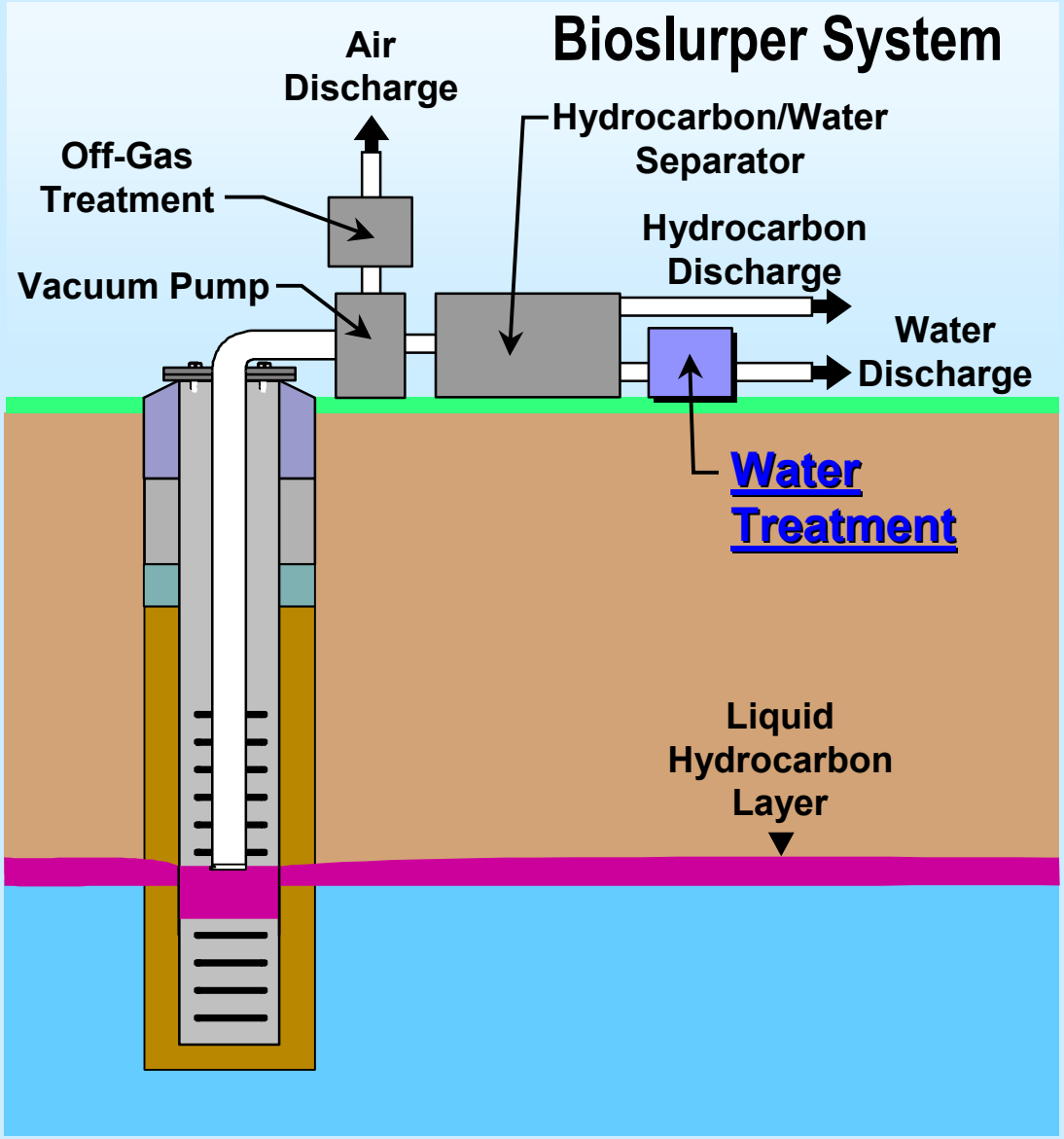
Ex Situ Groundwater Treatment (GWTT)
Example 1 (Chlorinated Solvents)



Halogenated VOCs:
PCE, TCE, 1,2,-DCE, Vinyl Chloride

Non-halogenated VOCs:
BTEX, TPHs

Treatment Design Flowrate:
60 gpm

pH: **6.2**

SO_4: **80 mg/L**

Hardness:
200 mg/L (as $CaCO_3$)

Fe: **0.4 mg/L**

Mn: **0.3 mg/L**

TDS: **750 mg/L**

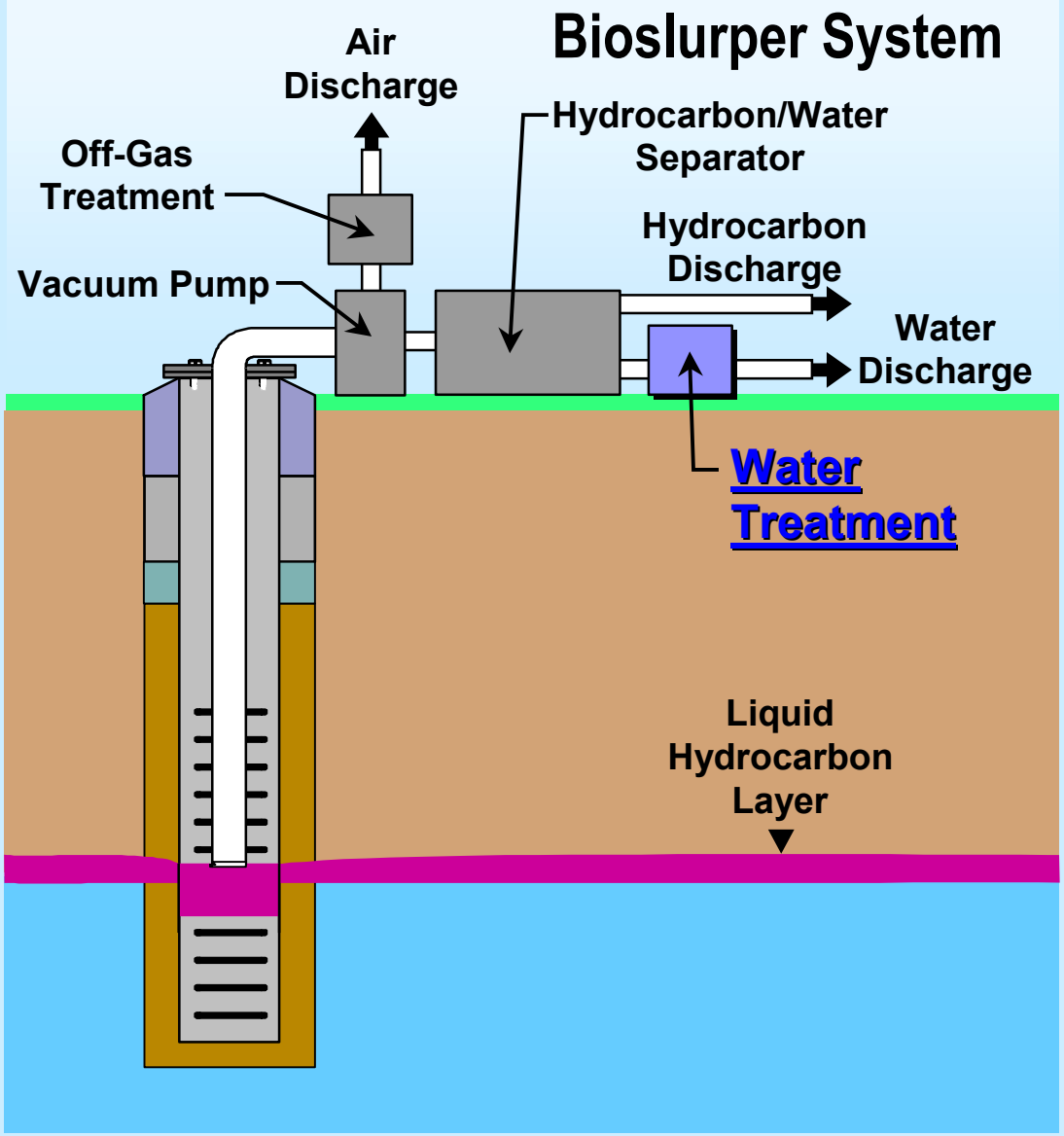
TSS: **0.4 mg/L**

LNAPL: **Present**

GWTT
Example 1 Output

Recommended Ex Situ Groundwater Treatment Train	
Treatment Train Steps	**Recommended Processes**
Oil/Water Separation Processes:	Gravity Separation Dissolved Air Floatation
Pre-treatment/Water Quality Adjustment:	Not Applicable
Primary Inorganic Treatment Options:	Not Applicable
Primary Organic Treatment Options:	(1) Air Stripping (2) Chemical Oxidation (Organics) (3) Constructed Wetlands (4) Ultraviolet Light/Chemical Oxidation (5) Sprinkler Irrigation
Inorganic Polishing:	Not Applicable
Organic Polishing:	Granular Activated Carbon
Post-treatment:	Not Applicable

GWTT
Example 2 (Metal [Arsenic])



Metals:
As 500 ug/L

Treatment Design Flowrate:
250 gpm

pH: **6.2**

SO_4: **600 mg/L**

Hardness:
50 mg/L (as $CaCO_3$)

Fe: **100 mg/L**

Mn: **80 mg/L**

TDS: **3000 mg/L**

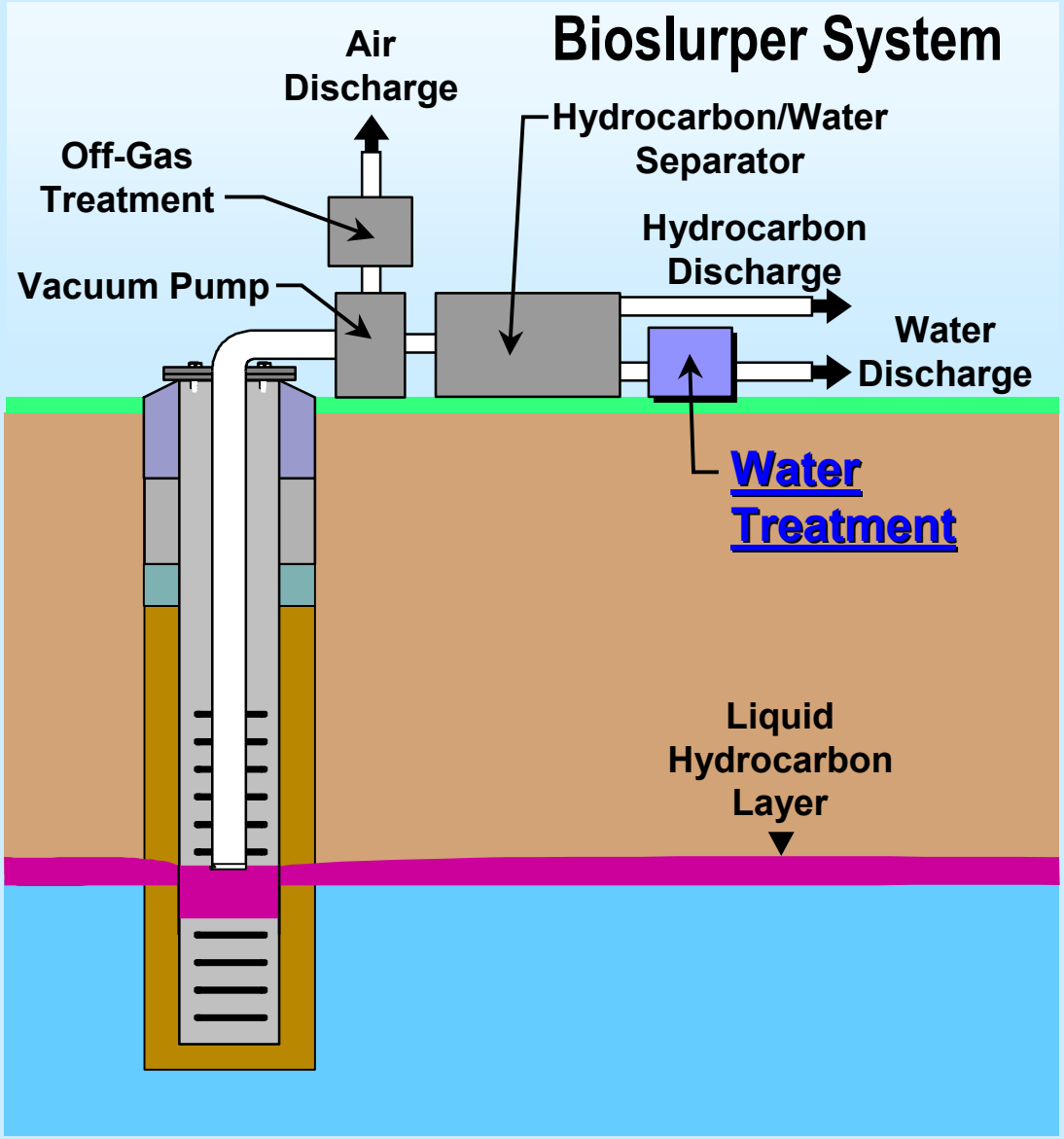
TSS: **0.4 mg/L**

LNAPL: **Not Present**

GWTT
Example 2 Output

Recommended Ex Situ Groundwater Treatment Train	
Treatment Train Steps	**Recommended Processes**
Oil/Water Separation Processes:	Not Applicable
Pre-treatment/Water Quality Adjustment:	Fe/Mn Removal
Primary Inorganic Treatment Options:	(1) Chemical Reduction/Oxidation (2) Precipitation (Hydroxide or Sulfide) (3) Activated Alumina (4) Reverse Osmosis
Primary Organic Treatment Options:	Not Applicable
Inorganic Polishing:	Ion Exchange
Organic Polishing:	Not Applicable
Post-treatment:	Filtration

GWTT
Example 3 (PCBs, Dioxins, Furans)



Other Organic Contaminants:
PCBs, Dioxins, Furans 0.3 mg/L

Treatment Design Flowrate:
10 gpm

pH: **6.2**

SO_4: **80 mg/L**

Hardness:
200 mg/L (as $CaCO_3$)

Fe: **0.4 mg/L**

Mn: **0.3 mg/L**

TDS: **750 mg/L**

TSS: **0.4 mg/L**

LNAPL: **Not Present**

GWTT
Example 3 Output

Recommended Ex Situ Groundwater Treatment Train	
Treatment Train Steps	**Recommended Processes**
Oil/Water Separation Processes:	Not Applicable
Pre-treatment/Water Quality Adjustment:	Not Applicable
Primary Inorganic Treatment Options:	Not Applicable
Primary Organic Treatment Options:	(1) Air Stripping (2) GAC (3) Ultraviolet Light/Chemical Oxidation
Inorganic Polishing:	Not Applicable
Organic Polishing:	Granular Activated Carbon
Post-treatment:	Not Applicable