Unocal 5472
LUST # 1975
UST # 84599

DATE: July 10, 2001

TOSCO MARKETING COMPANY QUARTERLY REPORT

Former Unocal Site No.: 5472 Address: 3460 First Avenue South, Seattle, WA
Tosco Project Manager: Timothy D. Johnson
Consulting Co./Contact Person: GeoEngineers, Inc./Lisa Bona
Consultant Project No.: 4823-350-05
Primary Agency/Regulatory ID No.: Ecology LUST Incident No. 1975
Other Parties to Receive Copies: Ben Amoah-Forson, Washington State Department of Ecology; Mike Hess, First Western Development Services

WORK PERFORMED THIS QUARTER [Second – 2001]:

1. GeoEngineers monitored the system parameters in April, May and June, 2001. H2Oil Recovery conducted system O&M in April, May and June, 2001.
2. GeoEngineers cleaned the filter at the manifold on June 8 to improve vacuum at the manifold. The remediation system was down for most of the period between June 11 and 20, 2001, because of shutdowns apparently caused by a worn check valve at the knockout tank. H2Oil Recovery replaced the check valve on June 20 and restarted the system.

WORK PROPOSED FOR NEXT QUARTER [Third - 2001]:

1. Write a letter to PSCAA proposing that the catalytic oxidizer be removed and that emitted vapors be treated through an activated carbon vessel.
2. Upon authorization from PSCAA, change vapor treatment.
3. Monitor the system operation parameters on a monthly basis.
4. H2Oil Recovery will conduct system O&M.

Current Phase of Project:	Remediation	(Assmnt, Remed., etc.)
Frequency of Sampling:	Not applicable	(Quarterly, etc.)
Frequency of Monitoring:	Monthly, if system operating	(Monthly, etc.)
Are LPH Present On-site:	Not measured by GEI during the Second Quarter 2001	(Yes/No)
Hydrocarbons Recovered This Quarter:	Approximately 15 gallons via vapor phase	
Hydrocarbons Recovered to Date:	Approximately 99 gallons via vapor phase	
Bulk Soil Removed to Date:	1,140 cubic yards by AGRA	(cubic yards)
Water Wells or Surface Waters w/in a 1,000' Radius & Their Respective Directions (if known):	Unknown.	(Distance and Direction)
Current Remediation Techniques:	Vapor extraction and air sparging. A catalytic oxidizer treats vapors before emission into the atmosphere.	(SVES, LPH Removal, etc.)
Permits for Discharge:	PSCAA Notice of Construction 8121	(NPDES, POTW, etc.)
Approximate Depth to Groundwater	Not measured by GEI during Second Quarter 2001	(Measured Feet)
Groundwater Gradient:	Not calculated. See report by ERI.	(Bearing)
		(Magnitude)
Maximum TPH-G/Benzene Concentrations:	Not sampled. See report by ERI.	(µg/l)

Discussion:

- Influent vapor concentrations have been less than 50 parts per million (ppm) since September 2000.

GeoEngineers
2924 Colby Avenue
Everett, Washington
(425) 252-4565

Summary of Unusual Activity: None
Agency Directive Requirements: Independent remedial action

Attachments:

- Table 1: Summary of Vapor Extraction Catalytic Oxidizer Operation and Pounds Removed
- Table 2: Summary of Vapor Extraction Vacuum
- Table 3: Summary of Air Sparging System Operating Parameters
- Figure 1: Site Plan
- Attachment A: H2Oil Recovery Field Reports

Signed by: Chris Lim /For
Kurt S. Anderson

Title: Principal

TABLE 1 (Page 1 of 2)
SUMMARY OF VAPOR EXTRACTION CATALYTIC OXIDIZER OPERATION AND POUNDS REMOVED
FORMER UNOCAL SITE NO. 5472
SEATTLE, WASHINGTON

Date	Catox Total Hours	Catox Total Days	Catalyst Temp[1] (deg F)	Heater Temp (deg F)	Influent Organic Vapor Concentration[2] (ppm)	Flow Rate (cfm)	Pounds Hydrocarbons Treated/Day[3]	Cumulative Pounds Treated	Cumulative Gallons Treated[4]	Effluent Organic Vapor Concentration[2] (ppm)
04/11/00	8,104.2	--	546	550	--	290	--	--	--	0
System down 04/12/00 to 04/18/00 because overflow batch tank was full of water.										
04/18/00	8,118.2	0.6	558	542	51.6	290	5	3	1	0
System down 04/29/00 to 05/11/00 because of power loss to the system.										
05/11/00	8,361.2	10.7	561	552	104	290	3	31	4	0
System down 05/12/00 to 05/16/00 because knockout drum was full of water.										
05/16/00[5]	8,365.8	10.9	555	540	--	--	--	--	--	--
System down 05/13/00 to 05/31/00 because knockout drum and overflow batch tank were full of water.										
05/31/00	8,390.7	11.9	560	551	90.5	290	3	34	5	0
System down 06/01/00 to 06/06/00 because overflow batch tank was full of water.										
06/12/00[5]	8,576.3	19.7	566	547	--	--	--	--	--	--
07/06/00	9,121.1	42.4	555	549	141	270	2	86	12	0
07/19/00[5]	9,430.9	55.3	550	542	--	--	--	--	--	--
08/17/00	9,704.0	66.7	562	548	175	280	4	187	27	**0**
08/24/00[5]	9,875.2	73.8	551	546	--	--	--	--	--	--
09/22/00	10,114.5	83.8	550	540	73.6	280	3	238	34	**0**
10/24/00	10,885.7	115.9	552	544	48.5	185	2	288	41	**0**
10/25/00[5]	10,970.0	119.4	546	545	--	--	--	--	--	--
System down on 11/15/00 because of debris in the float switches.[5]										
11/22/00	10,681.0	141.4[6]	546	540	49.3	280	2	332	47[6]	0
12/01/00	10,918.0	151.3	546	538	43.6	280	2	355	50	0
12/20/00[5]	11,375.4	170.4	536	550	--	--	--	--	--	--
12/29/00	11,587.0	179.2	553	543	27.6	285	3	439	62	0
01/10/01[5]	11,884.3	191.6	553	540	--		--	--	--	
01/31/01	12,379.4	212.2	550	545	46.3	288	2	490	69	0

Notes appear on page 2 of 2

TABLE 1 (Page 2 of 2)

Date	Catox Total Hours	Catox Total Days	Catalyst Temp[1] (deg F)	Heater Temp (deg F)	Influent Organic Vapor Concentration[2] (ppm)	Flow Rate (cfm)	Pounds Hydrocarbons Treated/Day[3]	Cumulative Pounds Treated	Cumulative Gallons Treated[4]	Effluent Organic Vapor Concentration[2] (ppm)
System down on approximately 01/03/01 because of power loss[5]										
02/14/01[5]	12,472.0	216.1	556	540	--	--	--	--	--	--
02/20/01	12,583.0	220.7	548	541	13.6	280	2	507	72	0
System down on approximately 03/01/01 because of power loss[5]										
03/21/01[5]	12,807.0	230.0	550	535	--	--	--	--	--	--
03/21/01	12,807.1	230.0	548	536	10.4	280	4	540	77	0
04/13/01	**13,357.0**	**252.9**	**544**	**538**	**43.6**	**280**	**2**	**581**	**82**	**0**
04/25/01[5]	**13,641.3**	**264.8**	**550**	**548**	--	--	--	--	--	--
05/03/01	**13,836.0**	**272.9**	**548**	**539**	**6.8**	**280**	**3**	**634**	**90**	**0**
05/18/01[5]	**14,181.6**	**287.3**	**550**	**552**	--	--	--	--	--	--
06/08/01	**14,606.0**	**305.0**	**553**	**546**	**7.4**	**280**	**2**	**701**	**99**	**0**
System down on 06/11/01 because of high level in knockout tank. System restarted five times between 06/12/01 and 06/15/01. System left down on 06/15/01 until H2Oil Recovery could replace worn check valve (on 06/20/01).										
06/20/01[5]	**14,623.1**	**305.7**	**556**	**546**	--	--	--	--	--	--

Notes:

[1]The system was received with a baseline of 8,104 total hours operation.

[2]The difference between the catalyst temperature and the heater temperature (a/k/a temperature rise across the catalyst) is a function of the combustible vapor concentration in the influent vapor. Approximately 25 degrees of temperature increase equates to approximately 1 percent LEL for combustible vapors. 1% LEL = 110 ppm.

[3]Measured using a Photovac MicroTIP photoionization detector.

[4]Calculated as follows: lb/day = (catalyst deg F temp - heater temp)*(1%LEL/25 deg F)*(110 ppm/1%LEL)*0.000001*CFM*(0.167 lb hydrocarbon/ft3)*1440 min/day.

[5]Measurements provided by H2Oil Recovery.

[6]The total hour meter was not advancing between the October 25 and November 22 site visits. An estimated 22 operating days during this period was used to calculate cumulative pounds and gallons of hydrocarbons treated.

-- = not measured or not applicable deg F = degrees Fahrenheit ppm = parts per million cfm = cubic feet per minute

Bolding indicates a measurement obtained during the current reporting period.

TABLE 2
SUMMARY OF VAPOR EXTRACTION VACUUM
FORMER UNOCAL SITE NO. 5472
SEATTLE, WASHINGTON

	Well Vacuum (inches H2O)					
Date	VE-1	VE-2	VE-3	VE-4	VE-5	System
05/11/00	40	45	40	40	44	40
05/31/00	35	35	35	34	35	40
06/06/00	18	18	18	20	20	20
07/06/00	14	15	14	15	15	50
08/17/00	17	20	17	18	20	20
09/22/00	16	17	17	18	18	20
10/24/00	10	50	30	50	50	60
11/22/00	40	38	40	40	40	40
12/29/00	35	36	35	36	36	40
01/31/01	38	38	38	38	38	40
02/20/01	40	40	40	40	40	42
03/21/01	30	31	31	31	32	35
04/13/01	**39**	**39**	**38**	**39**	**39**	**42**
05/03/01	**39**	**40**	**39**	**40**	**40**	**42**
06/08/01	**38**	**40**	**38**	**38**	**39**	**42**

Notes:
Bolding indicates a measurement obtained during the current reporting period.

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TABLE 3
SUMMARY OF AIR SPARGING
SYSTEM OPERATING PARAMETERS
FORMER UNOCAL SITE NO. 5472
SEATTLE, WASHINGTON

Date	Sparge Wells On	Average Injection Pressure (psi)	Average Injection Flow Rate (cfm/well)
04/18/00	AS-1 through AS-18	4.5	5
05/11/00	AS-1 through AS-18	5	5
05/31/00	AS-1 through AS-18	6	5.5
06/06/00	AS-1 through AS-18	5	6
07/06/00	AS-1 through AS-18	4.5	6
08/17/00	AS-1 through AS-18	5	5
09/22/00	AS-1 through AS-18	5	6
10/24/00	AS-1 through AS-18	4	7
11/22/00	AS-1 through AS-18	5	7
12/29/00	AS-1 through AS-18	4	7
01/31/01	AS-1 through AS-18	4	7
02/20/01	AS-1 through AS-18	4	7
03/21/01	AS-1 through AS-18	5	7
04/13/01	**AS-1 through AS-18**	**4**	**7**
05/03/01	**AS-1 through AS-18**	**4**	**7**
06/08/01	**AS-1 through AS-18**	**4**	**7**

Notes:
psi = pounds per square inch cfm = cubic feet per minute
Bolding indicates the current reporting period.

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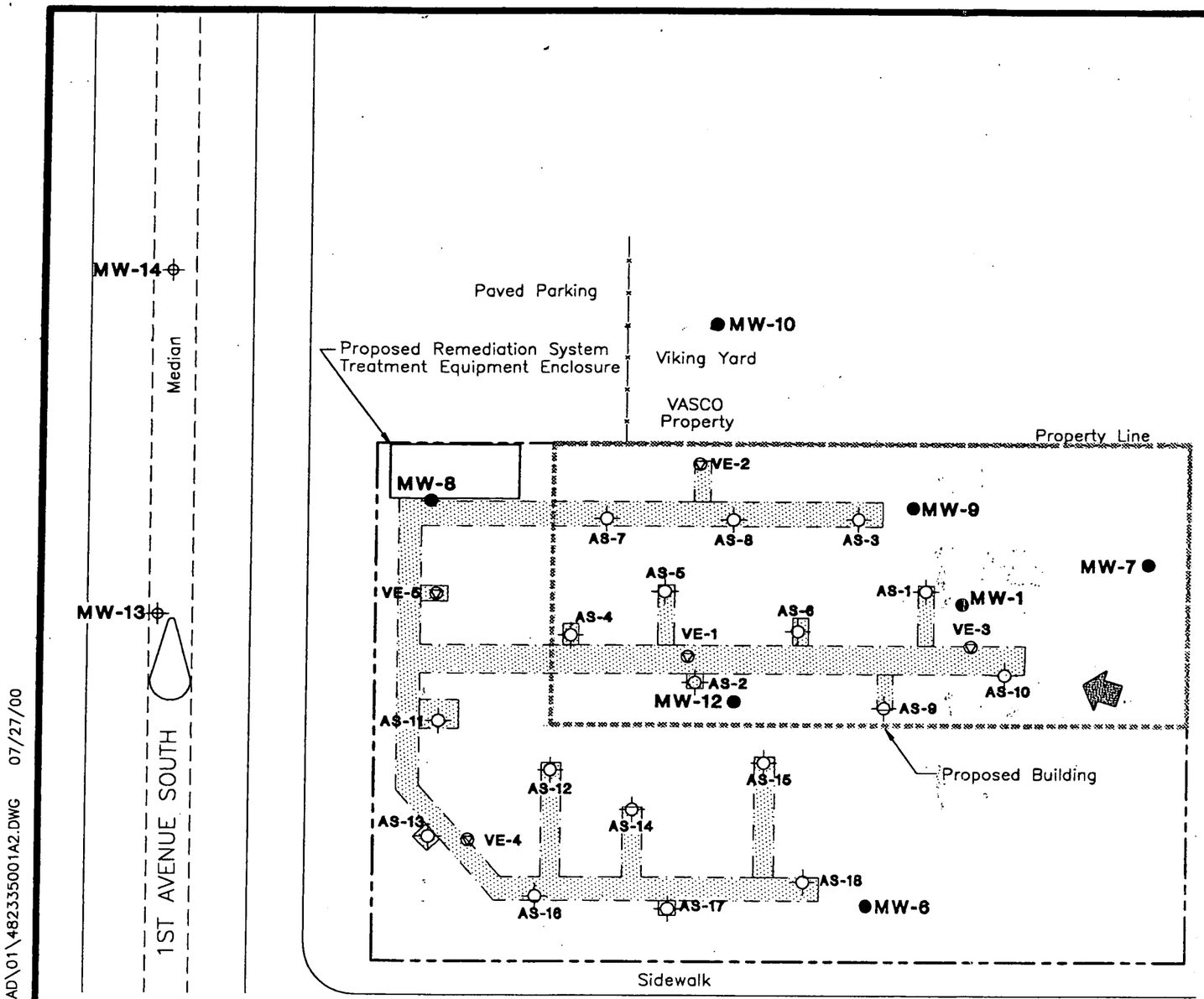

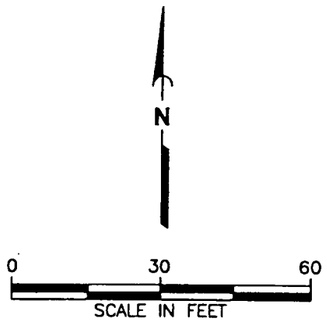

Peterson Pattern and Casting

EXPLANATION:

- MW-1 ● MONITORING WELL INSTALLED BY RZA AGRA
- MW-13 ⊕ MONITORING WELL INSTALLED BY GEOENGINEERS
- AS-1 ⊕ AIR SPARGING WELL COMPLETED BY GEOENGINEERS
- VE-1 ⊘ VAPOR EXTRACTION WELL COMPLETED BY GEOENGINEERS
- REMEDIATION PIPING TRENCH
- GENERAL DIRECTION OF GROUND WATER FLOW

Note: The locations of all features shown are approximate.

Reference: Base drawing prepared by RZA AGRA, Inc., Engineering Consultants job number W-6839-13, dated 02/93.

LJB:SYF P:\TOSCO\4823350\CAD\01\482335001A2.DWG 07/27/00

TOSCO	PROJECT: REMEDIATION SYSTEM		TITLE: SITE PLAN
Geo Engineers	FACILITY: FORMER UNOCAL SITE NO. 5472		
	3460 1st Avenue South		
	Seattle, WA		
	DATE: 11/08/99	SHEET 1 OF 7	DRAWING No. 1 / 1

76 Branded

Equipment Maintenance Report

Tosco Contact: Mr. Tim Johnson — Date: 04/25/01

Consultant & Contact: Geo Engineers, Inc. - Lisa Bona — Time: 10:30 AM

Contractor & Contact: H2 Oil Recovery Equipment, Inc. - Scott Hatcher — Weather: 60's & Sunny

1.0 System Description: *Site #255472 (Station 5472), 3460 First Ave S, Seattle Washington*

H2TCO250 Gas Catalytic oxidizer, Sutorbilt 4MP blower (3600 rpm) with 10 hp (230 vac, 1725 rpm, TEFC, 1 ph) motor, 55 gal. Moisture separator with Goulds 1ST 1/2 hp auto pump (230 vac, 1 ph), and 80 gal. Poly tank, all mounted on a 16' tandem trailer. Sutorbilt 4HP sparge blower with 20 hp (460 vac, 3 ph, 1755 rpm) motor and magnetic motor starter, and heat exchanger (mod #XCHAA-250) with motor (460 vac, 3 ph). All controls in Nema 4 boxes.

(attach schematic including manufacturer and date of purchase) Site #206-223-4002

2.0 Operational Hours During This Reporting Period:

Available (Total) Hours	13641.3	(a)	Total Operating Hours for this System:
Operating Hours		(b)	Hours since last major overhaul (if applicable):
Downtime Hours		(a - b)	

3.0 Routine Maintenance Required and Performed:

Description	Date
Observe complete system operation. Change oil and grease blower. Inspect intake	04/25/01
filters, replace if needed. Check belt tension, adjust if needed.	
Record amps on blower motors.	

4.0 Equipment Readings and Measurements:

SVES blower (Sutorbilt) amps - 25.2/25.5 @ 40" vac	Oxidizer
Combustion blower amps - 7.2/7.0	Temp controller - 550 deg (f)
Sparge blower amps - 18.5/17.2/18.0 @ 15 psi	Burner controller - 548 deg (f)
Auto pump out amps - 1.4/1.5	Cat controller - 535 deg (f)
Heat exchanger amps - 1.3/1.3/1.0	
Batch tank level - 2" water	LEL - 1%
	Hour meter - 13641.3 hrs

5.0 Other Repairs Performed, parts needed, etc:

6.0 Equipment Status and Reasons for Downtime:

System operating upon arrival and departure.

Individual Completing this form, including company-

Scott Wakefield - H2 Oil Recovery Equipment, Inc.

76 Branded

Equipment Maintenance Report

Tosco Contact: Mr. Tim Johnson — Date: 05/18/01

Consultant & Contact: Geo Engineers, Inc. - Lisa Bona — Time: 11:30 AM

Contractor & Contact: H2 Oil Recovery Equipment, Inc. - Scott Hatcher — Weather: 70's & Sunny

1.0 System Description: *Site #255472 (Station 5472), 3460 First Ave S, Seattle Washington*

H2TCO250 Gas Catalytic oxidizer, Sutorbilt 4MP blower (3600 rpm) with 10 hp (230 vac, 1725 rpm, TEFC, 1 ph) motor, 55 gal. Moisture separator with Goulds 1ST 1/2 hp auto pump (230 vac, 1 ph), and 80 gal. Poly tank, all mounted on a 16' tandem trailer. Sutorbilt 4HP sparge blower with 20 hp (460 vac, 3 ph, 1755 rpm) motor and magnetic motor starter, and heat exchanger (mod #XCHAA-250) with motor (460 vac, 3 ph). All controls in Nema 4 boxes.

(attach schematic including manufacturer and date of purchase) Site #206-223-4002

2.0 Operational Hours During This Reporting Period:		Total Operating Hours for this
Available (Total) Hours 14181.6	(a)	System:
Operating Hours	(b)	Hours since last major overhaul
Downtime Hours	(a - b)	(if applicable):

3.0 Routine Maintenance Required and Performed:

Description	Date
Observe complete system operation. Change oil and grease blower. Inspect intake	05/18/01
filters, replace if needed. Check belt tension, adjust if needed.	
Record amps on blower motors.	

4.0 Equipment Readings and Measurements:

SVES blower (Sutorbilt) amps - 24.9/25.3 @ 40" vac	Oxidizer
Combustion blower amps - 7.0/7.0	Temp controller - 550 deg (f)
Sparge blower amps - 18.0/17.5/18.5 @ 15 psi	Burner controller - 552 deg (f)
Auto pump out amps - 1.2/1.4	Cat controller - 540 deg (f)
Heat exchanger amps - 1.1/1.4/1.4	
Batch tank level - 2" water	LEL - 0%

5.0 Other Repairs Performed, parts needed, etc:

6.0 Equipment Status and Reasons for Downtime:

System operating upon arrival and departure.

Individual Completing this form, including company-

Scott Wakefield - H2 Oil Recovery Equipment, Inc.

76 Branded

Equipment Maintenance Report

Tosco Contact: Mr. Tim Johnson
Date: 06/20/01
Consultant & Contact: Geo Engineers, Inc. - Lisa Bona
Time: 12:30 PM
Contractor & Contact: H2 Oil Recovery Equipment, Inc. - Scott Hatcher
Weather: 80's & Sunny

1.0 System Description: *Site #255472 (Station 5472), 3460 First Ave S, Seattle Washington*
H2TCO250 Gas Catalytic oxidizer, Sutorbilt 4MP blower (3600 rpm) with 10 hp (230 vac, 1725 rpm, TEFC, 1 ph) motor, 55 gal. Moisture separator with Goulds 1ST 1/2 hp auto pump (230 vac, 1 ph), and 80 gal. Poly tank, all mounted on a 16' tandem trailer. Sutorbilt 4HP sparge blower with 20 hp (460 vac, 3 ph, 1755 rpm) motor and magnetic motor starter, and heat exchanger (mod #XCHAA-250) with motor (460 vac, 3 ph). All controls in Nema 4 boxes.
(attach schematic including manufacturer and date of purchase) Site #206-223-4002

2.0 Operational Hours During This Reporting Period:

Available (Total) Hours 14181.6	(a)	Total Operating Hours for this System:
Operating Hours	(b)	Hours since last major overhaul (if applicable):
Downtime Hours	(a - b)	

3.0 Routine Maintenance Required and Performed:

Description	Date
Observe complete system operation. Change oil and grease blower. Inspect intake	06/20/01
filters, replace if needed. Check belt tension, adjust if needed.	
Record amps on blower motors.	

4.0 Equipment Readings and Measurements:

SVES blower (Sutorbilt) amps - 27.3/27.4 @ 40" vac	Oxidizer
Combustion blower amps - 7.5/7.4	Temp controller - 556 deg (f)
Sparge blower amps - 20.6/20.1/20.7 @ 15 psi	Burner controller - 546 deg (f)
Auto pump out amps - 1.3/1.4	Cat controller - 531 deg (f)
Heat exchanger amps - 1.5/1.5/1.4	
Batch tank level - 6" water	LEL - 1%
	Hour meter - 14623.1 hrs

5.0 Other Repairs Performed, parts needed, etc:
High level in moisture separator - debris had fouled pump out system.

6.0 Equipment Status and Reasons for Downtime:
System down upon arrival. Serviced and restarted. Operating upon departure.

Individual Completing this form, including company-
Scott Wakefield - H2 Oil Recovery Equipment, Inc.