GRO (Gasoline Range Organics) was 210 mg/kg and Benzene was 0.4 mg/kg.

Enviro Clean Services, LLC generated a work plan to include the bioremediation of the condensate via an in-situ topical application of EnviroClean. The work plan was submitted to the unit operator and the Louisiana Department of Environmental Quality for review and approval prior to startup. The impacted area to be treated was approximately 6,250 sq ft with an average depth of treatment of 6 inches. Approximately 115 cubic yards of soil required treatment. After receiving approval for the work plan the project was initiated on February 1, 2002. The soil was thoroughly rototilled to an approximate depth of 6 inches bgs and treated with 500 gallons of 3% solution of EnviroClean. The application rate was calculated to be approximately 4.35 gallons of 3% solution per cubic yard treated. The site was then left to undergo natural biodegradation of the contaminant with no further site work performed until May 15, 2002.

Observations made during the treatment were significant.

1) Before and during the active phase of the project while the soil was being tilled, a strong odor of hydrocarbon was evident due to the presence of the condensate in, and on, the soil of the project site. Upon application of the EnviroClean solution to the impacted areas, the strong hydrocarbon odor disappeared. This was attributed to the ability of the product to effectively shroud the hydrocarbon in the aqueous phase and distribute it within the pore space of the soil. This effectively reduces or eliminates VOC release. No actual vapor monitoring took place, however the observable difference was plainly apparent to site personnel.
2) Having had experience with applying water based additives to hydrocarbon impacted soil, the site personnel noticed that the assimilation of the EnviroClean solution into the soil matrix was very rapid and even. Typically, applying water to hydrophobic soils (due to hydrocarbon contamination) causes puddling and ponding due to the restricted access to the soil pore space. This was attributed to the reduction of surface tension with the addition of the EnviroClean. The surface tension of a 3% EnviroClean solution is approximately 28 dynes as opposed to plain water at 72 dynes.

On May 15, 2002 a series of seven grab samples were pulled to monitor the effectiveness of the treatment process. These individual grab samples were pulled from across the site at depths ranging from surface to 5 inches bgs. All samples except for number 019 showed non detect for TPH-DRO, TPH-GRO and BTEX. Sample 019, which was from the same location as 004, was non detect for TPH-GRO and BTEX and showed 162 mg/kg for TPH-DRO.

Based upon these results and a risk based assessment, the treatment was considered effective and the file was considered closed. The site has achieved a “no further action required” status.

For more information please contact Enviro Clean Products & Services or your local Distributor:

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Hard Surface Spill Application Directions for EnviroClean

Application Rates

Use one gallon of EnviroClean concentrate for each eight gallons of flammable hydrocarbon product and apply in dilution. Application ratios may vary depending on type of hydrocarbon / petrochemical, or site to be treated.

On small spills, EnviroClean may be applied with common "water extinguishers," or other pressure vessels. This semi-concentrate must be agitated with a coarse stream of water, or brushed thoroughly, in a two step application.

- **Fill vessel, (1 to 1.5 Quarts EnviroClean concentrate, 2 gallons water, in a 2.5 gallon vessel) Pressurize accordingly, Shake Contents.**

Cover entire spill, working in a circular motion from the outside perimeter toward the center of the spill. After the application of the EnviroClean solution has been completed, AGITATE the spill area with a coarse stream of water (a second water extinguisher works well), or brush fluids thoroughly with a stiff broom. Wash fluids to containment and dispose of as local rules require. In some cases, where approved, the effluent may be discharged to a sanitary sewer with the Operator's approval.

On Larger Spills, it is recommended that EnviroClean be applied at a 6% dilution. A minimum of (50) feet of hose (booster or fire hose) and an in-line eductor is recommended. Eductor may be set at apparatus discharge. An all purpose nozzle should be utilized and set at a hard cone or coarse stream. A 90 gpm flow rate, or above, is recommended with a 90 psi minimum at the nozzle. EnviroClean may also be utilized in any foam reservoir with metering equipment on the apparatus or pre-mixed in any batch tank. Start application at outside perimeter of spill, if possible, and use a stirring mixing action on stream. Apply directly to spill. Wash to containment and dispose of as local rules permit.

Roadways and Pavement

EnviroClean will not adversely affect asphalt or concrete surfaces. Upon proper application and washdown to containment, EnviroClean will instantly stop the deterioration of asphalt by diesel or gasoline, and immediately eliminate slippery conditions and secondary hazards. EnviroClean is equally effective on all types of Vehicle Operating Fluids (VOF's) (i.e glycol/antifreeze, motor oil, diesel, gasoline, hydraulic oil…)

In Sewers

Educt EnviroClean at 6% following "Large Spill" protocol, or apply EnviroClean concentrate directly, into the manhole and flush and agitate with copious amounts of water. *Add one Gallon of EnviroClean concentrate per 1 inch of Hydrocarbon visible in a 4 foot diameter manhole and agitate thoroughly*. Vent in proper fashion. Always secure proper approvals before applying.

FOR DEMONSTRATION PURPOSES

Spill 0.5 to 1 gallon of unleaded gasoline on a flat asphalt surface. Using a water extinguisher charged with EnviroClean solution described above, cover the spill working from the outer perimeter to the center of the spill. After you have treated the area properly, spray with a steady stream of water to agitate the entire area and/or brush thoroughly with a stiff broom. Taking a small amount of gasoline, draw a line of gas from the area you have treated back 8 - 10 feet, then light the line of gasoline. You will notice that the line of gasoline will ignite, but the treated area will not ignite. This is a very impressive demonstration which shows the effectiveness of EnviroClean. Dispose of fluids according to local rules.

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Diesel Release In A Parking Lot

Oklahoma City, Oklahoma
12/18/03

11:00 AM - Receive call from Trucking Company. Load & Prep. Trailer, leave for site. On site approximately 100 gallons Diesel spilled and laterally contained to parking lot by diking with soil at north end. Truck diesel tank had been repaired. Oklahoma City Public Works Department on site and Fire Department had already been released.

Trailer and sweeper on site. Spread 13 bags of Sphag Sorb throughout spill area. Work in and agitate with brooms. Use sweeper to pick up saturated Sphag Sorb. Spread 8 bags Oil Pick Up and agitate with brooms. Use sweeper to recover Oil Pick Up. Pull samples from bags of absorbent for waste profile. Use shovels and brooms to load all absorbent materials into plastic trash bags.

Treat all seams in concrete, and then entire spill area, with a 3% solution of EnviroClean. Warehouse Manager, Operations Manager, and Oklahoma City DPW inspected site and approved final clean up.

1:15 PM - Load bags of absorbent and saturated pallet. Return to yard and decontaminate brooms and shovels. Deliver samples to lab.

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Remediation of a 300 bbl Crude Oil Spill

A release of approximately 300 Bbls (12,600 gal.) of crude oil occurred from a tank battery in northeast Texas resulting in heavy contamination on site.

The crude oil released during this spill migrated from the tank battery into an area which was recently cleared and grubbed for a new pasture. This area was of particular concern was due to the exposed and disturbed soils and the tendency for the oil to pool in the locally variable topography and saturate the soil. Also, the night of the incident there was rainfall on the order of 1.5 inches resulting in water/oil saturated conditions within the soil. The oil also traveled through this area and into an active pasture area which was subsequently isolated and slated for treatment. It was decided to utilize "insitu burning" to remove much of the oil floating on the water contained in the various pools and pockets in the disturbed area.

After the burning took place, a vac truck was employed to recover any remaining free oils pooled, or floating, within the area. A trackhoe was then employed to mix, blend and homogenize the soil to an approximate depth of 18 inches, and to provide a uniform grade to the site. Abundant oil was observed leaching from the soil as it was being worked and turned. Due to the significant levels of contamination, no initial soil samples were taken at the outset of the cleanup.

A 3% solution of EnviroClean was then mixed in a 120 bbl (5,040 gal.) transport vessel and sprayed evenly out over the impacted areas of the site.

The site was left to undergo "enhanced natural attenuation" and visually monitored. Photos were taken on June 17, 2001 approximately 3 months after treatment.

Photos were again taken after approximately one year post treatment on May 29, 2002. A full vegetative cover is indicative of satisfactory remediation of the hydrocarbon release in the pasture area.

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Application of EnviroClean for Soil Vapor & Odor Control

EnviroClean offers a unique solution to problematic vapor and odor emissions due to the release of VOC's, Benzene, & LEL's, as well as problem odors. These nuisances can be effectively reduced or eliminated with a simple application of EnviroClean solution. EnviroClean encapsulates the source of the vapor rather than temporarily blanketing it like foam, or other physical barrier. EnviroClean utilizes micro-emulsion technology to affect a "clean-cap" for soil vapor suppression by treating the VOC's in the pore space of the soil, thereby reducing or eliminating atmospheric release. Vapor reduction is rapid upon application and typically can last for weeks if undisturbed.

EnviroClean offers a relatively simple and cost effective method of suppressing VOC vapor release from soils during excavation, loading, stockpiling, etc. The following guidelines will apply to the most common situations encountered on site. EnviroClean is *not* foam; it is a liquid surfactant based product that will apply like water. The solution may be applied with a hand sprayer, high-pressure power sprayer, water truck, etc., whichever method best suits the site and/or conditions.

Application Directions:

In most cases a 3% solution of EnviroClean will be adequate to keep vapor emissions within acceptable limits. Dilute EnviroClean concentrate with water at a ratio of 1 part EnviroClean to 33 parts water to make a 3% solution. The EnviroClean solution should be applied evenly to the soil surface in sufficient quantity to dampen the surface well. As a general rule, 1 gallon of solution will cover approximately 4 sq. yd. of soil surface area.

NOTE: In the case of extremely high emission levels and/or very porous soil it may be necessary to increase the strength of the EnviroClean solution (maximum of 6%) or apply more per sq. yd. to reduce emissions adequately. On stockpiled soil or other soil that will be undisturbed, a single application of EnviroClean solution to the exposed surfaces may last 10-14 days or more. During excavation, loading, or other movement of soil it may be necessary or required to spray each freshly exposed surface to keep emissions below acceptable levels. Also, "misting" a work area while excavation progresses can be effective for fugitive odors. It is important that the site be monitored regularly, and the EnviroClean solution be reapplied if/when necessary to ensure that vapor emissions remain at or below acceptable standards.

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Mitigation of JP8 Spill Utilizing EnviroClean
Oklahoma, USA

Enviro Clean Services, LLC arrived on site on November 20, 2001 to mitigate a spill of JP8 Fuel inside of a gravel lined, concrete header vault which was part of a pipeline distribution system. The concrete vault was 30' x 30' x 8' deep, with gravel in the bottom 6 – 20 inches deep. The JP8 spill had flooded the entire area and there was a drain at the NE corner. All recoverable free product had been vacuumed out the prior day. Upon first inspection, the LEL's were pegging the meter indicating a volatile situation in the vault. It would be necessary to perform "hot work" within the header area for welding repairs.

A hot oiler was loaded with 60 Bbls fresh water, and 55 gallons EnviroClean for a solution concentration of approximately 2%. The application of the solution was initiated at a temperature of 150° F with a ½" jet nozzle. Heavy agitation of the solution was maintained while it was directed into the into gravel substrate. A Transport vessel with 120 Bbls fresh water, loaded with another 110 gals of EnviroClean (2% solution) was employed to follow the initial application from the hot oiler. The entire operation began in the SW corner and the fluids were flushed to the drain area in the NE corner. Abundant free product JP8 was noted working out of the gravel and flowing to the drain area for recovery. After 60 Bbls were used, the application was terminated and a final vacuum up of product and solution was performed.

The vault area was then thoroughly monitored for vapor readings as 0% LEL was required for hot work and for welding repairs to begin. LEL was at zero during initial monitoring. It was decided to wait an additional 20 minutes prior to hot work, to verify vapor reduction and confirm acceptable LEL. After 20 minutes LEL readings were still at zero. The welder began hot work and continued for approximately (1) hour while the LEL remained constant at zero.

Upon completion of welding, the remaining 60 Bbls of 2% EnviroClean solution were used to flush the gravel again to the NE corner. The vac - truck was employed to vacuum up fluids from the NE corner and no JP8 was noted remaining. The project was then considered complete.

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Application of EnviroClean for Bioremediation of Hydrocarbon

Primary technical guidance and application rates for using EnviroClean as a catalyst for exsitu and insitu bioremediation projects.

This guidance document is intended to give the environmental engineer basic concepts and application procedures. This document does not take into account site specific information nor is it a substitute for any treatablity analysis. Adjustments for site specific treatment are the duty of the project manager.

Application of EnviroClean for contaminated surface soils in place (i.e. landfarming) or for contaminated soils excavated and placed within a "biocell" or other treatment facility

- If contaminated soil is deeper than 15 inches, excavate the soil and spread at the surface to a depth of 10-12 inches and then proceed with this protocol. If contaminated soil is 15 inches in depth or less, thoroughly mix and aerate the soil in place utilizing a roto-tiller or similar equipment. If soil is extremely oily or gummy, mix clean soil with oily soil to expedite clean up and to make it easier to work with.

- Utilizing soil or rock, build a small berm surrounding the treatment area (cell) to prevent rain water run off from the site. When required, place impervious barrier in bottom of cell (plastic).

- Dilute the EnviroClean to approximately a 3% solution (33 gallons water to 1 gallon EnviroClean). Spray the 3% EnviroClean solution over the entire treatment cell. Approximately 2 gallons of solution is applied per cubic yard of soil.

To determine volumes of EnviroClean solution required for treatment, calculate the volume of the soil to be treated in cubic yards.

- **For Example:** Treatment area is 100' x 50' x 1' deep (100 x 50 ÷ 27 = 185 cu.yds).

Multiply the cubic yardage x **.06** (6%) to determine the amount of EnviroClean concentrate to utilize in the treatment

- **Example:** 185 cu.yds. x .06 = 11 gallons EnviroClean concentrate).

- Monitor site weekly, and if no rainfall has occurred, water site thoroughly to maintain good moisture content.

- Wait another week and repeat steps 1 and 3, if needed.

- Monitor and continue the treatment process until desired clean up levels are reached.

***Notes*:**

- It is recommended to add a water soluble, high nitrogen fertilizer (36-6-6, NPK) such as Miracle Grow or Sam's Choice to the first 3% EnviroClean solution. Two pounds per (50) gallons of solution is recommended.
- The addition of bacteria is not typically required. The EnviroClean solution will stimulate the activity level of the naturally occurring bacteria.

- In the fall and winter, it helps to expedite the job if the treatment cell is covered with plastic between treatments. This tends to hold in heat and generate additional moisture. Keeping the soil moist is an integral part of bioremediation as all activity takes place in the aqueous phase in the soil pore space.

Application of EnviroClean for insitu (injected) Bioremediation Enhancement in the Unsaturated and Vadose Zones

Typical site characterization should be performed to determine contaminant plume dimensions and levels of target contaminant within the zone of contamination. After the plume has been identified, a proper work plan should be developed and approved by the Authority with Jurisdiction (AWJ).

Generally for Insitu applications of EnviroClean for bioremediation enhancement in the unsaturated zone or vadose zone, a series of injection points are established. These points may be additionally used for monitoring and are typically installed around the periphery of the plume as well as within the target zone of contamination itself. The points should be staggered vertically and laid out in such a way as to allow for adequate coverage of the injectant solution throughout the zone of contamination. Depending on the nature of the formation and the soils acceptance criterion, (i.e. porosity, percolation, existing moisture content… pressure injection may be feasible versus gravity feed for introduction of the injectant solution.) Any points installed should be screened so as to allow for adequate distribution of the injectant solution both laterally and vertically within the formation.

To determine the required volumes of solution, it is necessary to calculate the effective pore space available within the "radius of influence" (ROI) for the depth of the treatment zone for each injection point. Usually, the injectant solution volume should be sufficient to saturate the soils to approximately 30-75% of the available pore space for the treatment point depending on existing moisture content. The injection should entail applying smaller volumes of injectant over a period of time to avoid over saturation of the subsoils in the zone of contamination.

To prepare the injectant solution to the calculated volume, in a mixing tank:

- Add one (1) gallon of EnviroClean concentrate to (33) gallons of water.
- Add nutrients at the rate of (2) pounds per (50) gallons of solution. Water soluble 36-6-6 NPK is recommended.

Inject/apply solution to the point(s) most near the center of plume first, and continue to apply to the wells moving from center-point and finishing at the outside perimeter.

Monitoring or sentinel wells down gradient of the plume should not be used for injection. Caps for all injection points should support passive oxygen availability to the substrate. In some cases low volume forced air blowers, or other sparging processes can provide favorable aerobic conditions. The solution may also be added to any "bioslurping" process to accelerate contaminant removal. If Hydrogen Peroxide is used, make positively sure that it is applied below toxic levels to the microbial populations.

Monitor treatment process (i.e. vapor influent from well points) and repeat process as necessary. Final soil sampling should be performed to verify treatment to target levels.

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Industrial Cleaning Applications of EnviroClean

For Heavily Soiled Oil and Grease on Hard Surfaces

Step One:

- Mix a 6% solution of EnviroClean concentrate with clean water in quantity sufficient to cover contaminated area.
- Apply generous amounts with a spray applicator, or equivalent and allow reasonable time for the surfactants in EnviroClean to penetrate and break down the hydrocarbon and grime. Once applied, solution may be scrubbed or brushed in for stubborn soiling.

Step Two:

- Once the first procedure has been completed, apply EnviroClean solution at 1% -2% through a power washer. (Note: a heated power wash system will expedite the process.)
- Flush residue to containment and dispose of as local rules apply.

EnviroClean will not harm hard or soft surfaces and is user friendly. (General common sense rules apply)

For Lightly Soiled or Freshly Oiled Surfaces

EnviroClean may be used through any power washer or steam jenny currently available. Operating temperatures of 140 degrees F. will maximize effectiveness. Solution strengths of 1%-2% may be used for lighter decontamination duties. For heavier contamination, or where VOC's may be generated as a result of the cleaning activities, solutions from 3%-5% may be used. EnviroClean is effective on most hydrocarbons, fats, oils & grease of petroleum, plant and mineral origin.

- For small applications, a 5% solution (16 oz. EnviroClean concentrate to 2.5 gallons water) of EnviroClean may be applied with a small pump sprayer and scrubbed or brushed into surface.

Be sure to use Best Management Practices (BMP's) and dispose of residue according to applicable regulations.

For Aqueous Parts Washing Applications

EnviroClean is very effective for industrial parts washing applications. EnviroClean is used at light dilutions and has a significant "life of batch" as well as low foaming tendencies. The surfactants in EnviroClean desorb and micro-emulsifies grease and oil contamination and separate it from solids (metal shavings, grit…) allowing them to settle without accumulating oily sludges. These factors make EnviroClean ideal for spray wash systems as well as dip/agitating equipment. Lower wash temperatures (140 degrees F.) are also utilized and shorter wash cycles allow for quicker turnaround of parts and equipment being cleaned.

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Application of Surfactant for "High Intensity Targeted" (HIT) - Enhanced Fluid Recovery (EFR®) of Light Non-Aqueous Phase Liquids (LNAPL)*

The following text will describe in detail the appropriate methodology to conduct a surfactant amended, mobile extraction event for residual free phase product (LNAPL) entrained within the vadose zone/smear zone. This process results in high contaminant mass removal with low effluent volumes generated. This methodology has been employed at a number of Sites and the results have proven this technology as cost effective and viable. The process employs the injection of a surfactant solution followed shortly thereafter with a vacuum extraction event.

The USEPA Office of Underground Storage Tanks, and the New Jersey Department of Environmental Protection hosted a Strategic Technology Exchange Workshop (STEW) for the Regulators from two East Coast federal regions in August of 1998. At the seminar, this process technology was termed "Mobile Multi-Phase Extraction," and since that time the HIT-EFR® process has become widely accepted as a feasible option for residual source area removal. The NJDEP maintains technical guidance for this process on their website: http://www.state.nj.us/dep/srp/regs/guidance.htm

Upon completion of gross free product recovery, or at the point of diminishing returns for such an event, an injected surfactant amendment can maintain, or initiate, maximum levels of product recovery. The use of surfactant will maximize the effective mass removal and minimize the total generated effluent for a typical recovery event. Additionally, tertiary bioremediation of any remaining contaminant will be accelerated during the monitoring phase of the site's life. In some instances, the rapid removal of residual free product will qualify a site for "natural attenuation" programs, or other forms of "passive remediation" with minimal additional site work. (i.e. periodic sampling)

Basic site characterization should be performed and any existing "treatment process" should be reviewed. Particularly, LNAPL thickness, formation type / permeability, presence of receptors, existing monitoring well locations for injection/recovery. Success has been achieved injecting surfactant solution into monitoring wells using a jet pump (as opposed to gravity siphon). If the existing well locations are too far apart, pressure injection using a "grout" pump, "Rupe" pump/Geoprobe to inject, or by installing additional 2 inch wells with Geoprobe or other device based upon depth…for additional coverage is effective.

The primary imperative for developing a proposal is that the injectant solution is adequately distributed throughout the area of subsurface impact for effective treatment.

In general, once the extent of LPH is defined, one can do a quick calculation to determine the approximate volume of LPH remaining (i.e. Pi x r2 x LPH thickness x effective porosity x effective LPH saturation (approx. 0.3 to 0.4) x 7.48 gal/cu feet). Once an estimate of the LPH volume is made, a surfactant solution: LPH ratio of 5:1 by volume is recommended. Another way of calculating injectant volumes is to utilize "available pore space" when residual volume is not effectively calculable. In essence, the injectant solution volume should be at least adequate to saturate the available pore space within the target portion of the formation for the radius of influence for each injection point.

Regarding the effective concentration of the injectant, for light ends like gasoline, a 2% v/v solution of surfactant concentrate (diluted with water) is used. Higher concentrations of surfactant solution should be used for higher end contaminants (i.e. DRO, #6 fuel oil). It should not be necessary to utilize concentrations of solution any higher than 6% v/v for this application. One (5) gallon pail of surfactant concentrate makes up about 250 gallons of 2%, or 150 gallons of approximately 3% injectant solution.

Baseline groundwater sampling is commonly conducted, and recommended, at the wells targeted for treatment and at 1-2 wells downgradient of the injection area (to monitor any mobility). Baseline groundwater sampling may consist of methyl blue active substances (MBAS) via USEPA method 425.1 to identify any surfactant presence.

The surfactant solution injection should occur inside, and around the perimeter, (as best as possible) of the LPH plume (ensuring that the entire horizontal and vertical extent of the plume will come in contact with the surfactant solution). On average, a minimum of approximately 100 gallons of injectant solution into each well should be considered. The actual solution volume required will depend on how much surfactant solution you will be injecting/# wells available, and the aquifer acceptance rate. For permitting purposes, (250) gallons maximum per point has been acceptable and practical. **Effective saturation of the target area is the critical goal.** Surrounding wells may be gauged for mounding to determine your effective injection ROI. The surfactant should equilibrate 24 –48 hours within the formation and the HIT-EFR® event should be conducted shortly thereafter.

It's also recommended to conduct additional surfactant injection during the recovery phase of the project to wash any remaining smear zone impact. The HIT-EFR® event should obviously initiate at the monitoring wells, or other points, which contain most LPH. (It is sometimes practical to manifold the recovery system to allow for multiple point recovery) Typically, a "sealed point" multiphase vacuum recovery process is most effective utilizing a "vac truck." In those situations where vac recovery is not feasible, (deep aquifer) use of a submersible pump(s) is effective. In either case, it is imperative to recover from the groundwater interface and not from within the aquifer itself. Typically, shallow drawdown allows for the treated fluids to be extracted from the groundwater/vadose interface. **Remember that treated fluids will equilibrate to the top of the water table post injection, and this event is designed to maximize mass removal and reduce total effluent.** After about 2-3 hours, the extraction configuration may be altered to recover from other wells within the LPH plume. Concurrent with the extraction, additional surfactant solution may be injected in surrounding wells (i.e. if extraction starts from the center of the plume, additional surfactant solution can be injected into wells around the LPH perimeter. If the extraction configuration changes to the perimeter wells, inject more surfactant into the original extraction wells). The duration of the HIT-EFR® recovery event usually lasts up to 10 hours (or depending on the amount of LPH, may require additional days for recovery), during which time, airflow, well casing vacuum pressure, FID, 02, and LEL measurements are made (air bag lab analysis may be a good idea).

Approximately 2 weeks after the injection/recovery events, the follow-up MBAS sampling and confirmatory groundwater sampling parameters may be conducted at the same wells to ensure that the surfactant and treated LPH has been recovered.

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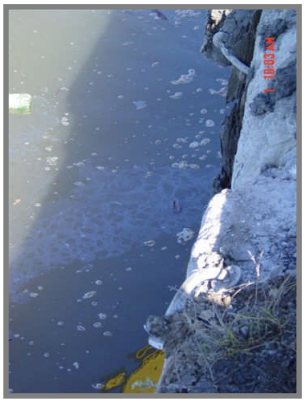
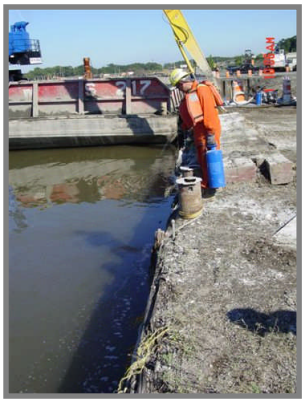
Shoreline / Bulkhead Cleaning Application of EnviroClean

A large excavation of contaminated sediment was being completed in the tidal zone of the lower Hudson River in New York State. As the excavation proceeded and the substrate was disturbed, heavy sheening and free oils were observed within the boomed area. The liberated oils would float to the surface and migrate with the river current to the shoreline within the perimeter boom. The oils would then "smear" and re-sorb onto surfaces thereby impacting the shoreline and bulkhead with the continuing cycles of the tide.





EnviroClean, a USEPA NCP listed Surface Washing Agent (SW #31), was selected and approved for use in treating the entrained and sorbed oils on the exposed surfaces of the shore line and bulkhead. The agent was diluted for use and applied manually to the impacted surfaces with a typical pump spray unit. The EnviroClean solution allowed the oils to release and be recovered by the "soft boom" in place along the perimeter of the area. Additionally, due to the reduction in surface tension, the application of the surface washing agent tended to herd the sheens into oil droplets which were more easily captured by the absorbent booms deployed. This action thereby reduced the surface area and volume of oil exposed to the water surface which would limit fugitive dissolved contamination levels. The application of EnviroClean allowed for a simple and economical means to mitigate impacts from the free oils liberated by the dredging activities.

* *EnviroClean is also very effective for the cleaning and decontaminating of booms and equipment*

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Application of EnviroClean for Degassing and Cleaning of Product Storage Tanks and Other Vessels

This technical guidance is primarily for vessels of less than 50,000 gallon capacity containing Volatiles, Refined Products and other Light Ends (i.e. Gasoline, Condensate, Fuel Oils…).

EnviroClean is very effective in eliminating VOC vapors and LEL'S in tank cleaning applications. When applied as an aqueous solution through typical hot or cold water pressure washing equipment, EnviroClean used in the tank will rapidly mitigate fugitive vapor release from any product residue in the tank. The cleaning process also decontaminates the interior tank surfaces and will not harm any coatings. Treated fluids may be phase separated for hydrocarbon recovery, if desired, and the spent solution is compatible with any wastewater recycling processes.

For Degassing Operations: Use a 5% -6% solution and apply at a rate of one (1) gallon EnviroClean concentrate for each 2,000 gallons of tank size capacity on a pumped out tank.

For Cleaning and Decontamination Operations: Use dilutions of 1% - 3% depending on type of product stored in vessel and degree of contamination (use higher concentrations of EnviroClean solution for heavier hydrocarbons or sludges).

General Procedure:

- Determine what type of fuel is in tank, how long it has been there and the general condition of the tank, if possible.
- Pump out all remaining fuel, vent tank in approved manner and inspect tank for sludge, sediment, scale... (stick tank through open "bung" or manway)
- With EnviroClean solution, spray the walls and bottom of the vessel with a power washer starting at the top and work downward. A wand extension should be used to place the wand approximately one foot above the bottom sludge for proper agitation and to scour the tank bottom surface. If substantial build-up of "bottom" material exists, pre-spray bottom of tank first as noted above and let tank stand for one hour. This will allow for EnviroClean to penetrate rust, scale, sediment ...and liberate hydrocarbon. This effluent should be pumped from tank prior to continuation of washing / degassing work.)
- Tank interior should be thoroughly power washed and any residue thoroughly agitated in the tank.
- Pump out all remaining effluent and take explosion meter reading. If LEL is at appropriate levels continue with project.
- Continue to monitor vapor concentration during any operations involving tank.

*****If tank residue is well aged, tacky, and/or semi solid, use of a hot water unit is recommended*****

It is important to note that if the tank was filled with fuel and has leaked into surrounding soil, EnviroClean can be used effectively for vapor suppression on the soil to neutralize explosive or flammability characteristics as well as reduce exposure to harmful vapor (i.e. benzene) during excavation activities.

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Application of EnviroClean for Vapor Mitigation and Remediation of Tank Bedding Contamination

Once a tank has been effectively degassed with the EnviroClean solution, entry is typically made to perform necessary service work relative to API 633 inspection, or other service requirement. Frequently, upon initiation of "hot work" or initial exploration in the "dead" tank by the service company, the floor plating is usually punctured as a function of replacement or service work. This can occur anywhere from the annular ring to the center of the tank depending on specifics of each Maintenance/Repair or "hot work plan."

If the tank flooring has leaked during storage, head generated has forced product to saturate the bedding, or voids, under the floor plating. This can be localized or complete. When the product has been removed from the tank, and pressure released on the floor, the plating can "buckle" and void spaces will occur between the bedding material, if any, and the flooring. These areas can contain free product and also concentrated vapor. If this occurs in an area where free product is physically held at a gradient (i.e. towards the middle of a sump center tank) the effect can be "artesian" in that free product will spew from the exploratory perforation(s).

This situation causes immediate disruption of work schedule and subsequent priorities due to constant regeneration of vapor - typically exceeding entry allowances. Unfortunately, this can become considerably costly in terms of extending out of service time, not to mention additional costs to rectify the problem.

EnviroClean has proven to be dramatically effective in eliminating the source of this vapor and providing for a low cost means of remediating the bedding contamination.

A common and effective means of mitigating the vapor hazard and remediating the tank bedding is to utilize a “flushing and recovery” technique with a dilute solution of EnviroClean. Typically a 3%-5% solution of EnviroClean and water is utilized in a batch process to treat the impacted portions of the tank floor area.

Simply perforating the affected floor area with a "buster" or hole saw and allowing the EnviroClean solution to flood the affected bedding will eliminate immediate, and future, recurrences of vapor generation. The process also serves to remediate the contamination by flushing entrained hydrocarbon out of the bedding for recovery and disposal, or re-processing. If necessary, the entire sub-floor area may be treated by saturating the zone of contamination and flushing the fluid to the sump, or other collection point, and recovering the rinsate for disposal.

Depending upon the severity of the leak, and the resultant degree of subfloor contamination, the EnviroClean solution can be applied so as to simply saturate the bedding material, or it can be injected so as to flush and recover gross quantities of hydrocarbon. A simple work plan can be developed for either of these scenarios, and would be advisable to maintain as a standard operating procedure (S.O.P.) for use in the event the condition is discovered.

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