James P. Bowers, PE
R. William Rudolph, Jr., PE

July 22, 1993
SCI 727.001

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STID 1315

Mr Rich Hiett
Regional Water Quality Control Board
2101 Webster Street, Suite 500
Oakland, California 94612

Groundwater Disposal
Coulter Steel and Forge Company
722 Folger Avenue/Diesel Fuel Area
Emeryville, California

Dear Mr. Hiett:

Subsurface Consultants, Inc. (SCI) has been retained by Coulter Steel and Forge Company to oversee cleanup activities at the referenced site. To date, approximately 5000-gallons of groundwater have been removed and stored on-site in an above grade tank. A sample of the stored groundwater contained 8 mg/L of total extractable hydrocarbons as diesel and nondetectable levels of benzene, toluene, ethylbenzene and xylene. SCI petitioned the East Bay Municipal Utility District (EBMUD) to accept the water for treatment at their wastewater treatment facility. However, as the attached letter indicates, EBMUD ordinances do not allow untreated groundwater to be discharged into the sanitary sewer.

We understand that the Regional Water Quality Control Board is currently regulating one time discharges of treated groundwater into the storm sewer system under the National Pollutant Discharge Elimination System (NPDES) program. As such, SCI would appreciate board consideration of the following treatment and disposal plan for the groundwater now stored on-site.

The stored groundwater will be bioremediated using, Munox 112, a dry bacteria mixture consisting of Pseudomonas putida and Pseudomonas fluorescens. Munox 112 has been shown by others to be effective at bioremediating petroleum contaminated water. A specifications sheet for Munox 112 is attached.

The Munox 112 bacteria will be added to the stored groundwater at a dosage suggested by the manufacturer. Once the bacteria has been added, the water will be aerated and agitated using on-site air compressor equipment. After approximately 2 weeks, the water will

be sampled and analyzed for diesel and BTEX. If the results indicate nondetectable concentrations, then the water will be discharged into the nearest storm sewer manhole. If detectable diesel concentrations are still present, then an additional "dose" of bacteria will be added and biotreatment will continue until nondetectable results are obtained.

SCI is ready to implement this plan once we have board approval.

If you have any questions, please call.

Yours very truly,

Jeriann Alexander

Jeriann N. Alexander
Civil Engineer 40469 (expires 3/31/95)

MFW:JNA:egh

Attachments: EBMUD letter dated July 9, 1993
Munox 112 Specifications Sheets

cc: Mr. Dante Sambajon
✓Ms. Susan Hugo

EAST BAY
MUNICIPAL UTILITY DISTRICT

MICHAEL J. WALLIS
DIRECTOR OF WASTEWATER

July 9, 1993

Ms. Jeri Alexander
Subsurface Consultants
171 12th St. Suite 201
Oakland, CA 94607

RE: Response to Discharge Request of Groundwater

Dear Ms. Alexander,

This letter is in response to your request to discharge groundwater on a onetime basis.

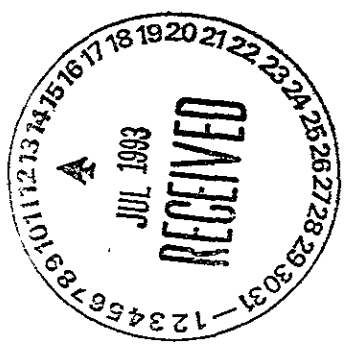
East Bay Municipal Utility District's Ordinance Number 311 Section 2.c.(1) prohibits the discharge of untreated groundwater to the sanitary sewer. No waiver can be granted for this Ordinance condition.

If you have any questions, please call me at (510) 287-1641.

Sincerely,

ROBERT NEWMAN
Wastewater Control Representative

RDN:rdn



P.O. BOX 24055 . OAKLAND . CA 94623-1055 . (510) 287-1405
BOARD OF DIRECTORS KATHERINE McKENNEY . STUART FLASHMAN . ANDREW COHEN
JOHN A. COLEMAN . JOHN M. GIOIA . NANCY J. NADEL . KENNETH H. SIMMONS

OSPREY Biotechnics
2530 B Trailmate Drive | Post Office Box 758
Sarasota Fl 34243 | Oneco Fl 34264
Phone (813) 755-7770 Fax (813) 755-0625

Product Specifications

Munox™ 112

(MUNOX B, MUNOX C, MUNOX E)

AN INOCULANT FOR ENHANCING BIOLOGICAL OXIDATION

DESCRIPTION

Fine white powder of hydrocarbon degrading freeze dried strains of bacteria. The product is shipped in dry ice and must be stored at 10°F or below.

CONTAINERS

Eight ounce bags with inside foil liner.

COMPOSITION

Hydrocarbon degrading mixed bacteria concentrate consisting of Pseudomonas putida and Pseudomonas fluorescens.

LOT NUMBERING SYSTEM

Consists of five digits stamped on the top of each bag.

MICROBIOLOGICAL STANDARDS

Each lot is routinely tested for the absence of the following undesirable organism:

Xanthomonas sp	Absent by Test
Salmonella/Shigella sp.	Absent by Test

ACTIVITY

Each lot of MUNOX 112 inoculant has sufficient viable Pseudomonas count to provide minimum of 1 x 10^9 viable Pseudomonas cells per gram at time of shipment.

Growth of MUNOX 112 in presence of naphthalene.

Growth of MUNOX 112 in presence of tributyrin.

Growth of MUNOX 112 in presence of hexane.

5. Incubate plates for 48 h at 35° +/- 2°C.

6. Count colonies. Colonies x dilution factor gives viable cell count per ml.

II. EXAMINATION OF ABSENCE OF UNDESIRABLE ORGANISM

A. Xanthomonas (According to Laboratory Guide for Indentification of Plant Pathogenic Bacteria, 1980, The American Phytopathological Society, St. Paul, MN. N.W. Schaad ed., p.2).

Preparation of Yeast extract - dextrose - $CaCO_3$, Agar (YDC Agar).

Yeast extract 10.0 g calcium carbonate (finely ground powder) 20.0 g, Agar 15.0 g distilled water 900 ml.

Autoclave 15 min. at 121°C. Cool to 50°-55°^C in a water bath and aseptically add filter sterilized 100 ml - 20% dextrose solution (20 g dextrose into 100 ml distilled water). Mix well and pour into sterile petri dishes. (Caution: Keep swirling before pouring for $CaCO_3$ to be suspended). Dry plates 24h at room temperature before use.

Aseptically transfer 0.1 ml from 10^{-6} dilution prepared for viable cell count (above - B) to YDC Agar plate and spread evenly onto the surface of duplicate plate with a sterile bent glass rod. Incubate plates 48 h at 24°C. Examine above plate for colonies conforming to the following description:

YDC Agar - yellow or orange colonies. Check colonies microscopically for characteristic gram negative rods.

B. Salmonella (According to A.O.A.C. 14th Edition, 1984, pp. 963-969).

Pre-Enrichment
Aseptically transfer 10g from each of the F, M, and L containers from the production lot into 500 ml wide-mouth flask containing 270 ml of sterile lactose broth (Difco Cat. No. 10004-01-5 or equivalent). Cap, mix by shaking and, if necessary, adjust pH to 6.8 +/- 0.2 with sterile 1.0 N NaOH or 1.0 N HCl. Loosen cap about 1/4 turn and incubate 24 h +/- 2 h at 35°C.

III. MUNOX™ 112 ACTIVITY TESTS.

A. DETERMINATION OF GROWTH OF MUNOX 112 IN PRESENCE OF TRIBUTYRIN (LIPOLYTIC ACTIVITY). (MUNOX C COMPONENT STRAIN)

Aseptically transfer 0.1 ml from the 10^{-6} dilution prepared for viable cell count (above C) to Nutrient-Tributyrin Agar plate (See below for composition) and spread evenly onto the surface with a sterile bent glass rod. Incubate plate 72 h at 24°C.

Examine above plate for colonies conforming to the following description.

NA-Tributyrin Agar - Lipolytic colonies are indicated by a transparent zone surrounding the colony on an opaque background.

Procedure for preparation of Nutrient-Tributyrin Agar

1. Prepare Nutrient Agar (Difco Cat. No. or equivalent) as per manufacturer's direction. Add 2 drops of antifoam (use 1.0 ml pipet) and autoclave at 121°C for 15 min.
2. Autoclave 99% tributyrin (Fisher Brand Cat. No. or equivalent) separately at 121°C for 15 min.
3. Cool both to 50°C and mix 1% tributyrin (ml tributyrin per 100 ml NA) in a sterile blender jar.
4. Blend the mixture for 1 min. at high speed.
5. Immediately pour approximately 20 ml NA-Tributyrin Agar per sterile plastic plates.
6. Store plates in refrigerator. Dry plates before use.

B. DETERMINATION OF GROWTH OF MUNOX 112 IN PRESENCE OF NAPHTHALENE. (MUNOX B COMPONENT STRAIN)

1. Aseptically transfer 0.1 ml (use 1.0 ml pipet) from the 10^{-6} dilution sample to the dried surface of sterile MAO-HUNTERS-METAL "44" agar plates. (See below for composition).
2. Using sterile bent glass rod, aseptically distribute 0.1 sample uniformly on surface of MAO-44 agar.

MATERIAL SAFETY DATA SHEET

Prepared 1/23/92
Supersedes:

N.A. = DOES NOT APPLY
N.K. = NOT KNOWN

SECTION I IDENTIFICATION

Manufacturer's Name
OSPREY BIOTECHNICS, INC

Emergency Telephone Number
813/755-7770

Address (Number, Street, City, State, and Zip Code)
25308 Trailmate Drive, Sarasota, FL 34243

Chemical Name and Synonyms
BACTERIAL INOCULANT FOR WASTEWATER

Trade Name and Synonyms
MUNOX®

Chemical Family N.A. CAS NUMBER: N.A.
Formula N.A.

SECTION II - HAZARDOUS INGREDIENTS

MATERIAL OR COMPONENT	CAS NUMBER	%
PROPRIETARY BLEND OF INORGANIC SALTS		MORE THAN ONE %

SECTION III - PHYSICAL DATA

Boiling Point (°F)	N.A.
Specific Gravity 2.26	2.26
Vapor Pressure (mm Hg.)	
Percent Volatile by Volume (%)	N.A.
Vapor Density (AIR=1) 2.9	2.9
Evaporation Rate	N.K.
Solubility in-Water	SOLUBLE

Appearance and Odor
White to off white powder.

Add to sterile Noble Agar and H_2O (10g/500 ml distilled H_2O) the following soloutions:

20 ml: of solution A
10 ml: of solution B
5 ml: of solution C

IV. MONITORING STABILITY OF CULTURE DURING STORAGE AT MINUS 20° OR BELOW

Collect twelve bags of MUNOX 112 from production run and store in production frezer use in monitoring storage stability.

One month after MUNOX 112 is manufactured and every month there after for a total of one year or until the product is depleted from stock, perform viable cell count following procedure in Section C.

-END-

Approved by _____Date_____
John E. Hill, Ph.D., Director
Applications Development

Read and Understood by_____Date_____