

# How to Utilize Mobile Enhanced Multi-Phase Extraction (MEME) Effectively



Since 1998 Fruits and Associates, Inc. has concentrated on building and implementing a viable mobile remediation platform and we have termed High-Vacuum Remediation for completing episodic MEME events. The idea behind High-Vacuum Remediation for completing episodic MEME events was two fold:

1. To provide high impact remediation at sites without the capital expenditure of a fixed based system.
2. To put the system on a platform that allows for a wide variety of operation options and data collection capabilities under a wide range of subsurface conditions.

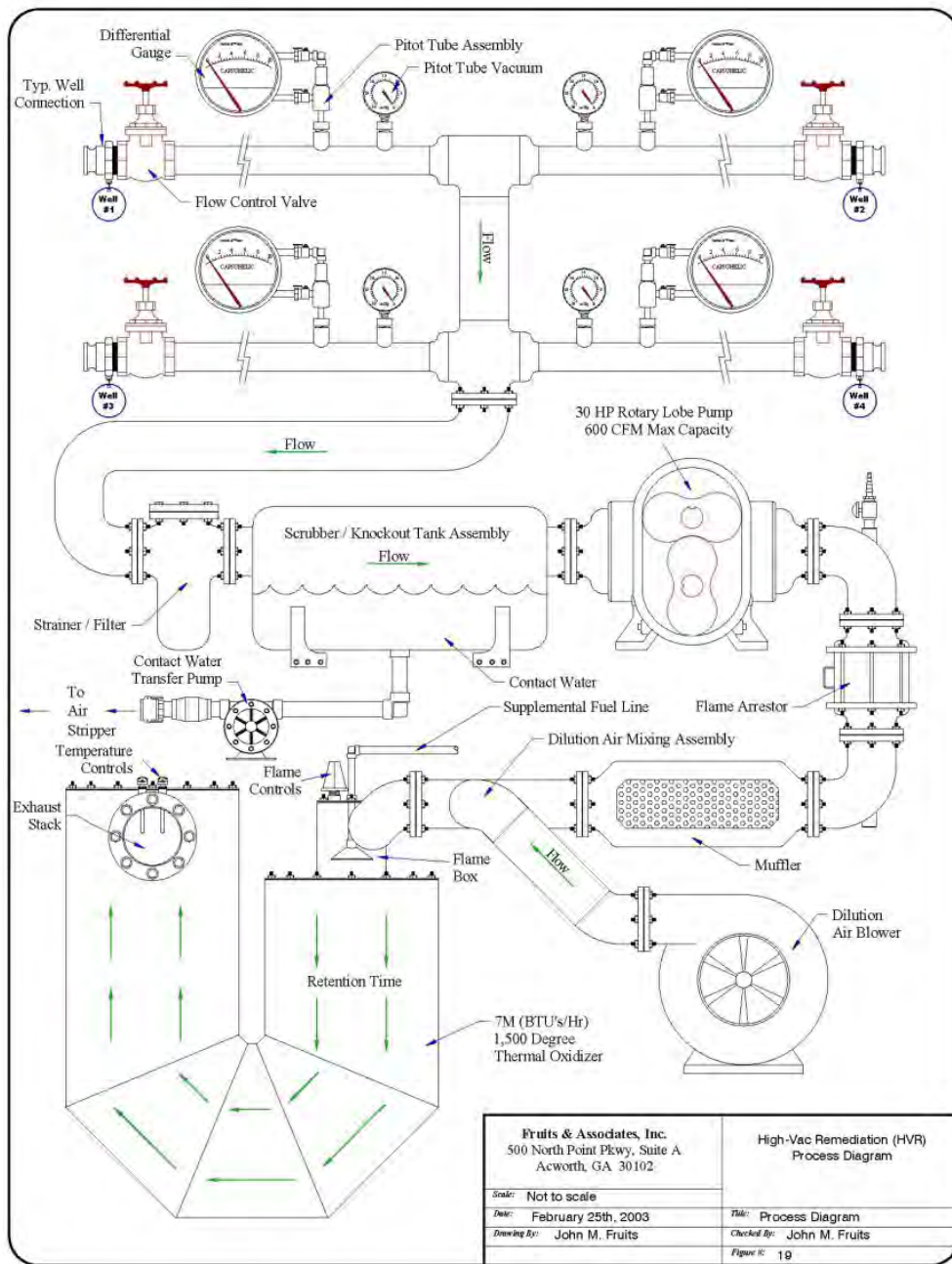


Some of the major benefits to MEME is it's mobility, it's capacity to provide a turn-key service, and it's ability to enhance and increase the effectiveness of a variety of remediation applications.



## Here is some general information regarding our HVR units:

- Utilizes a 30 horsepower - variable speed - rotary lobe compressor, which is capable of 25" of mercury.
- The entire process is monitored and controlled by an onboard Telemetry Computer. This allows the system to operate in an unattended mode.
- All process controls include fail safe switches with redundancy switches installed at critical operating points.
- Up to six extraction wells can be connected simultaneously providing individual extraction well flow rates.
- The off-gas destruction is accomplished in our 7 million BTU/hr Thermal Oxidizer (THOX) unit which provides a hydrocarbon destruction rate of approximately 50-75 gallons per hour.
- Each HVR Unit has the ability to extract and store 3,000+ gallons of impacted groundwater for disposal.

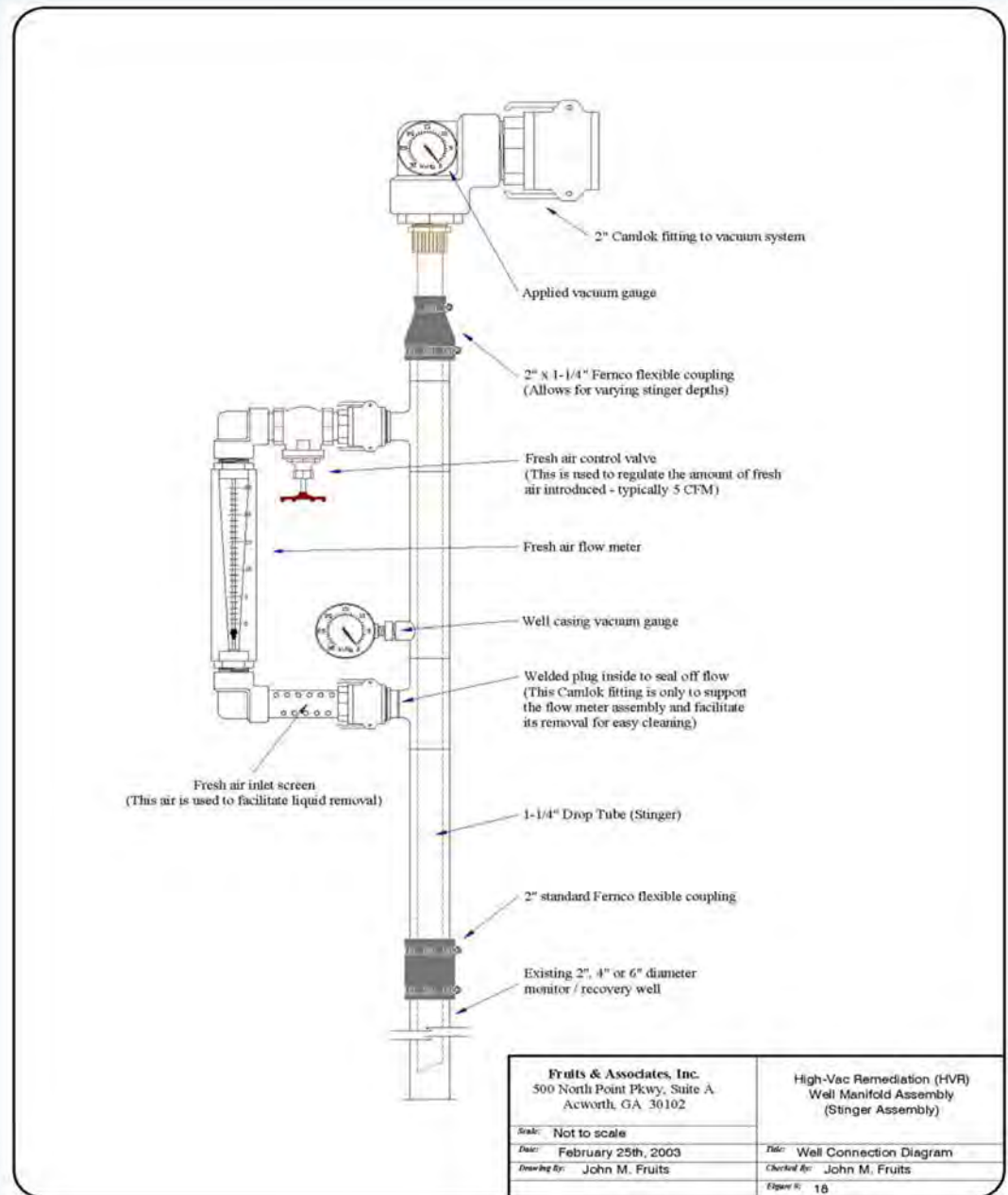


During the extraction process, the combined air and liquids are transferred to the HVR mobile treatment system. The liquids are separated from the airflow with a liquid scrubber/knock-out system and discharged into an internal storage tank for later disposal.

The hydrocarbon vapors are transferred to the off-gas treatment system and are incinerated in our forced air THOX unit. After thorough destruction of the contaminants in the air stream, the clean air is discharged into the atmosphere.

A drop tube assembly commonly known as a stinger is used to facilitate the extraction of vapors, groundwater and free phase product from on-site monitoring well and/or recovery wells.

The stinger assembly and piping configuration should allow for data to be collected at each individual well head in addition to the overall site data collected at the HVR unit.



## Event Duration/Cost of Recovery

**8-Hour Event in Norcross, GA** – New release. One well with 1.85 ft. of LNAPL. Extracted from LNAPL well and two recovery wells.

*287.9 equiv. gallons of hydrocarbons removed  
1,700 gallons of PCW  
~\$13.00 per equiv. gallon*

**24-Hour Event in Atlanta, GA (Event #3)** –Scope was three events each month for 90 days. Three LNAPL wells ranging from 0.12 ft. to 1.05 ft. in thickness. 1<sup>st</sup> event had five LNAPL wells ranging from 0.35 ft. to 1.41 ft. Rotated extraction between 8 on-site wells.

*195 equiv. gallons of hydrocarbons removed (Total 689)  
5,993 gallons of PCW (Total 15,444)  
~\$39.00 per equiv. gallon (Total ~\$32.00)*

## Event Duration/Cost of Recovery

**48-Hour Event in Knoxville, AL (Event #13)** – Eleven LNAPL wells ranging from 0.11 ft. to 1.17 ft. in thickness. Rotated extraction between 8 on-site wells.

*554 equiv. gallons of hydrocarbons removed (Total 3,691)*

*11,550 gallons of PCW (Total 115,795)*

*~\$20.00 per equiv. gallon (Total ~\$23.00)*

**96-Hour Event in Decatur, GA (Event #3)** – Three LNAPL wells ranging from 0.28 ft. to 1.28 ft. in thickness. Historical LNAPL has been over 2 ft. at times. Extracted from 4 on-site wells.

*675 equiv. gallons of hydrocarbons removed (Total 1079.05)*

*4,700 gallons of PCW (Total 22,333)*

*~\$27.00 per equiv. gallon (Total ~\$30.00)*



# Pilot Testing

MEME is the perfect tool to assist in the development of a remediation strategy and remediation system design. Data can be collected across the spectrum of airflow, vacuum, GW recovery rates, TOV concentrations, & ROI. Examples of this are:

- Stinger depth vs. TOV readings
- Stinger depth vs. Air flow
- Stinger depth vs. Historic DTW
- Vacuum vs. Airflow
- Vacuum vs. ROI
- Vacuum vs. GW Recovery Rates
- Well vs. Well



# Surfactant & In-Situ Remediation

Consultants and clients are seeing the added value in evaluating and implementing in-situ remediation alternatives at project sites. However, the key to in-situ remediation has and will always will be Contact, Contact, Contact! To that end, combining HVR with in-situ remediation techniques can provide the following benefits at relatively low cost:

- Increase in radius of influence and the creation of a “pulling effect” (ChemOx)
- The creation of a cone of depression to allow better smear zone contact. (ChemOx & Surfactant)
- The creation of a capture zone and a means for mobile high vacuum extraction. (Surfactant)



# MEME w/ Episodic Air Sparging

Combination of MEME and episodic air sparging has brought along a new approach to providing site clean-up and/or site polishing while avoiding having to operate a fixed base system. This combination of mobile technologies can provide a means to address:

- On and off-site dissolved phase VOC concentrations.
- Remediation of outlining non-capture zones.
- Remediation of small and/or nuisance source areas.



Thanks!!!!

