

CytoCulture

ENVIRONMENTAL
BIOTECHNOLOGY



A DIVISION OF CYTOCULTURE INTERNATIONAL INC.

89 NOV 27 AM 11:46

July 17, 1989

Mr. William Meckel
Source Control Division
EAST BAY MUNICIPAL UTILITY DISTRICT
Mail Stop 59 P.O. Box 24055
Oakland, CA 94623

RE: Wastewater Discharge Permit (Groundwater Treatment)
EBMUD Account No. 001-00002
Fourth monthly report of treatment and discharge operations
for JUNE 1989

CytoCulture/Sybron Chemicals are herein reporting on the results for the fourth month of continuous biological treatment of diesel-contaminated groundwater and discharge of the treated water into an EBMUD interceptor at the former P.I.E. Nationwide truck terminal in Emeryville. Laboratory analytical results are enclosed along with our Daily Facility Log Sheets.

SUMMARY OF EVENTS AND OPERATIONS IN JUNE

Operating Conditions at Beginning of Month

At the end of May, both bioreactor systems were in continuous operation processing diesel-contaminated groundwater at a rate of 2.5 to 3 gpm (3,400 to 4,000 gpd). Free product was collected routinely now that an efficient oil recovery system has been established. From the system start up on March 2 through May 31, approximately 145,000 gallons of contaminated groundwater had been treated by the combined north and south bioreactor systems.

A system interruption caused by unusually high levels of free product recovery resulted in a shut-down for nearly two weeks. The excess aged diesel oil product was recovered from the bioreactors and stored in tight-lid drums on site. The systems were re-stabilized to pre-interruption operating conditions. Oil-water separators were re-installed upstream of the bioreactors to recover free product thereafter. Approximately 15 gallons of free product was recovered in the last week of May.

Influent total petroleum hydrocarbon levels in May had been in the range of 0 to 800 ppm. During the period when excess free product was present in the bioreactors, TPH within the system reached 1,400 ppm (no effluent water flow was permitted until the system re-equilibrated with greatly reduced levels of TPH).

In May, influent BTXE levels were variable, ranging from zero to 320 ppb for toluene and zero to 800 ppb for xylenes. Except for an initial effluent TPH reading of 6 ppm in the southwest bioreactor after the system interruption, all treated water effluent discharges registered as non-detectable for all of these constituents; a healthy bacterial floc settled out in about one hour to leave a clear, transparent and odorless supernatant. Samples of this treated water are available for inspection.

Groundwater Treatment in June

On June 1, the south extraction trench flow rate was running consistently at 1.5 gpm through both bioreactor systems for a net flow of 3 gpm. The oil skimmer operating in the east well of the south extraction trench consistently recovered free product. An effluent sample (E-55) taken on this day for routine analysis revealed a week later that the system was not adequately cleaning the groundwater. Routine ammonium and phosphate readings indicated that the nutrient levels were normal. Visual inspection of the cultures confirmed the presence of a good floc, but some free product was discovered in the bioreactors.

To improve performance, the aerators were cleaned out during routine inspection and maintenance on June 4. Nutrient flow into the bioreactors was increased to compensate for the higher COD. Effluent discharge samples taken over the next three days (E-56, E-57, E-58) continued to indicate a system problem with effluent TPH levels reported at 50, 39, 17 ppm, respectively. The maintenance work (increased airflow and nutrient rate) appeared to be correcting the problem as indicated by the daily 30-50% reduction in TPH levels thereafter. BTXE values for the discharged effluent were consistently non-detectable, so the operation was not in violation of the EBMUD permit during this period of poor system performance.

During this first week of June, an estimated 30-40 gallons of free product was recovered as the south trench well pump continued to skim the oil plume along the south boundary of the property. We believe some of this free product was accidentally passed from the oil/water skimmers to the bioreactors during the last few days of May. This unusually high hydrocarbon load apparently overloaded the bioreactors temporarily. Treatment flow rate was consistently 3 gpm for the combined system during this time.

By June 9, flow rate from the north trench began to wane and the overall system effluent discharge rate dropped to 1.3 gpm. An influent sample taken from the south system (I-60S) indicated an incoming levels of TPH at 210 ppm, benzene at 100 ppb, toluene at 13 and xylene at 20 ppb. The corresponding effluent sampled the same day (E-59) confirmed that the system's performance had been restored with non-detectable discharge levels of TPH and BTXE.

The system continued to function properly through June 20 (effluent levels remained N.D. for TPH and BTXE). A compressor problem was discovered on June 20 causing the system to be shut down for repairs until June 26. During this time, the bioreactors were maintained in normal operation. The system was started up slowly at a combined flow rate of 2 gpm. As with other shut downs, the 2000 gallon holding tank full of cleaned water was used for landfarming the year-old contaminated soil on site from the original trenching operations. The tank was then used to collect bioreactor treated water during the re-start for verification of adequate treatment prior to discharge into the EBMUD interceptor. Samples taken on June 29 and 30 (with 24 hour turn-around time) confirmed proper treatment at 2 gpm with non-detectable discharge levels of TPH and BTXE.

Free product recovery was estimated to be 150 gallons during the month of June, primarily skimmed off the groundwater in the south trench. P.I.E. was issued a hazardous waste generator number by the state (arranged by Blymyer & Sons Engineers, Inc.) to allow the oil to be hauled for recycling.

SUMMARY OF GROUNDWATER TREATMENT RATES

Dates	Average Flow	Net Volume
June 1-20	2.52	72,500 gal
June 26-30	2	13,500 gal
Estimated volume of treated water in June:		86,000 gal
March-May:		145,000 gal
Total groundwater treated to date:		231,000 gal

LABORATORY ANALYSIS OF GROUNDWATER TREATMENT SAMPLES

Tests run by Curtis & Tompkins, Ltd. on samples collected by CytoCulture field technicians:

- 1) EPA 602 - Volatile Aromatic Hydrocarbons in Water
- 2) EPA 8015 (modified) - Total Extractable Petroleum Hydrocarbons in Aqueous Solutions (TPH/TEH)

ND = Not Detectable; Detection limits for BTXE, ND = 1 ug/L;
for TPH, ND = 0.5 mg/L

<u>No.</u>	<u>Date</u>	<u>Description / Comment</u>	<u>ug/L (ppb)</u>			<u>mg/L(ppm)</u>
			<u>Benz.</u>	<u>Tol.</u>	<u>Xyl.</u>	<u>TPH/TEH</u>
E-55	6/1	Combined N/S Effluent 3 gpm	ND	ND	ND	38
E-56	6/4	Combined N/S Effluent 3 gpm	ND	ND	ND	50
E-57	6/5	Combined N/S Effluent 3 gpm	ND	ND	ND	39
E-58	6/7	Combined N/S Effluent 3 gpm	ND	ND	ND	17
E-59	6/9	Combined N/S Effluent 1.3 gpm	ND	ND	ND	ND
I-60S	6/9	South trench INFLUENT	100	13	20	210
E-61	6/13	Combined N/S Effluent 3 gpm	ND	ND	ND	ND
E-62	6/16	Combined N/S Effluent 3 gpm	ND	ND	ND	ND
E-63	6/28	Combined N/S Effluent 2 gpm	ND	ND	ND	ND
E-64	6/29	Combined N/S Effluent 2 gpm	ND	ND	ND	ND
E-65	6/30	Combined N/S Effluent 2 gpm	ND	ND	ND	ND

Effluent treated water discharged into the EBMUD interceptor at the end of June was at non-detectable levels of BTXE and total extractable petroleum hydrocarbons. Upon standing 20 minutes to allow the bacterial floc to settle, this treated water appears clear and odorless. Independent monthly sampling and testing for priority pollutants by EBMUD confirm these results.

GENERAL OPERATION NOTES

Aeration and mixing are continuous, providing saturated oxygen levels in the water and little accumulation of sediment on the bottom of the tanks. The aeration blower and air compressor for powering the pneumatic well pumps in the extraction trenches performed very well in the field. After proper adjustment, the well pumps themselves now easily deliver 2 gpm apiece (there are two wells per trench), although the tidally influenced north well works intermittently.

Daily observations of the turbidity, color and foam accumulation confirmed that the bioreactors were maintaining healthy bacterial cultures. Continual diammonium phosphate addition is supposed to keep ammonium nitrogen levels at 10 ppm or greater, and ortho phosphate levels at 5 ppm or greater, to ensure adequate nutrients for full degradation of the diesel COD. When the bioreactors were overwhelmed with free-product, the nutrient addition rate is increased to support the greater biomass.

All discharges of treated water leaving either bioreactor system are directed first to the 2,000 gallon aerated holding tank. This tank continues to serve as a final "polishing" step in the biological treatment process by extending the actual retention rate of contaminated water within the system.

Soil infiltration with treated water and bacterial cultures will utilize the effluent from the 2,000 gallon aerated holding tank which is now being discharged into the EBMUD interceptor.

UPDATE ON REINFILTRATION PLANS

CytoCulture plans to construct a series of infiltration galleries under the parking lot pavement along both sides of building D (upfield of both the north and south extraction trenches in an attempt to achieve some "hydraulic control" of infiltrated water). Please refer to CytoCulture's Phase II Report and Operational Plan for details on the proposed infiltration program for seeding contaminated soil with bacteria.

The Regional Water Quality Control Board (SF Bay Region) is giving consideration to CytoCulture's request to reinfiltrate the treated water with bacteria and nutrients. Meetings with this group are anticipated later this month.

Randall J. von Wedel, Ph.D.
Project Director

CytoCulture Bioremediation Project
for P.I.E. Nationwide former Truck Terminal Site
Emeryville, CA

Laboratory Analytical Results for June 1989
including BTXE and TPH/TEH Data
provided by Curtis & Tompkins, Ltd.

Each sample data set is preceded by the
corresponding Chain of Custody sheet

17496

Curtis & Tompkins, Ltd
 2323 Fifth Street
 Berkeley, California 94710
 (415) 486-0900

Chain of Custody Form

Samplers _____

Job Description Pie Emeryville

Job Number 467

Client Contact Kandall

Recorder _____

ANALYSIS REQUESTED									
EPA 601/8010									
EPA 602/8020									
EPA 624/8240									
EPA 625/8270									
Title 22 Metals									
EPA PP Metals (#)									
TPH Method- IEL									
Benzene-Toluene-Xylene (s)									
Oil and Grease									
EPA 608/8080 Pesticides & PCB's									

Matrix				#Containers	Method Preserved					Sample Number	Sampling Date				SAMPLE NOTES
Water	Soil	Waste	Oil		H ₂ SO ₄	HNO ₃	Ice	None	Other		Yr	Mo	Dy	Time	
X						X				E35	9	9	6	61	Effluent @ 3pm

Laboratory Notes :

Normal TAT

Chain of Custody Record

Relinquished by: (signature) Date/Hr <i>[Signature]</i>	Received by (signature)
Relinquished by: (signature) Date/Hr	Received by (signature)
Relinquished by: (signature) Date/Hr	Received by (signature)
Relinquished by: (signature) Date/Hr	Received by (signature)
Dispatched by: (signature) Date/Hr	Received for Lab by (signature) <i>[Signature]</i>

LABORATORY NUMBER: 17496
 CLIENT: CYTO CULTURE
 JOB LOCATION: PIE EMERYVILLE

DATE RECEIVED: 06/01/89
 DATE ANALYZED: 06/02/89
 DATE REPORTED: 06/14/89
 PAGE 3 OF 3

Benzene, Toluene, Ethyl Benzene, Xylenes by EPA 8020
 Extraction by EPA 5030 Purge and Trap

LAB ID	CLIENT ID	BENZENE (ug/L)	TOLUENE (ug/L)	TOTAL XYLENES (ug/L)	ETHYL BENZENE (ug/L)
17496	E-55	ND(1)	ND(1)	ND(1)	ND(1)

QA/QC SUMMARY

%RECOVERY 99

LABORATORY NUMBER: 17496
 CLIENT: CYTO CULTURE
 LOCATION: PIE EMERYVILLE

DATE RECEIVED: 06/01/89
 DATE ANALYZED: 06/09/89
 DATE REPORTED: 06/14/89
 PAGE 2 OF 3

Extractable Petroleum Hydrocarbons in Aqueous Solutions
 EPA 8015 (Modified)
 Extraction Method: EPA 3510

LAB ID	CLIENT ID	GASOLINE (mg/L)	KEROSINE (mg/L)	DIESEL (mg/L)	OTHER (mg/L)
17496	E-55	ND(0.5)	ND(0.5)	38*	ND(0.5)

* Fingerprint pattern does not match Hydrocarbon standards. Quantitation based on largest peaks within C12-C22 boiling range.

ND = Not Detected; Limit of detection in parentheses.

QA/QC SUMMARY

RPD, %	3
Spike: % Recovery	98

Curtis & Tompkins, Ltd

2323 Fifth Street
Berkeley, California 94710
(415) 486-0900

Chain of Custody Form

Samplers JPH

Job Description PIC

Job Number 1470

Client Contact John Humphries

Recorder JPH

ANALYSIS REQUESTED

EPA 601/8010	
EPA 602/8020	
EPA 624/8240	
EPA 625/8270	
Title 22 Metals	
EPA PP Metals (#)	
TPH Method-TEH	
Benzene-Toluene-Xylene(s)	
Oil and Grease	
EPA 608/8080 Pesticides & PCB's	

Matrix				#Containers	Method Preserved					Sample Number	Sampling Date				SAMPLE NOTES
Water	Soil	Waste	Oil		H2SO4	HNO3	Ice	None	Other		Yr	Mo	Dy	Time	
							X			6-56	6	4	12:00	Effluent	
							X			6-57	6	5	14:30	"	
							X			6-58	6	7	10:00	"	

Laboratory Notes :

1 week TAT

No Big Hurry.

3 gal effluent flow rate.

-JH

Chain of Custody Record

Relinquished by: (signature) Date/Hr <u>[Signature]</u> 6/7/91	Received by (signature) <u>[Signature]</u> 10:00 AM
Relinquished by: (signature) Date/Hr	Received by (signature)
Relinquished by: (signature) Date/Hr	Received by (signature)
Relinquished by: (signature) Date/Hr	Received by (signature)
Dispatched by: (signature) Date/Hr	Received for Lab by (signature) <u>[Signature]</u> 6/7

LABORATORY NUMBER: 17535
 CLIENT: CYTO CULTURE
 JOB LOCATION: PIE EMERYVILLE

DATE RECEIVED: 06/07/89
 DATE ANALYZED: 06/07/89
 DATE REPORTED: 06/14/89
 PAGE 3 OF 3

Benzene, Toluene, Ethyl Benzene, Xylenes by EPA 8020
 Extraction by EPA 5030 Purge and Trap

LAB ID	CLIENT ID	BENZENE (ug/L)	TOLUENE (ug/L)	TOTAL XYLENES (ug/L)	ETHYL BENZENE (ug/L)
17535-1	E-56	ND(1)	ND(1)	ND(1)	ND(1)
17535-2	E-57	ND(1)	ND(1)	ND(1)	ND(1)
17535-3	E-58	ND(1)	ND(1)	ND(1)	ND(1)

QA/QC SUMMARY

%RPD	
%RECOVERY	3
	100

LABORATORY NUMBER: 17535
 CLIENT: CYTO CULTURE
 LOCATION: PIE EMERYVILLE

DATE RECEIVED: 06/07/89
 DATE ANALYZED: 06/13/89
 DATE REPORTED: 06/14/89
 PAGE 2 OF 3

Extractable Petroleum Hydrocarbons in Aqueous Solutions
 EPA 8015 (Modified)
 Extraction Method: EPA 3510

LAB ID	CLIENT ID		GASOLINE (mg/L)	KEROSINE (mg/L)	DIESEL (mg/L)	OTHER (mg/L)
17535-1	E-56	6/4	ND(0.5)	ND(0.5)	50*	ND(0.5)
17535-2	E-57	6/5	ND(0.5)	ND(0.5)	39*	ND(0.5)
17535-3	E-58	6/7	ND(0.5)	ND(0.5)	17*	ND(0.5)

* Fingerprint pattern does not match Hydrocarbon standards. Quantitation based on largest peaks within C12-C22 boiling range.

ND = Not Detected; Limit of detection in parentheses.

QA/QC SUMMARY

RPD, %		1
Spike: % Recovery		93

Curtis & Tompkins, Ltd
 2323 Fifth Street
 Berkeley, California 94710
 (415) 486-0900

Chain of Custody Form

Samplers JPH

Job Description DIE

Job Number Cyto

Client Contact John Humphries

Recorder JPH

ANALYSIS REQUESTED										
EPA 601/8010	EPA 602/8020	EPA 624/8240	EPA 625/8270	Title 22 Metals	EPA PP Metals (#)	TPH Method- T&H	Benzene-Toluene-Xylene(s)	Oil and Grease	EPA 608/8080 Pesticides & PCB's	

Matrix				Method Preserved						Sample Number	Sampling Date				SAMPLE NOTES	
Water	Soil	Waste	Oil	# Containers	H ₂ SO ₄	HNO ₃	Ice	None	Other		Yr	Mo	Dy	Time		
X								X		8	9	06	09	12	20	Effluent
X								X		8	9	06	09	12	20	Influent 1.3 gpa

Laboratory Notes :

Chain of Custody Record	
Relinquished by: (signature) Date/Hr <i>JPH</i>	Received by (signature)
Relinquished by: (signature) Date/Hr	Received by (signature)
Relinquished by: (signature) Date/Hr	Received by (signature)
Relinquished by: (signature) Date/Hr	Received by (signature)
Dispatched by: (signature) Date/Hr	Received for Lab by (signature) <i>John Humphries</i>

LABORATORY NUMBER: 17562-1
 CLIENT: CYTO CULTURE
 SAMPLE ID: E59

DATE RECEIVED: 06/09/89
 DATE ANALYZED: 06/09/89
 DATE REPORTED: 06/20/89
 PAGE 3 OF 4

EPA 602: Volatile Aromatic Hydrocarbons in Water

COMPOUND	RESULT ug/L	DETECTION LIMIT ug/L
Benzene.....	ND	1
Toluene.....	ND	1
Ethyl Benzene.....	ND	1
Total Xylenes.....	ND	1
Chlorobenzene.....	ND	1
1,4-Dichlorobenzene.....	ND	1
1,3-Dichlorobenzene.....	ND	1
1,2-Dichlorobenzene.....	ND	1

ND = None Detected

QA/QC SUMMARY

RPD %	10
SPIKE RECOVERY %	97

LABORATORY NUMBER: 17562-2
 CLIENT: CYTO CULTURE
 SAMPLE ID: I60S

DATE RECEIVED: 06/09/89
 DATE ANALYZED: 06/09/89
 DATE REPORTED: 06/20/89
 PAGE 4 OF 4

EPA 602: Volatile Aromatic Hydrocarbons in Water

COMPOUND	RESULT ug/L	DETECTION LIMIT ug/L
Benzene.....	100	1
Toluene.....	13	1
Ethyl Benzene.....	ND	1
Total Xylenes.....	20	1
Chlorobenzene.....	ND	1
1,4-Dichlorobenzene.....	ND	1
1,3-Dichlorobenzene.....	ND	1
1,2-Dichlorobenzene.....	ND	1

ND = None Detected

QA/QC SUMMARY

RPD %	10
SPIKE RECOVERY %	97

LABORATORY NUMBER: 17562
 CLIENT: CYTO CULTURE

 DATE RECEIVED: 06/09/89
 DATE ANALYZED: 06/16/89
 DATE REPORTED: 06/20/89
 PAGE 2 OF 4

 Extractable Petroleum Hydrocarbons in Aqueous Solutions
 EPA 8015 (Modified)
 Extraction Method: EPA 3510

LAB ID	CLIENT ID	GASOLINE (mg/L)	KEROSINE (mg/L)	DIESEL (mg/L)	OTHER (mg/L)
17562-1	E-59	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)
17562-2	I-60S	ND(0.5)	ND(0.5)	210*	ND(0.5)

* Fingerprint pattern does not match Hydrocarbon standards. Quantitation based on largest peaks within C12-C22 boiling range.

ND = Not Detected; Limit of detection in parentheses.

QA/QC SUMMARY

RPD, %		1
Spike: % Recovery		101

17900

Curtis & Tompkins, Ltd

2323 Fifth Street
Berkeley, California 94710
(415) 486-0900

Chain of Custody Form

Samplers JPH

Job Description PIE

Job Number Cyto

Client Contact JP Humphries

Recorder JPH

Matrix				# Containers	Method Preserved					Sample Number	Sampling Date				SAMPLE NOTES		
Water	Soil	Waste	Oil		H ₂ SO ₄	HNO ₃	Ice	None	Other		Yr	Mo	Dy	Time			
<input checked="" type="checkbox"/>				3						E-61	8	9	06	13	11	00	Effluent 3gpm

ANALYSIS REQUESTED											
EPA 601/8010	EPA 602/8020	EPA 624/8240	EPA 625/8270	Title 22 Metals	EPA PP Metals (#)	TPH Method- TPH	Benzene-Toluene-Xylene (s)	Oil and Grease	EPA 608/8080 Pesticides & PCB's		

Laboratory Notes :

Chain of Custody Record	
Relinquished by: (signature) Date/Hr <i>JPH</i> 8/13 11:00 AM	Received by (signature)
Relinquished by: (signature) Date/Hr	Received by (signature)
Relinquished by: (signature) Date/Hr	Received by (signature)
Relinquished by: (signature) Date/Hr	Received by (signature)
Dispatched by: (signature) Date/Hr	Received for Lab by (signature) <i>Allyson</i>

LABORATORY NUMBER: 17586-1
 CLIENT: CYTO CULTURE
 LOCATION: PIE EMERYVILLE

DATE RECEIVED: 06/13/89
 DATE ANALYZED: 06/20/89
 DATE REPORTED: 06/26/89
 PAGE 2 OF 3

Extractable Petroleum Hydrocarbons in Aqueous Solutions
 EPA 8015 (Modified)
 Extraction Method: EPA 3510

LAB ID	CLIENT ID	GASOLINE (mg/L)	KEROSINE (mg/L)	DIESEL (mg/L)	OTHER (mg/L)
17586-1	E-61	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)

ND = Not Detected; Limit of detection in parentheses.

QA/QC SUMMARY

RPD, %	2
Spike: % Recovery	97



LABORATORY NUMBER: 17586-1
CLIENT: CYTO CULTURE
JOB LOCATION: PIE EMERYVILLE

DATE RECEIVED: 06/13/89
DATE ANALYZED: 06/13/89
DATE REPORTED: 06/26/89
PAGE 3 OF 3

Benzene, Toluene, Ethyl Benzene, Xylenes by EPA 8020
Extraction by EPA 5030 Purge and Trap

LAB ID	CLIENT ID	BENZENE (ug/L)	TOLUENE (ug/L)	TOTAL XYLENES (ug/L)	ETHYL BENZENE (ug/L)
17586-1	E-61	ND(1)	ND(1)	ND(1)	ND(1)

ND = Not detected; Limit of detection in parentheses.

QA/QC SUMMARY

%RPD	12
%RECOVERY	101

Curtis & Tompkins, Ltd

2323 Fifth Street
Berkeley, California 94710
(415) 486-0900

Chain of Custody Form

Samplers JH

Job Description PIE

Job Number Cyto

Client Contact J. Humphries

Recorder JH

ANALYSIS REQUESTED

EPA 601/8010	EPA 602/8020	EPA 624/8240	EPA 625/8270	Title 22 Metals	EPA PP Metals (#)	TPH Method- <u>TCX</u>	Benzene-Toluene-Xylene(s)	Oil and Grease	EPA 608/8080 Pesticides & PCB's
						X			

Matrix				#Containers	Method Preserved					Sample Number	Sampling Date				SAMPLE NOTES		
Water	Soil	Waste	Oil		H2SO4	HNO3	Ice	None	Other		Yr	Mo	Dy	Time			
X				1			X			E-63	8	9	06	28	13	45	Zygotic, No Flow No Flow
X				2			X			E-63	8	9	06	28	13	45	

Laboratory Notes :

24 hrs. on TPH would be best, asap.

BTXE soon too....

Thanks

Chain of Custody Record

Relinquished by: (signature) Date/Hr <u>[Signature]</u> 6/28 13:45	Received by (signature)
Relinquished by: (signature) Date/Hr	Received by (signature)
Relinquished by: (signature) Date/Hr	Received by (signature)
Relinquished by: (signature) Date/Hr	Received by (signature)
Dispatched by: (signature) Date/Hr	Received for Lab by (signature) <u>[Signature]</u> 6/28/89

13:45

LABORATORY NUMBER: 17735
 CLIENT: CYTO-CULTURE INTERNATIONAL
 PROJECT: PIE EMERYVILLE

DATE RECEIVED: 06/28/89
 DATE ANALYZED: 06/29/89
 DATE REPORTED: 06/29/89
 PAGE 2 OF 3

Extractable Petroleum Hydrocarbons in Aqueous Solutions
 EPA 8015 (Modified)
 Extraction Method: EPA 3510

LAB ID	CLIENT ID	KEROSENE (mg/L)	DIESEL (mg/L)	OTHER (mg/L)
17735-1	E-63	ND(0.5)	ND(0.5)	ND(0.5)

ND = Not Detected; Limit of detection in parentheses.

QA/QC SUMMARY

Duplicate: Relative % Difference	3
Spike: % Recovery	99

LABORATORY NUMBER: 17735
 CLIENT: CYTO-CULTURE INTERNATIONAL
 PROJECT: PIE EMERYVILLE
 SAMPLE #: E-63

DATE RECEIVED: 06/28/89
 DATE ANALYZED: 06/28/89
 DATE REPORTED: 06/29/89
 PAGE 3 OF 3

EPA 602: Volatile Aromatic Hydrocarbons in Water

COMPOUND	RESULT ug/L	DETECTION LIMIT ug/L
Benzene.....	ND	1
Toluene.....	ND	1
Ethyl Benzene.....	ND	1
Total Xylenes.....	ND	1
Chlorobenzene.....	ND	1
1,4-Dichlorobenzene.....	ND	1
1,3-Dichlorobenzene.....	ND	1
1,2-Dichlorobenzene.....	ND	1

ND = None Detected

QA/QC SUMMARY

RPD %	7
SPIKE RECOVERY %	102

Curtis & Tompkins, Ltd

2323 Fifth Street
Berkeley, California 94710
(415) 486-0900

Chain of Custody Form

NAL EQU D

Samplers _____

Job Description PTE

Job Number CYTO

Client Contact _____

Recorder _____

Matrix				#Containers	Method Preserved					Sample Number	Sampling Date				SAMPLE NOTES		
Water	Soil	Waste	Oil		H2SO4	HNO3	Ice	None	Other		Yr	Mo	Dy	Time			
✓							✓			E62	8	9	06	17	00	36PM	
✓							✓			E64	8	9	06	29	53	0	26PM
✓							✓			E65	8	9	06	30	18	30	26PM
✓							✓			E66	8	9	07	01	12	20	26PM
✓							✓			E67	8	9	07	02	19	00	26PM
✓							✓			E68	8	9	07	04	10	30	26PM

EPA 601/8010	EPA 602/8020	EPA 624/8240	EPA 625/8270	Title 22 Metals	EPA PP Metals (#)	TPH Method- <u>TEA</u>	Benzene-Toluene-Xylene(s)	Oil and Grease	EPA 608/8080 Pesticides & PCB's
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Laboratory Notes :

Normal!

Chain of Custody Record

Relinquished by: (signature) Date/Hr <i>[Signature]</i>	Received by (signature)
Relinquished by: (signature) Date/Hr	Received by (signature)
Relinquished by: (signature) Date/Hr	Received by (signature)
Relinquished by: (signature) Date/Hr	Received by (signature)
Dispatched by: (signature) Date/Hr	Received for Lab by (signature) <i>Norman Wilson</i>

LABORATORY NUMBER: 17771
 CLIENT: CYTO CULTURE
 PROJECT ID: PIE

 DATE RECEIVED: 07/05/89
 DATE ANALYZED: 07/06/89
 DATE REPORTED: 07/14/89
 PAGE 3 OF 3

 Benzene, Toluene, Ethyl Benzene, Xylenes by EPA 8020
 Extraction by EPA 5030 Purge and Trap

LAB ID	CLIENT ID	BENZENE (ug/L)	TOLUENE (ug/L)	TOTAL XYLENES (ug/L)	ETHYL BENZENE (ug/L)
17771-1	E62	ND(1)	ND(1)	ND(1)	ND(1)
17771-2	E64	ND(1)	ND(1)	ND(1)	ND(1)
17771-3	E65	ND(1)	ND(1)	ND(1)	ND(1)
17771-4	E66	ND(1)	ND(1)	ND(1)	ND(1)
17771-5	E67	ND(1)	ND(1)	ND(1)	ND(1)
17771-6	E68	ND(1)	ND(1)	ND(1)	ND(1)

QA/QC SUMMARY

%RPD	2
%RECOVERY	98

LABORATORY NUMBER: 17771
 CLIENT: CYTO CULTURE
 PROJECT ID: PIE

 DATE RECEIVED: 07/05/89
 DATE ANALYZED: 07/13/99
 DATE REPORTED: 07/14/89
 PAGE 2 OF 3

 Extractable Petroleum Hydrocarbons in Aqueous Solutions
 EPA 8015 (Modified)
 Extraction Method: EPA 3510

LAB ID	CLIENT ID	GASOLINE (mg/L)	KEROSINE (mg/L)	DIESEL (mg/L)	OTHER (mg/L)
17771-1	E62 <i>June 16</i>	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)
17771-2	E64 <i>June 29</i>	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)
17771-3	E65 <i>June 30</i>	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)
17771-4	E66 <i>July 1</i>	ND(0.5)	ND(0.5)	2.2*	ND(0.5)
17771-5	E67	ND(0.5)	ND(0.5)	TRACE*	ND(0.5)
17771-6	E68	ND(0.5)	ND(0.5)	0.8*	ND(0.5)

*C12-C22 RANGE

ND = Not Detected; Limit of detection in parentheses.

QA/QC SUMMARY

RPD, %	7
Spike: % Recovery	98

Daily Facility Log Sheets for June 1989

CytoCulture - PIE Bioremediation Project, Emeryville

CytoCulture International, Inc.

GROUNDWATER TREATMENT DAILY FACILITY INSPECTION LOG

P.I.E. NATIONWIDE BIOREMEDIATION SITE, EMERYVILLE, CA

OPERATOR: DNV

DATE: 1 Jun TIME: 2:00 PM HIGH TIDE: _____

WELL PUMP CONTROLLER SETTINGS AND OBSERVATIONS:

SOUTH TRENCH: Refill B Discharge Off Pressure 80

East well flow setting: 1/2 West well flow setting: Full

NORTH TRENCH: Refill B Discharge Off Pressure 81

South well flow setting: OFF North well flow setting: Full

COMPRESSOR CHECKS: Hours 1548 Temperature 150 Oil N

Air Filter drain checks: 1) ✓ 2) ✓ 3) ✓

BLOWER AIR PRESSURE READINGS and TEMPERATURE CHECKS:

North system: 82 in. South system: 82 in. Blower: 82 in.

GROUNDWATER EXTRACTION TRENCH FLOW RATES:

North Trench: 1.5 GPM South Trench: 1.5 GPM

TOTAL GROUNDWATER TREATMENT DISCHARGE RATE: 3 GPM

DIAMMONIUM PHOSPHATE FLOW AND PERCENT REMAINING:

North: 10 120 100 % South: 10 120 55 %

DATE OF LAST BIOSOCK INOCULATIONS: (# per unit)

North Units: _____ South Units: _____ 2,000 Gal. Unit _____

CULTURE OBSERVATIONS:

DOURs: [NH4]: [PC4]:

SAMPLES TAKEN AND TESTS REQUESTED FOR ANALYSIS:

Sample No. E-35 TPN: ✓ BTAL: ✓ Comments: 2000 at 3pm

Sample No. _____ TPN: _____ BTAL: _____ Comments: _____

OPERATIONAL CHANGES TODAY:

CytoCulture International, Inc.

GROUNDWATER TREATMENT DAILY FACILITY INSPECTION LOG

P.I.E. NATIONWIDE BIOREMEDIATION SITE, EMERYVILLE, CA

OPERATOR: POJ

DATE: 2 Jun TIME: 15:45 HIGH TIDE: _____

WELL PUMP CONTROLLER SETTINGS AND OBSERVATIONS:

SOUTH TRENCH: Refill 0.2 Discharge 0+2 Pressure 80

East well flow setting: 1/2 West well flow setting: Full

NORTH TRENCH: Refill 0 Discharge 0+2 Pressure _____

South well flow setting: OFF North well flow setting: Full

COMPRESSOR CHECKS: Hours 1571 Temperature 95 Oil N

Air Filter drain checks: 1) ✓ 2) ✓ 3) ✓

BLOWER AIR PRESSURE READINGS and TEMPERATURE CHECKS:

North system: 81 in. South system: 82 in. Blower: 82 in.

GROUNDWATER EXTRACTION TRENCH FLOW RATES:

North Trench: 1.5 GPM South Trench: 1.5 GPM

TOTAL GROUNDWATER TREATMENT DISCHARGE RATE: 3.0 GPM

DIAMMONIUM PHOSPHATE FLOW AND PERCENT REMAINING:

North: 10 / 90 Full % South: 10 / 90 50 %

DATE OF LAST BIOSOCK INOCULATIONS: (# per unit)

North Units: _____ South Units: _____ 2,000 Gal. Unit _____

CULTURE OBSERVATIONS:

DOURS: [NH4]: [PO4]:

SAMPLES TAKEN AND TESTS REQUESTED FOR ANALYSIS:

Sample No. _____ TWT: _____ BTWT: _____ Comment: _____

Sample No. _____ TWT: _____ BTWT: _____ Comment: _____

OPERATIONAL CHANGES TODAY:

Skipped N/S Chlorine

CytoCulture International, Inc.

GROUNDWATER TREATMENT DAILY FACILITY INSPECTION LOG

P.I.E. NATIONWIDE BIOREMEDIATION SITE, EMERYVILLE, CA

OPERATOR: JPH

DATE: 6/4/89 TIME: 12:20 PM HIGH TIDE: _____

WELL PUMP CONTROLLER SETTINGS AND OBSERVATIONS:

SOUTH TRENCH: Refill B Discharge A-1 Pressure 80 psi

East well flow setting: 1/2 West well flow setting: full

NORTH TRENCH: Refill B Discharge A-1 Pressure 80 psi

South well flow setting: was disconnected. I re-connected. North well flow setting: _____

COMPRESSOR CHECKS: Hours 1618 Temperature 135° Oil Parker

Air Filter drain checks: 1) ✓ 2) no 3) no *no tools here*

BLOWER AIR PRESSURE READINGS and TEMPERATURE CHECKS:

North system: 82 in. South system: 82 in. Blower: 82 in.

GROUNDWATER EXTRACTION TRENCH FLOW RATES:

North Trench: Clarifier 1/3 GPM South Trench: Clarifier 3/4 GPM

TOTAL GROUNDWATER TREATMENT DISCHARGE RATE: 1.1 GPM

DIAMMONIUM PHOSPHATE FLOW AND PERCENT REMAINING:

North: 15 ppm 75 % South: 15 20 50 %

DATE OF LAST BIOSOCK INOCULATIONS: (# per unit)

North Units: 5/28 South Units: 5/28 2,000 Gal. Unit 5/28

CULTURE OBSERVATIONS:

DOURS: PH-SE 6.5 SE-4.0ppm SE-3.5ppm
NE ≥ 7.0 [NH4]: NE > 10ppm [PO4]: NE-2.5ppm
(30?)

SAMPLES TAKEN AND TESTS REQUESTED FOR ANALYSIS:

Sample No. E-58 TPH/TEH: X BTXT: _____ Comment: EFFluent

Sample No. E-58 TPH/TEH: _____ BIV: X Comment: _____

OPERATIONAL CHANGES TODAY:

Oil in clarifiers is flocculating. No changes. Skimmer oil N+G.

Adjusted DAP to 15/20 for 20 revs
DAP in S to 15/20 speed/stroke.

CytoCulture International, Inc.

GROUNDWATER TREATMENT DAILY FACILITY INSPECTION LOG

P.I.E. NATIONWIDE BIOREMEDIATION SITE, EMERYVILLE, CA

OPERATOR: DDV

DATE: 5 June 6/5 TIME: 1530 HIGH TIDE: _____

WELL PUMP CONTROLLER SETTINGS AND OBSERVATIONS:

SOUTH TRENCH: Refill 0 Discharge _____ Pressure 80

East well flow setting: 1/2 West well flow setting: Full

NORTH TRENCH: Refill 0 Discharge _____ Pressure 80

South well flow setting: 00C North well flow setting: Full

COMPRESSOR CHECKS: Hours 1641 Temperature 135 Oil N

Air Filter drain checks: 1) 2) 3)

BLOWER AIR PRESSURE READINGS and TEMPERATURE CHECKS:

North system: 80 in. South system: 81 in. Blower: 81 in.

GROUNDWATER EXTRACTION TRENCH FLOW RATES:

North Trench: 1 GPM South Trench: 1.5 GPM

TOTAL GROUNDWATER TREATMENT DISCHARGE RATE: 2.5-3 GPM

DIAMMONIUM PHOSPHATE FLOW AND PERCENT REMAINING:

North: 10 / 20 50 % South: 10 / 20 39 %

DATE OF LAST BIOSOCK INOCULATIONS: (# per unit)

North Units: _____ South Units: _____ 2,000 Gal. Unit _____

CULTURE OBSERVATIONS:

DOURs: [NH4]: [PO4]:

SAMPLES TAKEN AND TESTS REQUESTED FOR ANALYSIS:

Sample No. 57 TPH/TEH: BTM: Comment: 2000 at 2.5 GPM ⁻³

Sample No. _____ TPH/TEH: _____ BTM: _____ Comment: _____

OPERATIONAL CHANGES TODAY:

Blow out AirHeads and Cleaned Blower Filter
Maintenances N Wells - N5 still in treatment
5 kind oil N15

CytoCulture International, Inc.

GROUNDWATER TREATMENT DAILY FACILITY INSPECTION LOG

P.I.E. NATIONWIDE BIOREMEDIATION SITE, EMERYVILLE, CA

OPERATOR: PLC

DATE: 7 June 67 TIME: 0800 HIGH TIDE: _____

WELL PUMP CONTROLLER SETTINGS AND OBSERVATIONS:

SOUTH TRENCH: Refill 0 Discharge 0+2 Pressure 80

East well flow setting: 1/2 West well flow setting: Full

NORTH TRENCH: Refill 0 Discharge 0+2 Pressure 80

South well flow setting: 00C North well flow setting: Full

COMPRESSOR CHECKS: Hours 1685 Temperature 130 Oil ✓

Air Filter drain checks: 1) ✓ 2) ✓ 3) ✓

BLOWER AIR PRESSURE READINGS and TEMPERATURE CHECKS:

North system: 81 in. South system: 82 in. Blower: 82 in.

GROUNDWATER EXTRACTION TRENCH FLOW RATES:

North Trench: 1.5 GPM South Trench: 1.5 GPM

TOTAL GROUNDWATER TREATMENT DISCHARGE RATE: 3 GPM

DIAMMONIUM PHOSPHATE FLOW AND PERCENT REMAINING:

North: 10 / 20 50 % South: 10 / 20 32 %

DATE OF LAST BIOSOCK INOCULATIONS: (# per unit)

North Units: 2 Jun South Units: 7 Jun 2,000 Gal. Unit _____

CULTURE OBSERVATIONS:

DOURS: [NH4]: [PO4]:

SAMPLES TAKEN AND TESTS REQUESTED FOR ANALYSIS:

Sample No. E-58 TPH/TEH: ✓ BTM: ✓ Comments: Effluent, 3 sps

Sample No. _____ TPH/TEH: _____ BTM: _____ Comments: _____

OPERATIONAL CHANGES TODAY:

skinned oil w/15

CytoCulture International, Inc.

GROUNDWATER TREATMENT DAILY FACILITY INSPECTION LOG

P.I.E. NATIONWIDE BIOREMEDIATION SITE, EMERYVILLE, CA

OPERATOR: JPH

DATE: 6/9/89 TIME: 12:10 PM HIGH TIDE: _____

WELL PUMP CONTROLLER SETTINGS AND OBSERVATIONS:

SOUTH TRENCH: Refill B Discharge 0+2 Pressure _____

East well flow setting: 1/2 West well flow setting: Full

NORTH TRENCH: Refill B Discharge 0+2 Pressure 80

South well flow setting: DOWN North well flow setting: Full

COMPRESSOR CHECKS: Hours 1738 Temperature 140° Oil

Air Filter drain checks: 1) 2) 3)

BLOWER AIR PRESSURE READINGS and TEMPERATURE CHECKS:

North system: 82 in. South system: 82 in. Blower: 82 in.

GROUNDWATER EXTRACTION TRENCH FLOW RATES:

North Trench: 1/4 GPM South Trench: 1 GPM

TOTAL GROUNDWATER TREATMENT DISCHARGE RATE: 1 1/3 GPM

DIAMMONIUM PHOSPHATE FLOW AND PERCENT REMAINING:

North: 20 / 10 spd. 50 % South: 20 / 10 spd. 35 %

DATE OF LAST BIOSOCK INOCULATIONS: (# per unit)

North Units: 6/6 South Units: 6/6 2,000 Gal. Unit 6/6

CULTURE OBSERVATIONS:

DOURS: [N4]: [O4]:

SAMPLES TAKEN AND TESTS REQUESTED FOR ANALYSIS:

Sample No. E-59 TRENCH: X BENT: X COMMENTS: 1.5 gpm Flow

Sample No. I-605 TRENCH: X BENT: X COMMENTS: 1.0 gpm Flow

OPERATIONAL CHANGES TODAY: South separator

Need to clean SG air spargers - low aeration

CytoCulture International, Inc.

GROUNDWATER TREATMENT DAILY FACILITY INSPECTION LOG

P.I.E. NATIONWIDE BIOREMEDIATION SITE, EMERYVILLE, CA

OPERATOR: DDJ

DATE: 6/11 TIME: 1100 HIGH TIDE: _____

WELL PUMP CONTROLLER SETTINGS AND OBSERVATIONS:

SOUTH TRENCH: Refill B Discharge on Pressure 80

East well flow setting: 1/2 West well flow setting: F

NORTH TRENCH: Refill B Discharge on Pressure 80

South well flow setting: 0.00 North well flow setting: F

COMPRESSOR CHECKS: Hours 1785 Temperature 130 Oil N

Air Filter drain checks: 1) ✓ 2) ✓ 3) ✓

BLOWER AIR PRESSURE READINGS and TEMPERATURE CHECKS:

North system: 91 in. South system: 91 in. Blower: 91 in.

GROUNDWATER EXTRACTION TRENCH FLOW RATES:

North Trench: 1 GPM South Trench: 1 1/2 GPM

TOTAL GROUNDWATER TREATMENT DISCHARGE RATE: 2 1/2 GPM

DIAMMONIUM PHOSPHATE FLOW AND PERCENT REMAINING:

North: 10 / 20 20 % South: 10 / 20 20 %

DATE OF LAST BIOSOCK INOCULATIONS: (# per unit)

North Units: _____ South Units: _____ 2,000 Gal. Unit _____

CULTURE OBSERVATIONS:

DOURs: [NH4]: [PO4]:

SAMPLES TAKEN AND TESTS REQUESTED FOR ANALYSIS:

Sample No. _____ TPN/TEH: _____ BTEL: _____ Comment: _____

Sample No. _____ TPN/TEH: _____ BTEL: _____ Comment: _____

OPERATIONAL CHANGES TODAY:

Blow-out aerators again

CytoCulture International, Inc.

GROUNDWATER TREATMENT DAILY FACILITY INSPECTION LOG

P.I.E. NATIONWIDE BIOREMEDIATION SITE, EMERYVILLE, CA

OPERATOR: 1: "

DATE: 6/17 TIME: 10:00 HIGH TIDE: _____

WELL PUMP CONTROLLER SETTINGS AND OBSERVATIONS:

SOUTH TRENCH: Refill 1/2 Discharge OFF Pressure 80

East well flow setting: 1/2 West well flow setting: Full

NORTH TRENCH: Refill 1 Discharge OFF Pressure 80

South well flow setting: 000 North well flow setting: Full

COMPRESSOR CHECKS: Hours 1809 Temperature 145 Oil N

Air Filter drain checks: 1) ✓ 2) ✓ 3) ✓

BLOWER AIR PRESSURE READINGS and TEMPERATURE CHECKS:

North system: 81 in. South system: 82 in. Blower: 82 in.

GROUNDWATER EXTRACTION TRENCH FLOW RATES:

North Trench: 1 GPM South Trench: 1 1/2 GPM

TOTAL GROUNDWATER TREATMENT DISCHARGE RATE: 2 1/2 GPM

DIAMMONIUM PHOSPHATE FLOW AND PERCENT REMAINING:

North: 10 / 70 15 % South: 10 / 20 15 %

DATE OF LAST BIOSOCK INOCULATIONS: (# per unit)

North Units: _____ South Units: _____ 2,000 Gal. Unit _____

CULTURE OBSERVATIONS:

DOURS: [NH4]: [PO4]:

SAMPLES TAKEN AND TESTS REQUESTED FOR ANALYSIS:

Sample No. _____ TPH/TEP: _____ PTM: _____ Components: _____

Sample No. _____ TPH/TEP: _____ PTM: _____ Components: _____

OPERATIONAL CHANGES TODAY:

Skinned oil N'S Refilled N Nutriate Tank

CytoCulture International, Inc.

GROUNDWATER TREATMENT DAILY FACILITY INSPECTION LOG

P.I.E. NATIONWIDE BIOREMEDIATION SITE, EMERYVILLE, CA

OPERATOR: DDd

DATE: Jan 13 TIME: 1015 HIGH TIDE: _____

WELL PUMP CONTROLLER SETTINGS AND OBSERVATIONS:

SOUTH TRENCH: Refill B Discharge 0+2 Pressure 80

East well flow setting: 1/2 West well flow setting: Full

NORTH TRENCH: Refill B Discharge 0+2 Pressure 80

South well flow setting: 00c North well flow setting: Full

COMPRESSOR CHECKS: Hours 10⁰⁰ Temperature 115 Oil N

Air Filter drain checks: 1) ✓ 2) ✓ 3) ✓

BLOWER AIR PRESSURE READINGS and TEMPERATURE CHECKS:

North system: 81 in. South system: 82 in. Blower: 82 in.

GROUNDWATER EXTRACTION TRENCH FLOW RATES:

North Trench: 1.0 GPM South Trench: 1 1/2 GPM

TOTAL GROUNDWATER TREATMENT DISCHARGE RATE: 2 1/2 GPM

DIAMMONIUM PHOSPHATE FLOW AND PERCENT REMAINING:

North: 10 / 20 100 % South: 10 / 20 13 %

DATE OF LAST BIOSOCK INOCULATIONS: (# per unit)

North Units: _____ South Units: _____ 2,000 Gal. Unit _____

CULTURE OBSERVATIONS:

DOURS: [NH4]: [PO4]:

SAMPLES TAKEN AND TESTS REQUESTED FOR ANALYSIS:

Sample No. E-61 TPH/TEH: ✓ BTAF: ✓ Comments: 3 ppm effluent

Sample No. 948N TPH/TEH: _____ BY: AM Comments: _____

OPERATIONAL CHANGES TODAY:

CytoCulture International, Inc.

GROUNDWATER TREATMENT DAILY FACILITY INSPECTION LOG

P.I.E. NATIONWIDE BIOREMEDIATION SITE, EMERYVILLE, CA

OPERATOR: PEU/JH

DATE: 14 Jun TIME: 1230 HIGH TIDE: _____

WELL PUMP CONTROLLER SETTINGS AND OBSERVATIONS:

SOUTH TRENCH: Refill D Discharge OTL Pressure 20

East well flow setting: 1/2 West well flow setting: Full

NORTH TRENCH: Refill D Discharge OTL Pressure 80

South well flow setting: 000 North well flow setting: Full

COMPRESSOR CHECKS: Hours 1858 Temperature 110 Oil N

Air Filter drain checks: 1) ✓ 2) ✓ 3) ✓

BLOWER AIR PRESSURE READINGS and TEMPERATURE CHECKS:

North system: 81 in. South system: 81 in. Blower: 81 in.

GROUNDWATER EXTRACTION TRENCH FLOW RATES:

North Trench: 1 GPM South Trench: 1.5 GPM

TOTAL GROUNDWATER TREATMENT DISCHARGE RATE: 2.5 GPM

DIAMMONIUM PHOSPHATE FLOW AND PERCENT REMAINING:

North: 10 120 95 % South: 10 120 10 %

DATE OF LAST BIOSOCK INOCULATIONS: (# per unit)

North Units: 14 Jun South Units: 14 Jun 2,000 Gal. Unit _____

CULTURE OBSERVATIONS:

DOURS:

NE - >10ppm NE - 5ppm
[NH4]: SE - >10ppm [PO4]: SE - 2ppm

SAMPLES TAKEN AND TESTS REQUESTED FOR ANALYSIS:

Sample No. _____ TPH/TEH: _____ BTX/E: _____ Comment: _____

Sample No. _____ TPH/TLH: _____ BTX/E: _____ Comment: _____

OPERATIONAL CHANGES TODAY:

Skimmed oil South / blow out South filters

CytoCulture International, Inc.

GROUNDWATER TREATMENT DAILY FACILITY INSPECTION LOG

P.I.E. NATIONWIDE BIOREMEDIATION SITE, EMERYVILLE, CA

OPERATOR: RFJ

DATE: 16 June TIME: 1700 HIGH TIDE: _____

WELL PUMP CONTROLLER SETTINGS AND OBSERVATIONS:

SOUTH TRENCH: Refill B Discharge 0+2 Pressure 80

East well flow setting: 1/2 West well flow setting: Full

NORTH TRENCH: Refill D Discharge 0+5 Pressure 81

South well flow setting: noc North well flow setting: Full

COMPRESSOR CHECKS: Hours 1910 Temperature 130 Oil N

Air Filter drain checks: 1) 2) 3)

BLOWER AIR PRESSURE READINGS and TEMPERATURE CHECKS:

North system: 81 in. South system: 81 in. Blower: 81 in.

GROUNDWATER EXTRACTION TRENCH FLOW RATES:

North Trench: 1.5 GPM South Trench: 1.5 GPM

TOTAL GROUNDWATER TREATMENT DISCHARGE RATE: 3 GPM

DIAMMONIUM PHOSPHATE FLOW AND PERCENT REMAINING:

North: 10 / 20 23 % South: 10 / 20 5 %

DATE OF LAST BIOSOCK INOCULATIONS: (# per unit)

North Units: _____ South Units: _____ 2,000 Gal. Unit _____

CULTURE OBSERVATIONS:

DOURS: [NH4]: [PO4]:

SAMPLES TAKEN AND TESTS REQUESTED FOR ANALYSIS:

Sample No. E-12 TYPE: --- DATE: --- Comment: Effluent

Sample No. _____ TYPE: _____ DATE: _____ Comment: _____

OPERATIONAL CHANGES TODAY:

Skim of oil 5

CytoCulture International, Inc.

GROUNDWATER TREATMENT DAILY FACILITY INSPECTION LOG

P.I.E. NATIONWIDE BIOREMEDIATION SITE, EMERYVILLE, CA

OPERATOR: [Signature]

DATE: June 17 TIME: 1530 HIGH TIDE: _____

WELL PUMP CONTROLLER SETTINGS AND OBSERVATIONS:

SOUTH TRENCH: Refill B Discharge 0+2 Pressure 80

East well flow setting: 1/2 West well flow setting: Full

NORTH TRENCH: Refill B Discharge 0+2 Pressure 81

South well flow setting: mc North well flow setting: Full

COMPRESSOR CHECKS: Hours 1933 Temperature 145 Oil N

Air Filter drain checks: 1) ✓ 2) ✓ 3) ✓

BLOWER AIR PRESSURE READINGS and TEMPERATURE CHECKS:

North system: 81 in. South system: 81 in. Blower: 81 in.

GROUNDWATER EXTRACTION TRENCH FLOW RATES:

North Trench: 1.5 GPM South Trench: 1.5 GPM

TOTAL GROUNDWATER TREATMENT DISCHARGE RATE: 3 GPM

DIAMMONIUM PHOSPHATE FLOW AND PERCENT REMAINING:

North: 10 1 20 70 % South: 10 1 20 100 %

DATE OF LAST BIOSOCK INOCULATIONS: (# per unit)

North Units: _____ South Units: _____ 2,000 Gal. Unit _____

CULTURE OBSERVATIONS:

DOURs: _____ [NH4]: _____ [PO4]: _____

SAMPLES TAKEN AND TESTS REQUESTED FOR ANALYSIS:

Sample No. _____ TPH/TEH: _____ BTAD: _____ Comment: _____

Sample No. _____ TPH/TEH: _____ BTAD: _____ Comment: _____

OPERATIONAL CHANGES TODAY:

Skimmed Oil S
Cleaned Controller Air Filter
Refilled S Nutrient Tank

CytoCulture International, Inc.

GROUNDWATER TREATMENT DAILY FACILITY INSPECTION LOG

P.I.E. NATIONWIDE BIOREMEDIATION SITE, EMERYVILLE, CA

OPERATOR: DJD

DATE: June 20 TIME: 1345 HIGH TIDE: _____

WELL PUMP CONTROLLER SETTINGS AND OBSERVATIONS:

SOUTH TRENCH: Refill _____ Discharge _____ Pressure _____

East well flow setting: _____ West well flow setting: _____

NORTH TRENCH: Refill _____ Discharge _____ Pressure _____

South well flow setting: _____ North well flow setting: _____

COMPRESSOR CHECKS: Hours _____ Temperature _____ Oil _____

Air Filter drain checks: 1) _____ 2) _____ 3) _____

BLOWER AIR PRESSURE READINGS and TEMPERATURE CHECKS:

North system: _____ in. South system: _____ in. Blower: _____ in.

GROUNDWATER EXTRACTION TRENCH FLOW RATES:

North Trench: _____ GPM South Trench: _____ GPM

TOTAL GROUNDWATER TREATMENT DISCHARGE RATE: _____ GPM

DIAMMONIUM PHOSPHATE FLOW AND PERCENT REMAINING:

North: _____ / _____ % South: _____ / _____ %

DATE OF LAST BIOSOCK INOCULATIONS: (# per unit)

North Units: _____ South Units: _____ 2,000 Gal. Unit _____

CULTURE OBSERVATIONS:

DOURS: [NH4]: [PO4]:

SAMPLES TAKEN AND TESTS REQUESTED FOR ANALYSIS:

Sample No. _____ TPH/TEH: _____ BTXL: _____ Comment: _____

Sample No. _____ TPH/TEH: _____ BTXL: _____ Comment: _____

OPERATIONAL CHANGES TODAY:

Shut Down

— Suspected malfunction in compressor.
Overhauled compressor, cleared out aerators
& started up again June 26. Sampled system
June 28

CytoCulture International, Inc.

GROUNDWATER TREATMENT DAILY FACILITY INSPECTION LOG

P.I.E. NATIONWIDE BIOREMEDIATION SITE, EMERYVILLE, CA

OPERATOR: JH/DV

DATE: 6/28 TIME: 12:30 PM HIGH TIDE: _____

WELL PUMP CONTROLLER SETTINGS AND OBSERVATIONS:

SOUTH TRENCH: Refill B+2 Discharge D+2 Pressure 80

East well flow setting: 1/4 on West well flow setting: 3/4 on

NORTH TRENCH: Refill B+2 Discharge D+2 Pressure 80

South well flow setting: off - ok North well flow setting: full on

COMPRESSOR CHECKS: Hours 1942 Temperature 130 Oil Time for

Air Filter drain checks: 1) 2) 3) Maint.

BLOWER PRESSURE READINGS and TEMPERATURE CHECKS:

North system: 92 in. South system: 82 in. Blower: 82 in.

GROUNDWATER EXTRACTION TRENCH FLOW RATES:

North Trench: 1 GPM South Trench: 1 GPM

TOTAL GROUNDWATER TREATMENT DISCHARGE RATE: 0 GPM - refilling 20 gal after 10 min

DIAMMONIUM PHOSPHATE FLOW AND PERCENT REMAINING:

North: 20 / 20 20 % South: 20 / 20 95 %

DATE OF LAST BIOSOCK INOCULATIONS: (# per unit)

North Units: 6/28 - 1 each South Units: 6/28 - 1 each 2,000 Gal. Unit 6/28 - 1

CULTURE OBSERVATIONS:

DOURS: [NH4]: > 10 ppm in all [FO4]: < 1 ppm in all

SAMPLES TAKEN AND TESTS REQUESTED FOR ANALYSIS:

Sample No. 5-63 TPH/TEH: ✓ BIAL: ✓ Comment: Taken from lab fan output

Sample No. _____ TPH/TEH: _____ BIAL: _____ Comment: will be reflow cut 5 min

OPERATIONAL CHANGES TODAY:

1. drawing ~ 500 gal 5:15 PM input - lower at source.
Samples for 24' in T-19 Added ~ 5 gal Sybran activator
Changed pH to 8.0 to both reactors in beta. Also KEAM 11 to all 5 main reactors

CytoCulture International, Inc.

GROUNDWATER TREATMENT DAILY FACILITY INSPECTION LOG

P.I.E. NATIONWIDE BIOREMEDIATION SITE, EMERYVILLE, CA

OPERATOR: JH

DATE: 6/29 TIME: 15:30 HIGH TIDE: _____

WELL PUMP CONTROLLER SETTINGS AND OBSERVATIONS:

SOUTH TRENCH: Refill B+2 Discharge A+2 Pressure 80

East well flow setting: 1/4 on West well flow setting: 3/4 on

NORTH TRENCH: Refill B+2 Discharge O+2 Pressure 80

South well flow setting: DOC North well flow setting: Full on

COMPRESSOR CHECKS: Hours 1969 Temperature 135 Oil

Air Filter drain checks: 1) 2) 3)

BLOWER AIR PRESSURE READINGS and TEMPERATURE CHECKS:

North 82 in. South system: 82 in. Blower: 82 in.

GROUNDWATER EXTRACTION TRENCH FLOW RATES:

North Trench: 1 GPM South Trench: 1 GPM

TOTAL GROUNDWATER TREATMENT DISCHARGE RATE: 2 GPM

DIAMMONIUM PHOSPHATE FLOW AND PERCENT REMAINING:

North: 20120 100 % South: 20120 90 %

DATE OF LAST BIOSOCK INOCULATIONS: (# per unit)

North Units: 6/28-2 South Units: 6/28-2 2,000 Gal. Unit 6/28-1

CULTURE OBSERVATIONS:

DOURS:

[NH4]:

[PO4]:

SAMPLES TAKEN AND TESTS REQUESTED FOR ANALYSIS:

Sample No. E-64 TPH/TEH: BTXE: Comment: 2 gpm

Sample No. _____ TPH/TEH: _____ BTXE: _____ Comment: _____

OPERATIONAL CHANGES TODAY:

None

All bioreactors 2000 gal. are foamy + honey colored w/ no smell.

CytoCulture International, Inc.

GROUNDWATER TREATMENT DAILY FACILITY INSPECTION LOG

P.I.E. NATIONWIDE BIOREMEDIATION SITE, EMERYVILLE, CA

OPERATOR: JPH

DATE: 6/30 TIME: 17:30 HIGH TIDE: _____

WELL PUMP CONTROLLER SETTINGS AND OBSERVATIONS:

SOUTH TRENCH: Refill B+2 Discharge 0+2 Pressure 80

East well flow setting: 1/4 on West well flow setting: 3/4 on

NORTH TRENCH: Refill B+2 Discharge 0+2 Pressure 80

South well flow setting: 00C North well flow setting: 1/4 on

COMPRESSOR CHECKS: Hours 1979 Temperature 130 Oil see over

Air Filter drain checks: 1) 2) 3)

BLOWER AIR PRESSURE READINGS and TEMPERATURE CHECKS:

North system: 82 in. South system: 82 in. Blower: 82 in.

GROUNDWATER EXTRACTION TRENCH FLOW RATES:

North Trench: 1 GPM South Trench: 1 GPM

TOTAL GROUNDWATER TREATMENT DISCHARGE RATE: 2 - see over GPM

DIAMMONIUM PHOSPHATE FLOW AND PERCENT REMAINING:

North: 20,20 95 % South: 20,20 85 %

DATE OF LAST BIOSOCK INOCULATIONS: (# per unit)

North Units: 6/28-2 South Units: 6/28-2 2,000 Gal. Unit 6/28-1

CULTURE OBSERVATIONS:

DOURS: [NH4]: [PO4]:

SAMPLES TAKEN AND TESTS REQUESTED FOR ANALYSIS:

Sample No. E-65 TPH/TEH: X BTXE: ✓ Comment: 2 up

Sample No. _____ TPH/TEH: _____ BTXE: _____ Comment: _____

OPERATIONAL CHANGES TODAY:

see over