

Case Study of a petroleum remediation project site using Subsurface Metabolism Enhancement (SME, patent # 6,464,005)

V-1 Oil Company, Facility ID# 1200286, Release ID# EIAU, 1219 Gibson Avenue, Ogden, UT; Bob Clayton, President. A release of gasoline was discovered during tank closure. Fuel was found in the soil and groundwater, with a heavy sheen observed on the groundwater. The treatment area covered approximately ½ acre. Corrective action was approved by the Utah Division of Environmental Response and Remediation (DERR) and immediately installed using a pilot form of Subsurface Metabolism Enhancement (SME).

A significant advancement in the technology came with the development of an automatic air flow control valve. Use of this device provided rapid reduction of total petroleum hydrocarbons (TPH). The automatic air flow control valve allowed an uninterrupted and consistent flow rate of air into the biospargers. Due to the stabilization of the flow rate, the TPH, which was not dropping in concentration as expected, dropped below the target concentration within one quarter. The automatic air flow valve administers a constant flow of air regardless of the back pressure from the compressor, the head pressure from changing groundwater levels, barometric pressure or changes in the air volume in the header lines.

SME started up in November 2000 and concluded in June 2003. Dissolved benzene was reduced to target concentrations within three quarters of corrective action startup. Use of the automatic air flow control valves was demonstrated to reduce TPH to target clean up within one quarter after the valves were installed.

Over 15,200 pounds of hydrocarbons were removed from the soil and groundwater at this site, 69% was metabolized in the subsurface by indigenous microbes and the balance was emitted to the atmosphere as volatile hydrocarbons as permitted by the Division of Air Quality. Based upon the monitor well data, 99.6% of the TPH and 100% of the benzene was removed from the groundwater. The *No Further Action* letter was issued by DERR on May 20, 2004.



Above: Hydrocarbon sludge floating on groundwater left of the failed underground storage tank.

Below: Failed underground storage tank broke in half during removal.

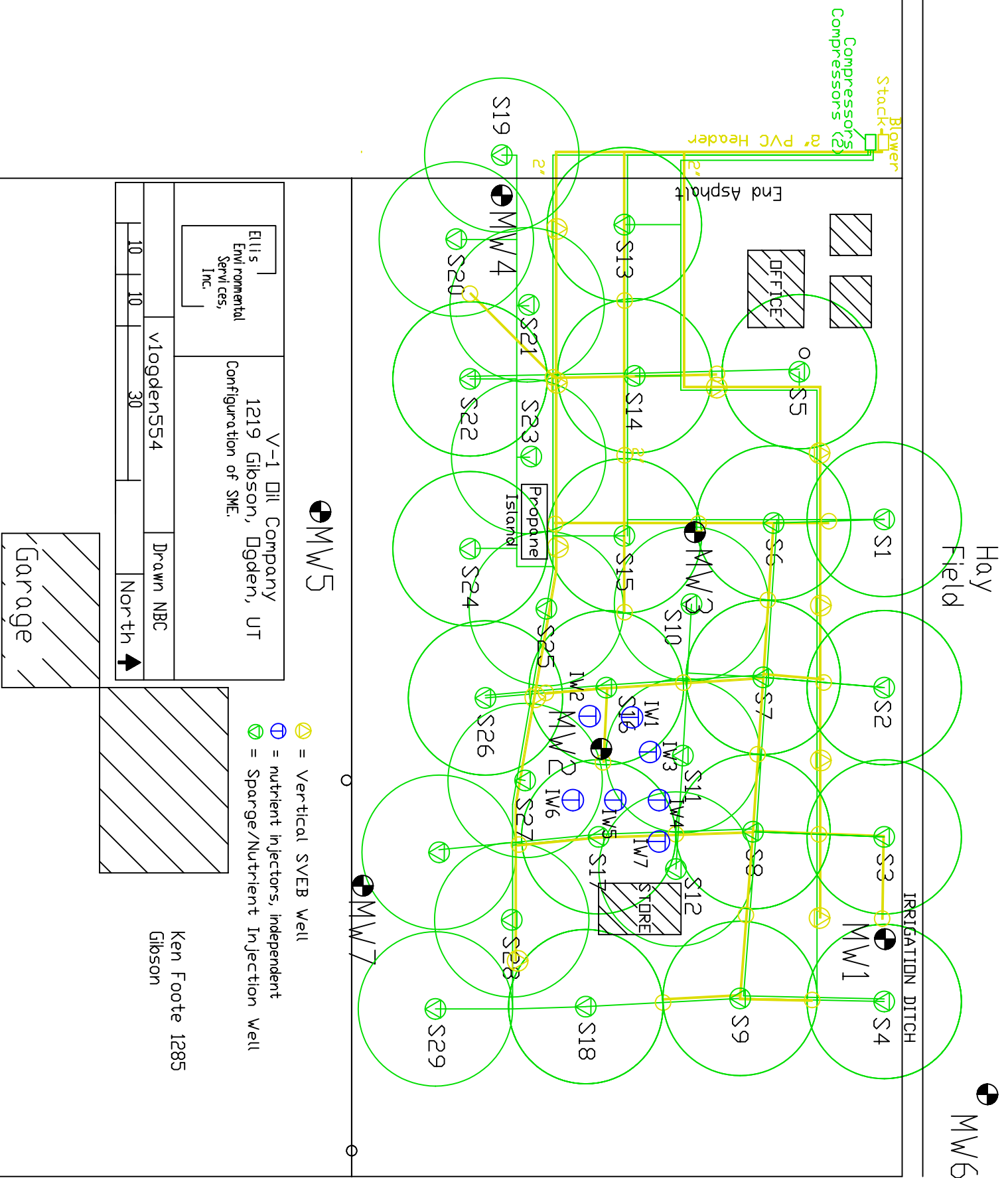




Above: Using a push probe to install the biosparge screens used to inject air (oxygen) into the subsurface soil and groundwater.

Below: Drilling and installation of components complete, SME components are ready for connection and the surface seal.





Ellis Environmental Services, Inc.
 V-1 Oil Company
 1219 Gibson, Ogden, UT
 Configuration of SMC.

10	10	30	North
v1ogden554			Drawn NBC

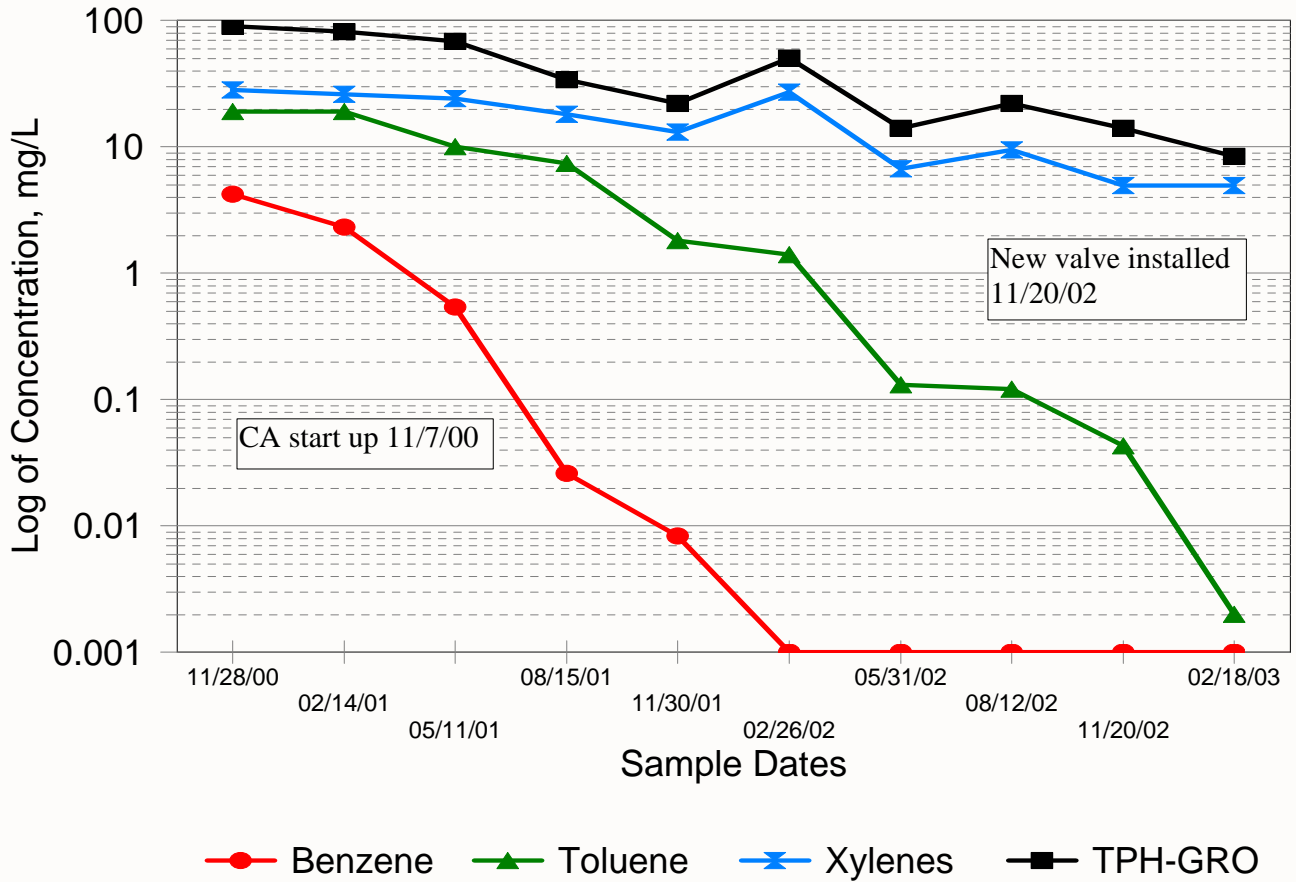
Garage

- = Vertical SVEB Well
 - = nutrient injectors, Independent
 - = Sparge/Nutrient Injection Well
- Ken Foote 1285
Gibson

GIBSON AVENUE

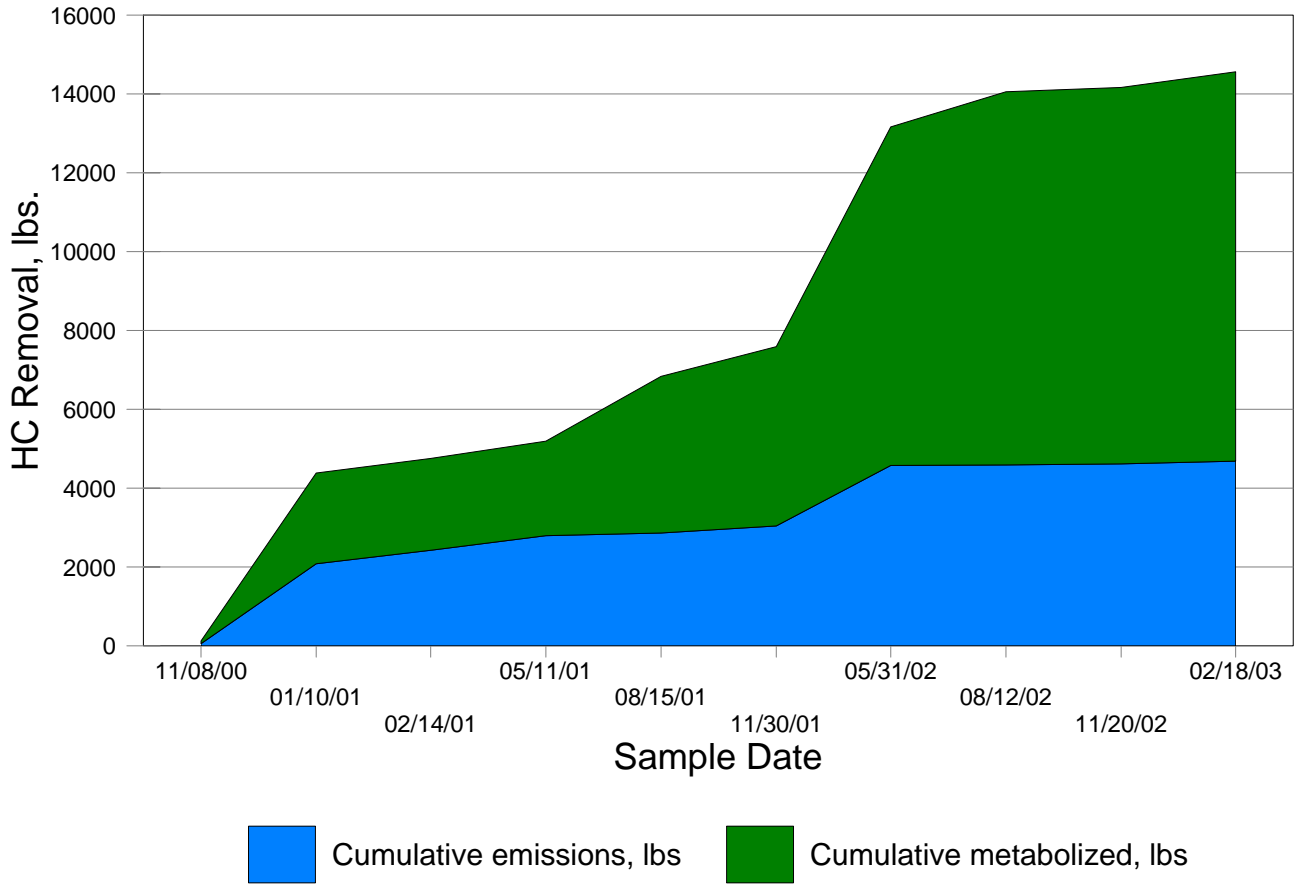
V-1 Oil Company, Ogden, UT

Fate of HC in MW2 Using SME Prototype



V-1 Oil Company, Ogden, UT

HC Removal by SME





State of Utah

Department of
Environmental Quality

Dianne R. Nielson, Ph.D.
Executive Director

DIVISION OF ENVIRONMENTAL
RESPONSE AND REMEDIATION
Brad T Johnson
Director

OLENE S. WALKER
Governor

GAYLE F. McKEACHNIE
Lieutenant Governor

ERRL-0661-04

May 20, 2004

Bob Clayton
1800 North Holmes Avenue
Idaho Falls, Idaho 83403-1527

Re: **No Further Action, Leaking Underground Storage Tank Release**
V-1 #99-554, located at 1219 Gibson Avenue, Ogden, Utah
Facility Identification No. 1200286, Release EIAU

Dear Mr. Clayton:

The file for this release has been reviewed by the Division of Environmental Response and Remediation (DERR) project manager, who has recommended that no further corrective action be taken at this time. This no further action applies only to the specific Release EIAU. This recommendation is based on the information contained in the file for this release supplied by you, your consultant or another representative.

The information submitted indicates that any detectable petroleum contamination from this release is not a threat to human health or the environment according to Utah Administrative Code, Rule R311-211. In the future, if other evidence indicates a spread of contamination from this release which may cause a threat, further corrective action may be required.

If you have any questions regarding this matter, please contact **Mark Crim**, the DERR Project Manager, at (801) 536-4100.

Sincerely,

Brad T Johnson, Executive Secretary (UST)
Utah Solid and Hazardous Waste Control Board

BTJ/MEC/klv

cc: Gary House, B.S., M.P.H., Director, Weber-Morgan Health Department
Linnette Hutton, Winder & Haslam, P.C.
Mark Ellis, Ellis Environmental Services, Inc.