



emcon

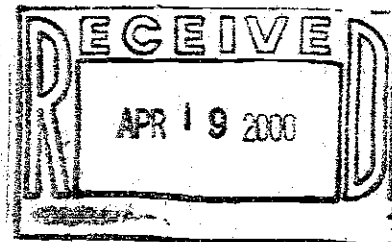
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April 17, 2000

Project 793842.08G00000

Serial Letter No. D0008-039

Mr. Lynden Belin
Southern Area Office
U.S. Army Engineer District, Alaska
P.O. Box 898
Anchorage, Alaska 99506-0898



Re: Second Operational Status Report Under, Task 8G, Vapor Extraction System
Building 986 Remedial Action, Fort Richardson, Alaska

Dear Mr. Belin:

EMCON Alaska, Inc. (EMCON), has been retained by the U.S. Army Corps of Engineers, Alaska District (USACE) under Delivery Order 008, Contract No. DACA85-94-D-0016, to perform operation and monitoring of the vapor extraction (VE) system at Building 986, Fort Richardson, Alaska. Under the awarded optional Task 8G, EMCON is performing operation and maintenance (O&M) and quarterly respiration testing. Throughout VE system operation, EMCON has conducted periodic monitoring and sampling to assess VE system performance. This letter report presents a summary of VE system performance from October 1999 through April 2000.

OPERATIONAL MONITORING

Since installation of the passive bioventing system after one year of VE system operation EMCON has performed monthly checks on the system operation. Currently the system is extracting soil gas from only the No. 3 VE well. This well is located in the former dry well location, which is surrounded by the 14 passive bioventing wells, as shown on the figure.

The system flow rates are remaining stable because only one well is currently open. No adjustments to the system are being made.



RESPIRATION SHUT DOWN TESTING

On October 18, 1999, the initial respiration testing was performed for a period of two days. Prior to shutting off the blower for the respiration test, the VE system was configured to extract air from VE Well No. 3; an initial effluent sample was then collected and initial soil vapor readings were taken from the three monitoring points. Readings were collected from each of the monitoring points on October 18, 1999, at ½-hour intervals for the first 4 hours of shutdown. On October 19, 1999, readings were collected every hour except, during a local power outage at mid day. Once the readings appeared to stabilize, the blower was turned back on.

The second respiration testing was conducted from January 17 to January 24, 2000. On January 17, the blower was shut off and readings were collected from the three monitoring points every hour for 6 hours. From January 18 to January 21, one reading was collected each day from the three monitoring points. The final readings were collected on January 24. No readings were collected over the weekend. After the last set of readings were collected from the monitoring points on January 24, 2000, the blower was turned back on. A sample of the effluent was collected for comparison with the initial effluent sample collected on October 19, 1999. The results of both of these samples will be reported in the second quarterly status report.

A third respiration test was conducted from April 3, 2000 to April 10, 2000. On April 3, prior to shutting off the VE system, an initial effluent air sample was collected and initial soil vapor readings were collected from each of the monitoring points. Within 15 minutes after system shut down on April 3, readings were collected from each of the monitoring points. At 45-minute intervals for the 4 hours following shutdown, readings were collected from the monitoring points. On the second day of the respiration test, readings were collected from each of the monitoring points twice, with a four hour interval separating the two events. After the second day of the shut down readings were collected once a day for the next six days (with the exception of April 9). Access to the site was limited due to the gate opening schedule, April 9, was a Sunday, site access was not available.

ANALYTICAL SAMPLING PROGRAM

Effluent Sampling

Prior to the initial respiration test conducted after installation of the passive bioventing wells, an effluent sample was collected from the VE system exhaust stack to estimate hydrocarbon-mass removal rates for the single well configuration. The sample was collected from the exhaust stack using laboratory-prepared, 1-liter Silco Summa[®] canisters. The sample was sent to Performance Analytical, Inc., of Simi Valley, California, for analysis. The effluent sample was analyzed for the following parameters:

- Total petroleum hydrocarbons (TPH) as gasoline by U.S. Environmental Protection Agency (EPA) Method TO-3
- Benzene, toluene, ethylbenzene, and xylenes (BTEX) by California Air Resources Board (CARB) Method 410
- Hydrogen sulfide (H₂S) by EPA Method 16.
- Methane (CH₄), carbon dioxide (CO₂), oxygen (O₂), and nitrogen (N₂) by EPA Method 25C

Prior to the respiration test conducted on April 3, 2000, an effluent sample was collected. This sample was collected in the same manner as previously stated and analyzed for the same compounds using the same methods.

FINDINGS

The results of the three respiration tests are presented in the attached charts. The readings for monitoring point MP1 (near the location of the former dry well) show that oxygen is being utilized at a linear rate and that carbon dioxide (the byproduct of biological activity) is increasing at a nonlinear rate, at both the 10-foot and 20-foot depth zones. These results indicate that biological activity is occurring in the area around MP1.

The readings from MP2 show that oxygen utilization and carbon dioxide concentrations were nonlinear in October 1999 at 10 feet but were linear at 20 feet. The results of the January and April 2000 monitoring at this location were similar. Due to the fluctuations seen in both oxygen and carbon dioxide concentrations for the 10-foot depth at MP2, it can be surmised that biological activity is sporadic due to the lack of nutrients or food (i.e.

Mr. Lynden Belin
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petroleum) for the microorganisms. There appears to be biological activity at the 20-foot depth at the location.

MP3 is away from the main area of contamination at the former dry well location. The concentrations of oxygen and carbon dioxide fluctuated significantly during both respiration tests. It appears that biological activity is minimal at this location. MP3 can be used to provide possible background information on the subsurface biological activity in areas where there is no significant amount of contamination.

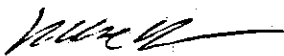
CONCLUSIONS

Review of monitoring and analytical data indicates that the VE system is remediating subsurface soil near the site of the dry well formerly located at Building 986. Observations to date indicate that remediation is progressing by two processes: physical removal of hydrocarbon vapors and, to a lesser degree, bioremediation through the utilization of oxygen in the soil gas.

Evidence of physical treatment and bioremediation is obtained through sampling and analysis of the extracted soil gas. Analysis of the VE system effluent for petroleum hydrocarbons indicates that the VE system is successfully extracting contaminants. The presence of slightly elevated CO₂ concentrations in soil gas analyzed from the VE system exhaust stack may be an indication of hydrocarbon biodegradation in the soil at this site. In addition, atmospheric oxygen concentrations in the soil gas indicate that oxygen is not currently limiting hydrocarbon biodegradation.

The data collected from the three soil gas monitoring points indicate that biodegradation is occurring in the soils at the site where contamination is found.

Sincerely,
EMCON Alaska, Inc.



Lance Raymore,
Project Manager

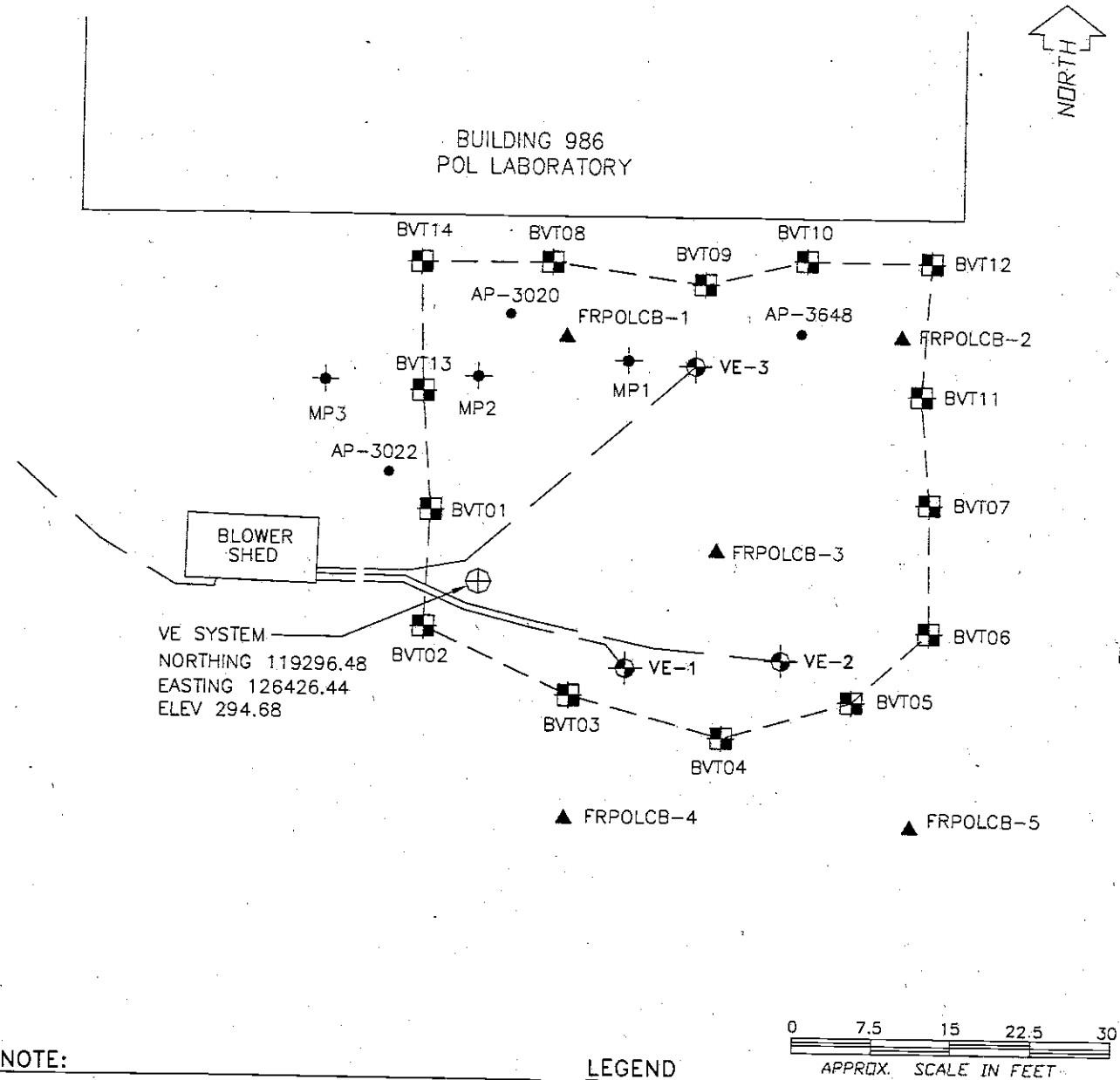
Attachments: Figure - Site Layout
Monitoring Point Respiration Testing Charts

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LIMITATIONS

The services described in this report were performed consistent with generally accepted professional consulting principles and practices. No other warranty, express or implied, is made. These services were performed consistent with our agreement with our client. This report is solely for the use and information of our client unless otherwise noted. Any reliance on this report by a third party is at such party's sole risk.

Opinions and recommendations contained in this report apply to conditions existing when services were performed and are intended only for the client, purposes, locations, time frames, and project parameters indicated. We are not responsible for the impacts of any changes in environmental standards, practices, or regulations subsequent to performance of services. We do not warrant the accuracy of information supplied by others, nor the use of segregated portions of this report.



NOTE:

CONTROL IS BASED ON COORDINATES PROVIDED BY COE SURVEY SECTION IN LOCAL FORT RICHARDSON GRID SYSTEM. ELEVATIONS ARE TO MEAN SEA LEVEL DATUM. UG LINES SHOWN CONNECTING THE VE WELLS TO THE BLOWER ARE AS DESCRIBED BY EMCON STAFF AND LOCATED BY STAKES PLACED AT ANGLE POINTS ON GROUND SURFACE. MONUMENT "VE SYSTEM" IS A STANDARD COE DISK MONUMENT SET AS PER EM 1110-1-1002 WITH FINNED ROD SECTION, DRIVEN TO A 4' REFUSAL DEPTH.

LEGEND

- MP1 SOIL GAS MONITORING POINTS
- VE-1 VAPOR EXTRACTION WELL
- AP-3020 MONITORING WELL
- FRPOLCB-4 CONFIRMATION BORING LOCATION
- BVT01 BIOVENTING WELLS
- MONUMENT
- SUBSURFACE PIPE



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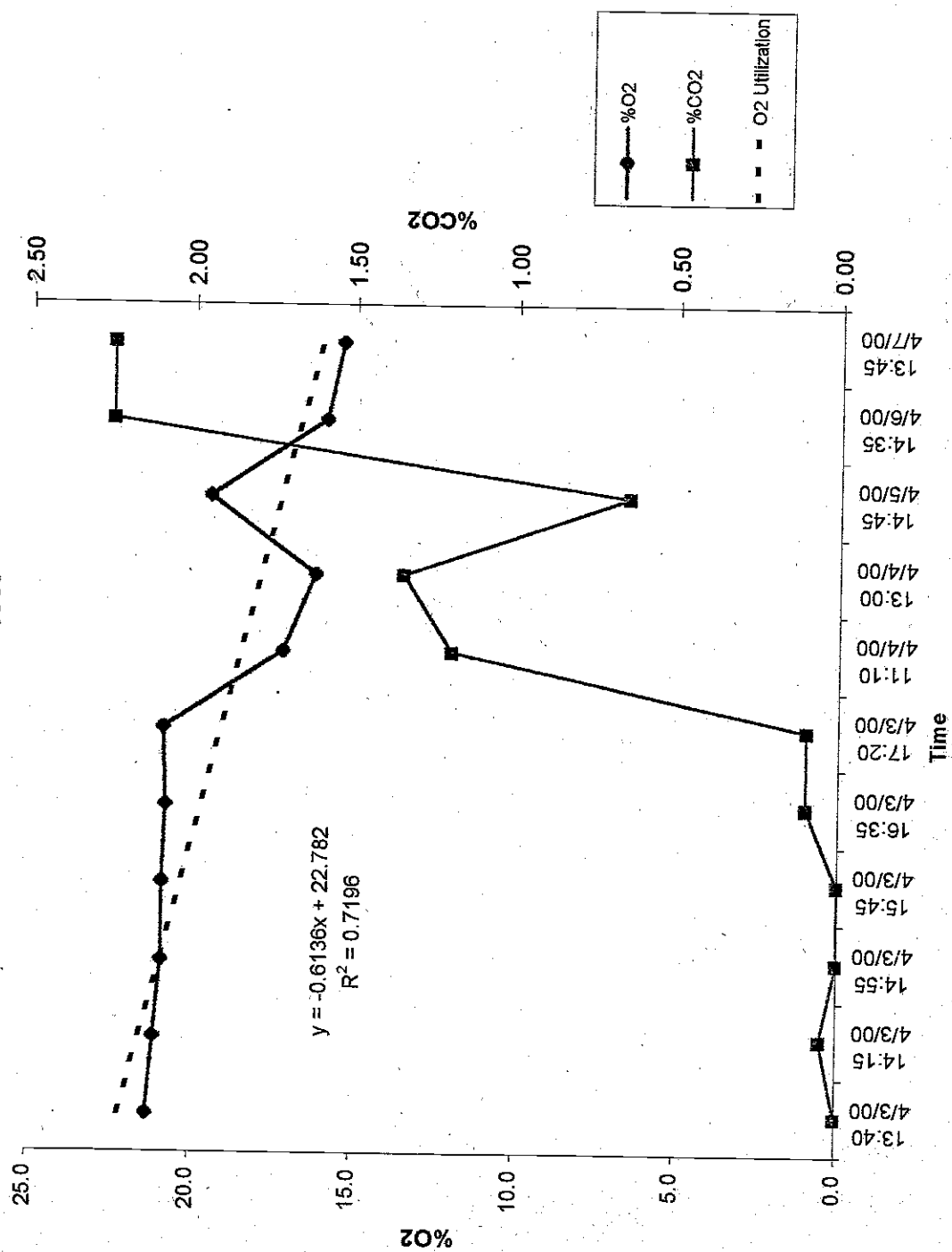
FORT RICHARDSON
BUILDING 986 REMEDIAL ACTION
Anchorage, Alaska

SITE LAYOUT

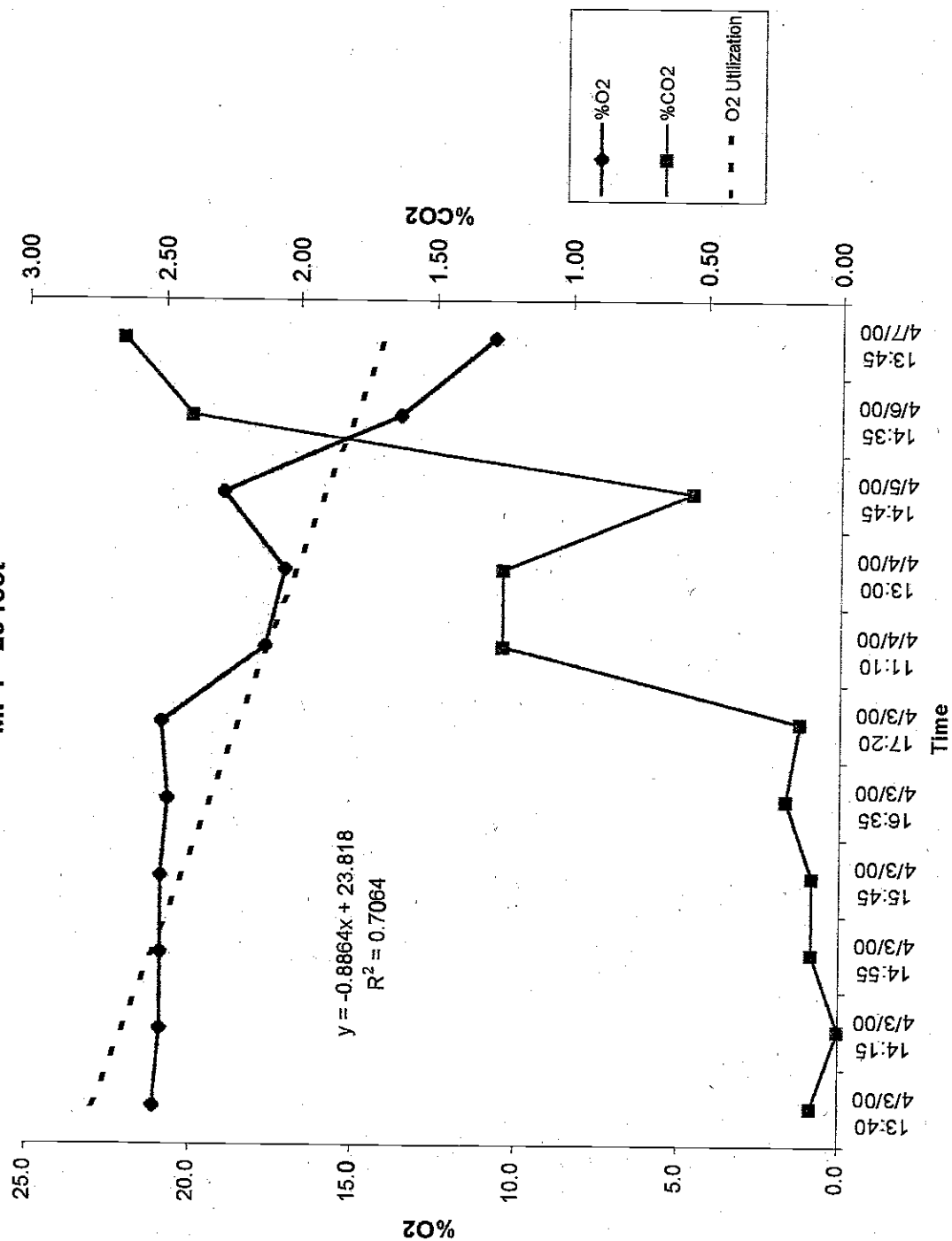
FIGURE

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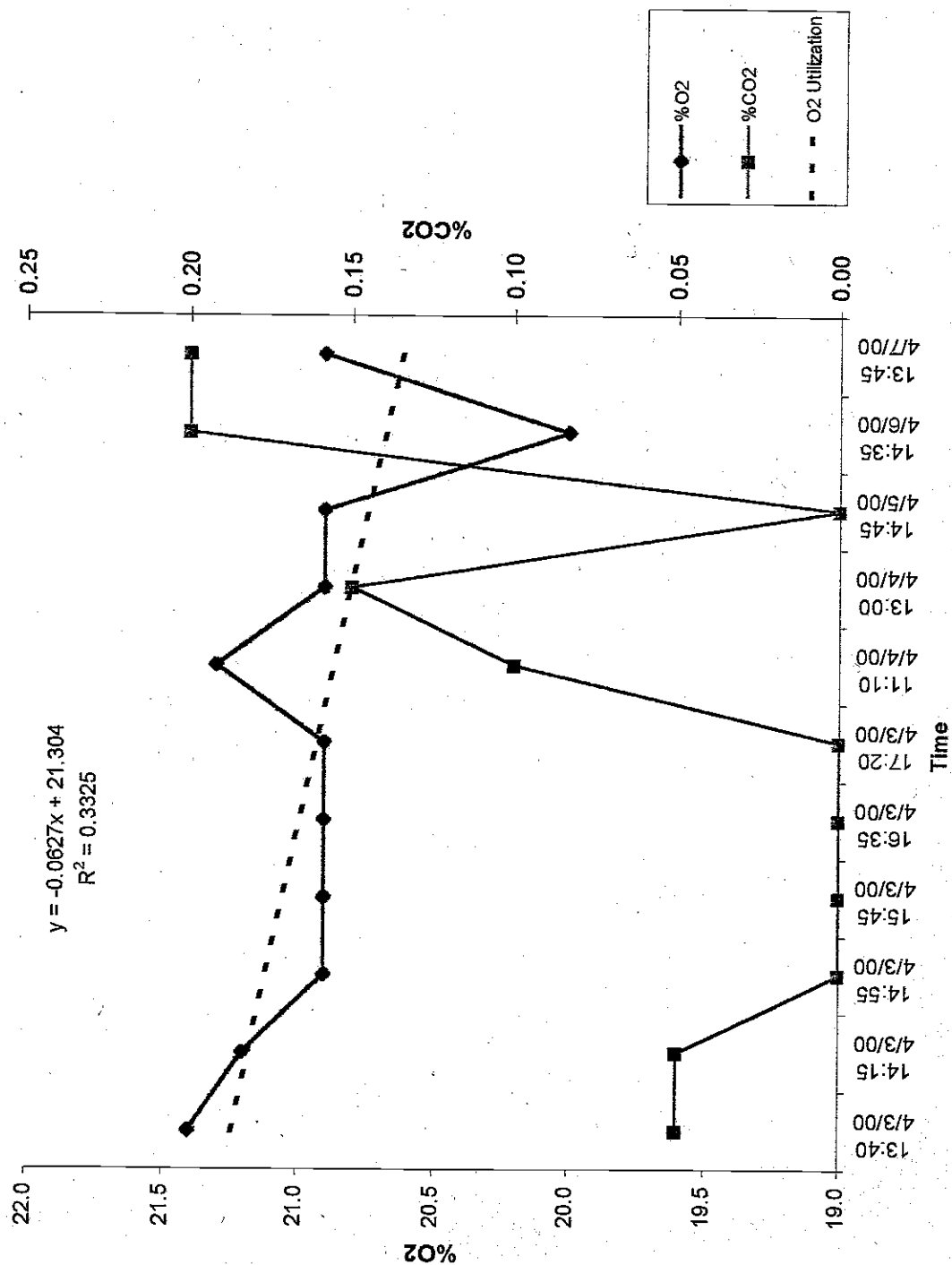
April 2000
MP1 - 10 feet



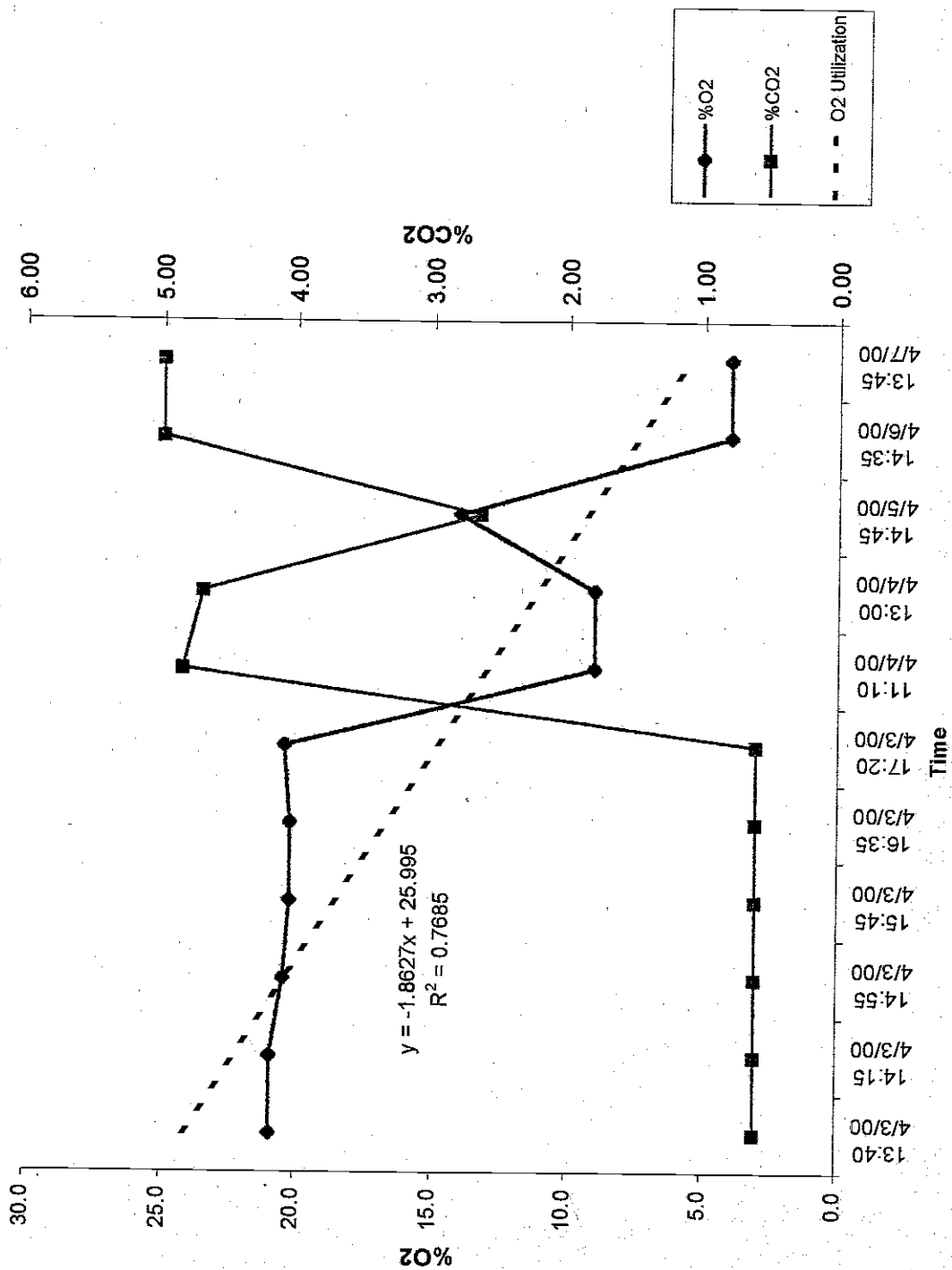
April 2000
MP1 - 20 feet



April 2000
MP2 - 10 feet



April 2000
MP2 - 20 feet



April 2000
MP3 - 10 feet

