GeoEngineers

2924 Colby Avenue
Everett, WA 98201-4011
Telephone: (425) 252-4565
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# LETTER OF TRANSMITTAL

**To:** Timothy Johnson
Tosco Marketing Company
3977 Leary Way NE
Seattle, Washington 98107

**Date:** April 24, 2001

**File:** 4823-350-05

**Regarding:** Former Unocal Service Station 0191

**We are sending:** ☒ Attached ☐ Under Separate Cover

| Copies | Date | Description |
|---|---|---|
| 1 | 4/24/01 | Revised Report for former Unocal site No. 5472 |

**These are transmitted as checked below:**

☐ For Your Use ☐ As Requested ☐ Returned

☒ For Review and Comment ☐ Other (see remarks)

**We are sending via:**

☒ US Mail ☐ Overnight ☐ Courier

**Remarks:** Please discard the reports dated April 16, 2001 and replace it with this revised report. Please call if you have questions.

**Copy To:** Ben Amoah-Forson, Washington State Dept. of Ecology
Mike Hess, First Western Development Services

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APR 25 2001
DEPT OF ECOLOGY

Signed: for
Lisa J. Bona
Senior Geologist

LUST 1975 Unocal Station # 5472
LUST 84591
Seattle

DATE: April 24, 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 [First – 2001]:**

1. GeoEngineers monitored the system parameters in January, February and March, 2001. H2Oil Recovery conducted system O&M in January, February and March, 2001.
2. H2Oil Recovery restarted the system, which had shut down from power loss, during their February and March visits.

**WORK PROPOSED FOR NEXT QUARTER [Second - 2001]:**

1. Monitor the system operation parameters on a monthly basis.
2. 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 Fourth Quarter 2000 | (Yes/No) |
| Hydrocarbons Recovered This Quarter: | Approximately 15 gallons via vapor phase | |
| Hydrocarbons Recovered to Date: | Approximately 77 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 First 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:**

- Well vacuum increased during this reporting period as seasonal ground water levels increased.

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11/9/01

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: Debra Dwelley
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. | | | | | | | | | | |
| 11/22/00 | 10,681.0 | 141.4[6] | 546 | 540 | 49.3 | 280 | 2 | 332[6] | 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 2 (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 02/03/01 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** |

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** |

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** |

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

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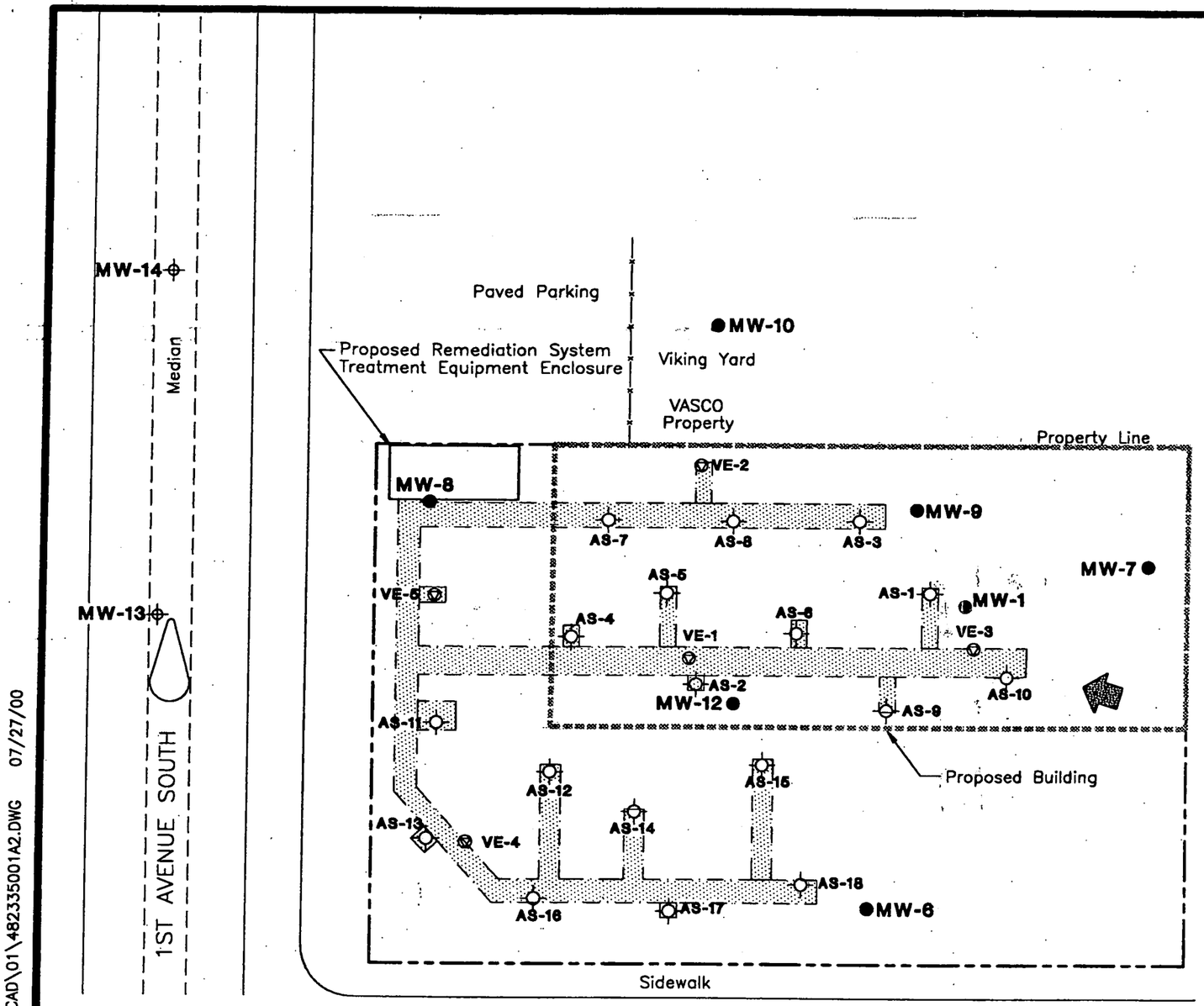


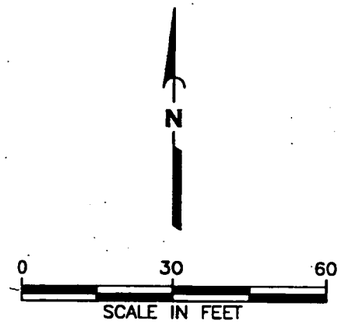


Peterson Pattern and Casting

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.

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

LJB:SYF P:\TOSCO\4823350\CAD\01\48233500 1A2.DWG 07/27/00

76 Branded

# *Equipment Maintenance Report*

Tosco Contact: Mr. Tim Johnson
Consultant & Contact: Geo Engineers, Inc. - Dave Cook
Contractor & Contact: H2 Oil Recovery Equipment, Inc. - Scott Hatcher

Date: 01/10/01
Time: 9:00 PM
Weather: 40's & Overcast

**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 | ( 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 | 01/10/01 |
| 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 - 26.0/26.0 @ 35" vac | Oxidizer |
| Combustion blower amps - 7.6/7.5 | Temp controller - 553 deg (f) |
| Sparge blower amps - 20.0/19.1/20.0 @ 15 psi | Burner controller - 541 deg (f) |
| Auto pump out amps - 1.4/1.2 | Cat controller - 540 deg (f) |
| Heat exchanger amps - 1.4/1.1/1.4 | |
| Batch tank level - 1-1/2" water | LEL - 0% |
| | Hour meter - 11884.3 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: 02/14/01

Consultant & Contact: Geo Engineers, Inc. - Dave Cook
Time: 12:00 PM

Contractor & Contact: 112 Oil Recovery Equipment, Inc. - Scott Hatcher
Weather: 37's & Overcast

**1.0 System Description:** *Site #255472 (Station 5472), 3460 First Ave S, Seattle Washington*
112TCO250 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 | ( 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 | 02/14/01 |
| filters, replace if needed. Check belt tension, adjust if needed. | |
| Record amps on blower motors. | |
| | |
| | |

**4.0 Equipment Readings and Measurements:**

| | |
|---|---|
| SVFS blower (Sutorbilt) amps - 25.0/26.0 @ 35" vac | Oxidizer |
| Combustion blower amps - 6.9/7.1 | Temp controller - 556 deg (f) |
| Sparge blower amps - 18.1/18.5/18.5 @ 15 psi | Burner controller - 551 deg (f) |
| Auto pump out amps - 1.3/1.3 | Cat controller - 540 deg (f) |
| Heat exchanger amps - 1.4/1.2/1.0 | |
| Batch tank level - 2" water | LEL - 0% |
| | |
| | Hour meter - 12472.0 hrs |

**5.0 Other Repairs Performed, parts needed, etc:**

**6.0 Equipment Status and Reasons for Downtime:**
System down upon arrival due to power loss alarm. Serviced and restarted. Operating upon departure.

***Individual Completing this form, including company-***
Scott Wakefield - 112 Oil Recovery Equipment, Inc.

76 Branded

# *Equipment Maintenance Report*

Tosco Contact: Mr. Tim Johnson
Consultant & Contact: Geo Engineers, Inc. - Lisa Bona
Contractor & Contact: H2 Oil Recovery Equipment, Inc. - Scott Hatcher

Date: 03/21/01
Time: 2:45 PM
Weather: 50'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 | 12807.1 | ( a ) |
| Operating Hours | | ( b ) |
| Downtime Hours | | ( a - b ) |

Total Operating Hours for this System:
Hours since last major overhaul (if applicable):

**3.0 Routine Maintenance Required and Performed:**

| Description | Date |
|---|---|
| Observe complete system operation. Change oil and grease blower. Inspect intake | 03/21/01 |
| 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 - 26.0/25.0 @ 37" vac | Oxidizer |
| Combustion blower amps - 7.3/7.0 | Temp controller - 550 deg (f) |
| Sparge blower amps - 18.8/17.5/18.0 @ 15 psi | Burner controller - 540 deg (f) |
| Auto pump out amps - 1.3/1.2 | Cat controller - 535 deg (f) |
| Heat exchanger amps - 1.3/1.1/1.1 | |
| Batch tank level - 2" water | LEL - 1% |
| | Hour meter - 12807 hrs |

**5.0 Other Repairs Performed, parts needed, etc:**
Re-programmed autodialer. Unit had reset itself. Tested and dialer works well, calling Scot Overdick upon alarm.

**6.0 Equipment Status and Reasons for Downtime:**
System down upon arrival due to power loss alarm. Serviced and restarted. Operating upon departure.

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