Dual-Phase Extraction

UST Permit #: _____ Release #: _____

Do not proceed unless the full extent of the contamination for the release has been delineated.

I. Applicability Determination (Initial Screening)	Effective	Somewhat Effective	Ineffective
1. Provide a general description of the **intrinsic permeability (k)*** of soils in the area of remediation measured in cm^2. ☐ Based on soil type ☐ Calculated ☐ Field/lab test *Stratified soils may require special consideration in design to ensure less-permeable stratum are addressed. This will require documentation.*	☐ $k \geq 1x10^{-8}$	☐ $1x10^{-8} \geq k \geq 1x10^{-11}$	☐ $k < 1x10^{-11}$
2. What is the general boiling point range in °C for chemicals subject to remediation at this site? *For complex mixtures, select the boiling point range that is most representative of the chemicals of concern to be remediated by using this remedy.*	☐ < 250	☐ ≥ 250 - ≤ 300	☐ ≥ 300
3. What is the depth in feet to groundwater based on the shallowest well in area where remediation is being performed? *If water-table elevation fluctuate significantly, special design provisions must be made to accommodate them.*	☐ > 10ft	☐ ≥ 3 - ≤ 10	☐ < 3
4. What is the moisture content (%) of soil in area of remediation?	☐ < 50	☐ ≥ 50 - ≤ 80	☐ > 85
5. What is the vapor pressure range in mm of the chemicals being remediated? *For complex mixtures, select the vapor pressure range that is most representative of the chemicals of concern to be remediated by using this remedy.*	☐ ≥ 1	☐ > 0.5 - < 1.0	☐ < 0.5
6. What is the Henry's law constant** (atm) for the chemicals being remediated? *For complex mixtures, select the Henry's law constant range that is most representative of the chemicals of concern to be remediated by using this remedy.*	☐ > 150	☐ ≥ 100 - < 150	☐ < 100

* *Intrinsic permeability is a measure of the ability of soils to transmit fluids and is the single most important factor in determining the effectiveness of DPE.*

** *Here is a link to an EPA website with common Henry's Law Constant for various chemicals. Choose* H_{px} *(partial pressure/mole fraction)*
https://www3.epa.gov/ceampubl/learn2model/part-two/onsite/esthenry.html

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II.a DPE System Design	Effective	Somewhat Effective	Ineffective
1. What is the radius of influence (ROI) for the proposed extraction wells in feet? *The wells must be identified by showing the ROI on a site diagram.*	☐ > 20 ft.	☐ > 5 - ≤ 20	☐ < 5
2. Has the radius of influence (ROI) been calculated for each soil type at the site? *For more complex sites with multiple treatment depth intervals and/or the need for multiple extraction wells, was subsurface airflow modeling conducted to determine well placement.*	☐ YES		☐ NO
3. Is the proposed well density appropriate, given the total area to be cleaned up and the radius of each well?	☐ YES		☐ NO
4. Is the blower selected appropriate for the site conditions?	☐ YES		☐ NO
5. Is wellhead vacuum determined from field pilot studies and between 3 and 100 inches of water?	☐ YES		☐ NO
6. Is the vapor extraction flow rate between 2 and 50 cfm per well?	☐ YES		☐ NO
7. Are groundwater extraction rates sufficient to capture groundwater with constituent concentration above cleanup goal?	☐ YES		☐ NO

Answering "no" to more than one question in Section II.a. indicates that DPE may not be very effective for the site.

II.b DPE System Design			
1. Are air injection of passive inlet wells proposed?	☐ YES		☐ NO
2. Is the proposed air injection/inlet well design appropriate for this site?	☐ YES		☐ NO
3. Are surface sealing materials proposed appropriate for this site?	☐ YES		☐ NO

Dual-Phase Extraction

III. Evaluation of Operation and Maintenance

1. What is the estimate of time the achieve cleanup of the site with the anticipated extraction flow rates?

_____ days

Daily monitoring of the DPE system must be performed for the first week of operation. At a minimum, the following should be monitored and provided in CAP Monitoring report : flow measurements, vacuum readings, and vapor concentrations, carbon dioxide and oxygen concentrations.

Weekly monitoring of the DPE system is recommended, but in no case should the monitoring of flow measurements, vacuum readings, and vapor concentrations, carbon dioxide and oxygen concentrations be less than every two weeks. This information should be provided in the CAP monitoring report.

List the monitoring and analytical parameters that will be sampled quarterly as part of the CAP monitoring report. *Use the Cap Analytical Parameters Attachment sheet.*

Example	
Well Name	Substance(s)
MW - 1	BTEX, MTBE
MW - 3	BTEX, MTBE

III. Sitemap

Attach a sitemap to this document

Sitemap(s) drawn to scale illustrating the following:

a. Location of all present and former tanks, piping and dispensers in area of release;
b. Footprint of surface and/or subsurface soil contamination;
c. Footprint of other structures (buildings, canopies, roads, utilities, etc..);
d. Location of treatment systems;
e. Location of extraction wells;
f. Location of monitoring wells that will be used for sampling;
g. Groundwater flow direction;
h. North arrow, bar scale, and map legend

CAP Analytical Parameters Attachment

Well/Sample Location	Parameters to be Monitored

Comments