

# **Enhanced In Situ Hydrocarbon Recovery: Dual Phase Vacuum Extraction and Pneumatic Fracturing Project**

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# Outline



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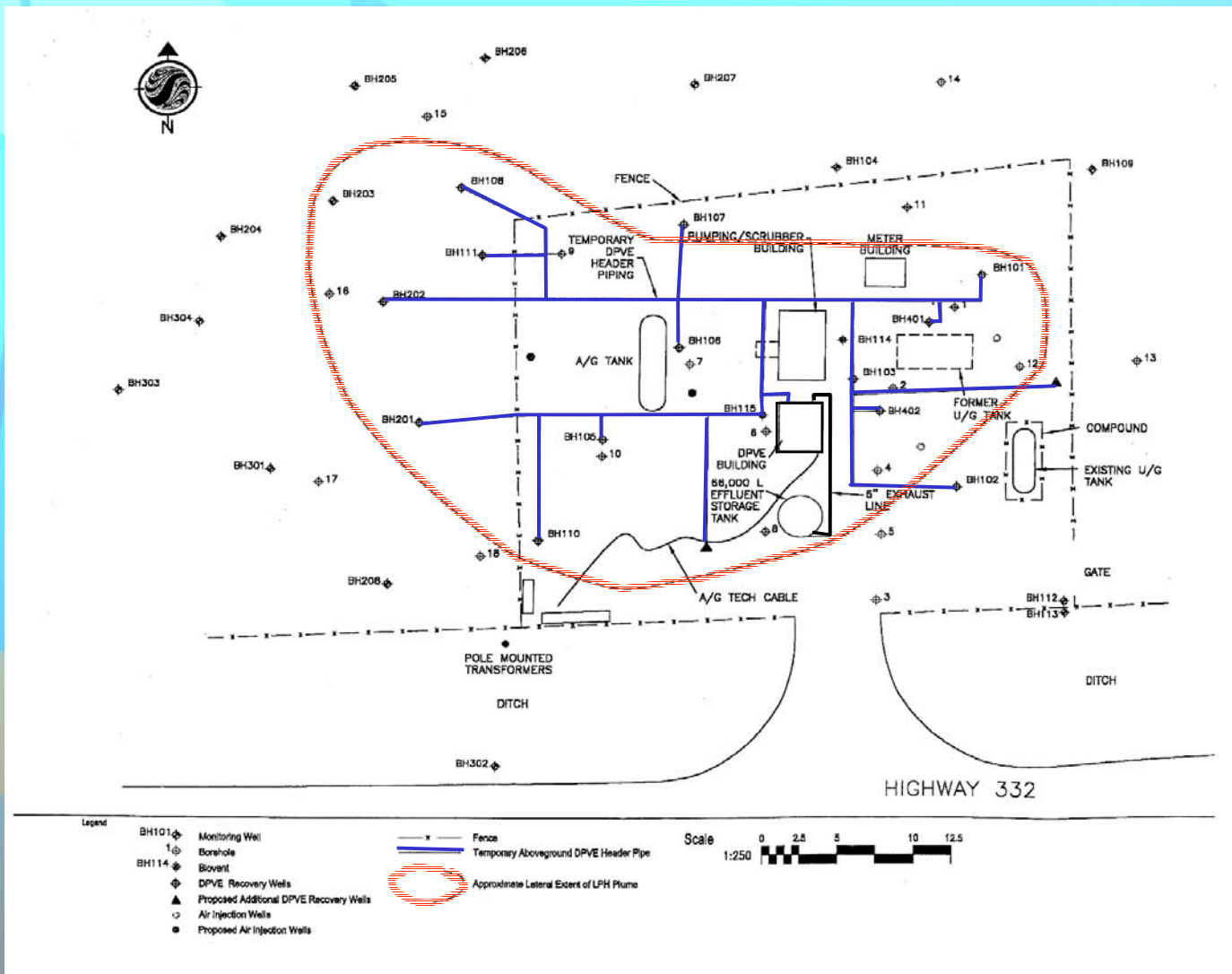
- **Introduction**
- **Dual Phase Vacuum Extraction (DPVE)**
- **Pneumatic Fracturing**
- **Remediation Equipment**
- **Results**
- **Summary**

# Introduction

## • Site Plan



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# Introduction



## •Site Photographs

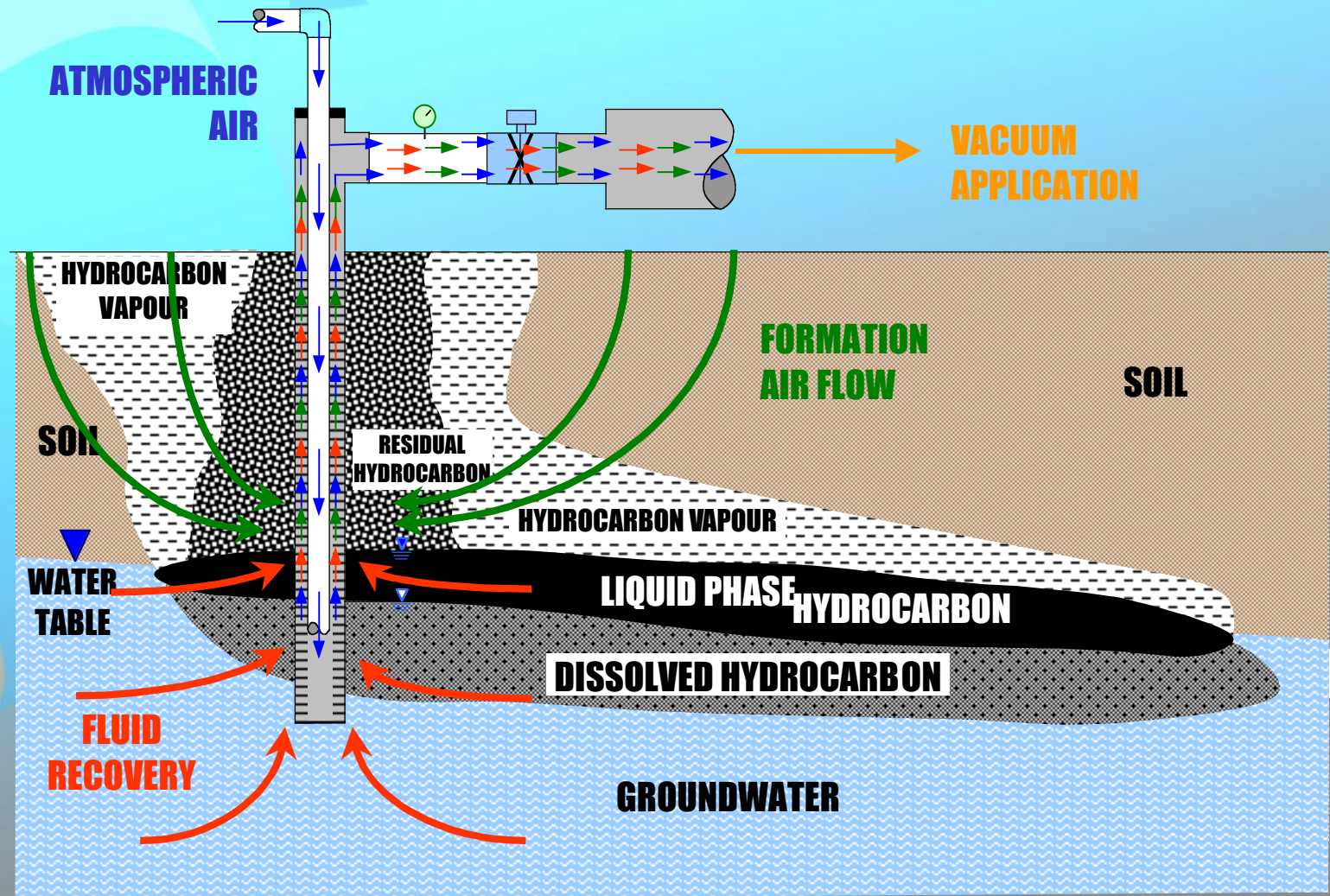


# DPVE



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## • Operation



# DPVE



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## • System Photographs

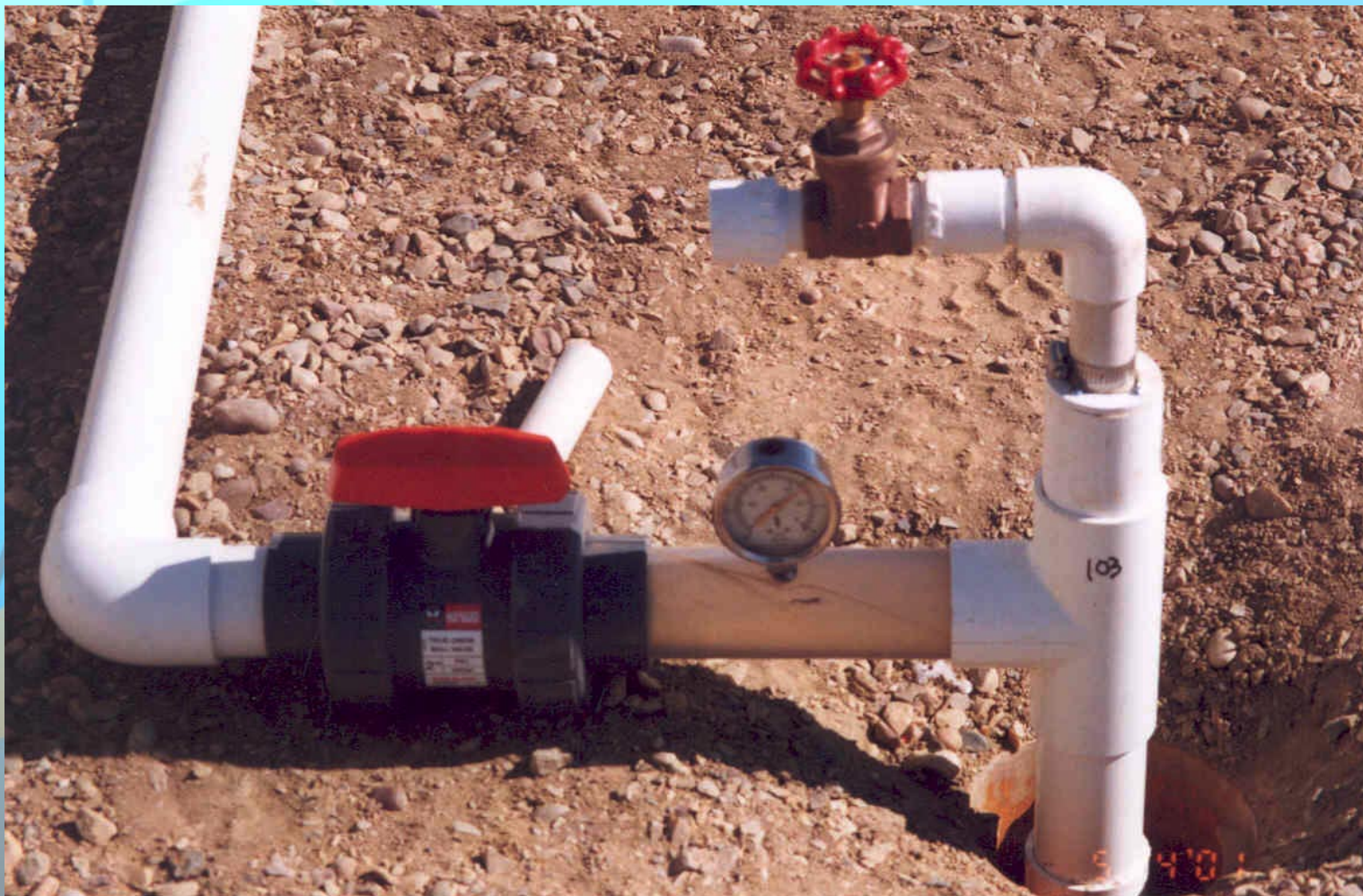


# DPVE



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## •Recovery Well Construction

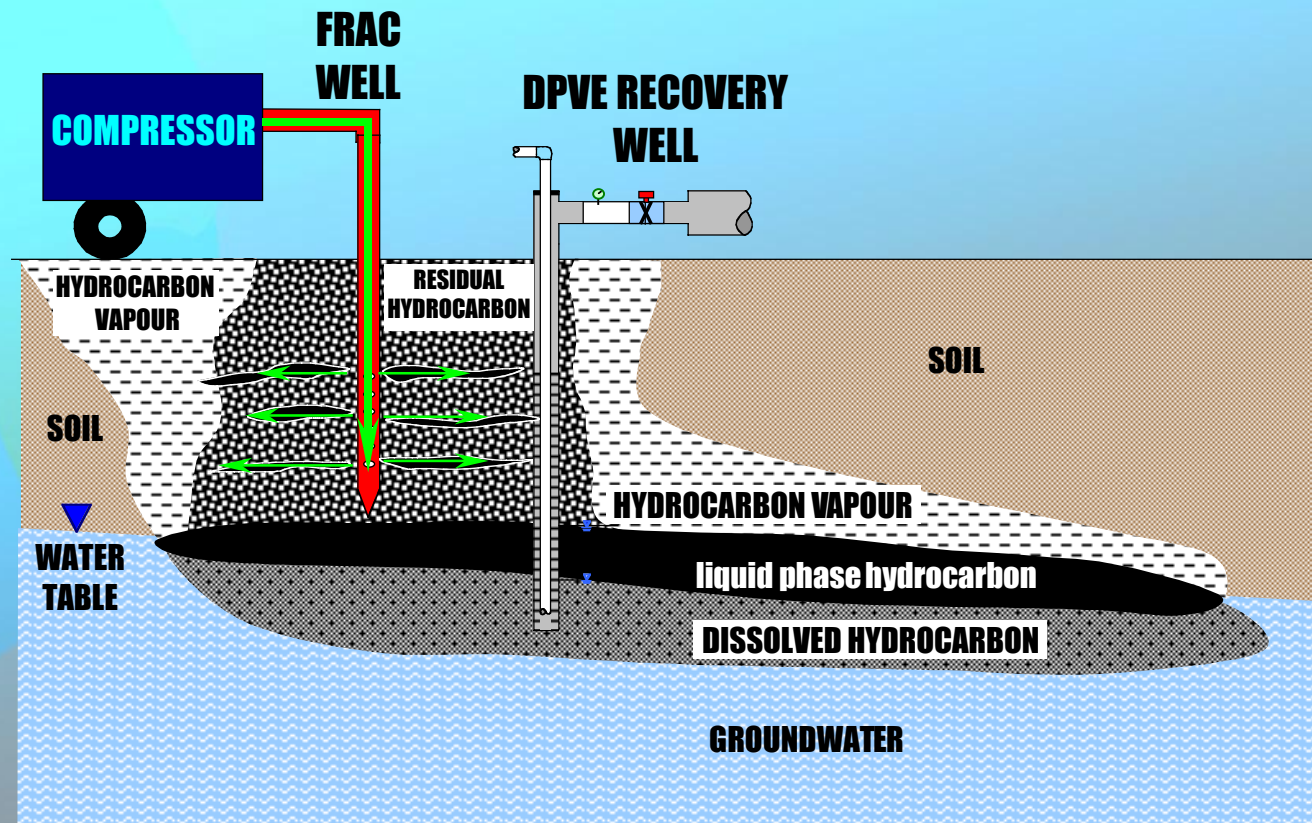


# Pneumatic Fracturing



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## • Operation





# Pneumatic Fracturing



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## • Installation Photographs



# Remediation Equipment



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## •Construction

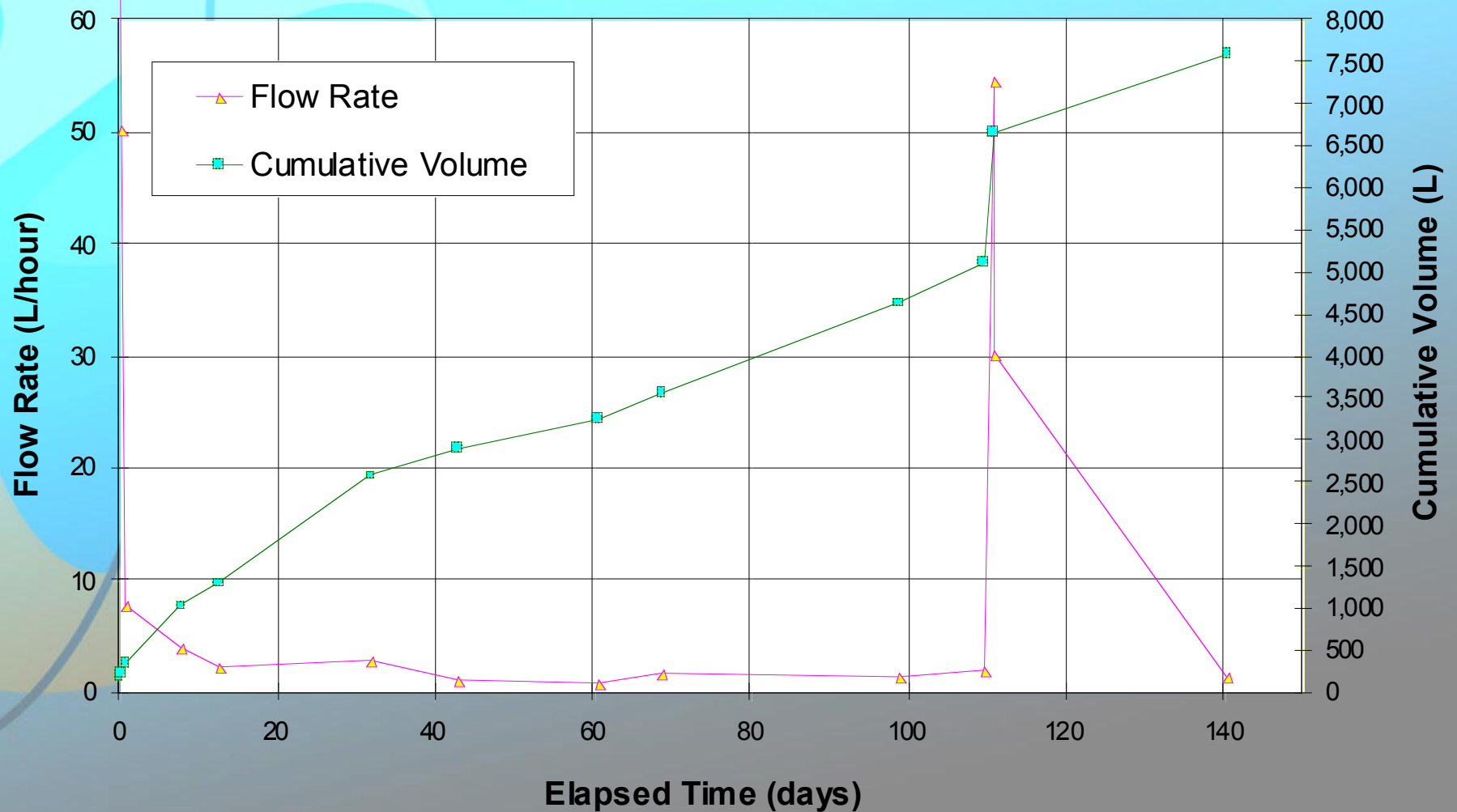


# Results



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## • Hydrocarbon Recovery

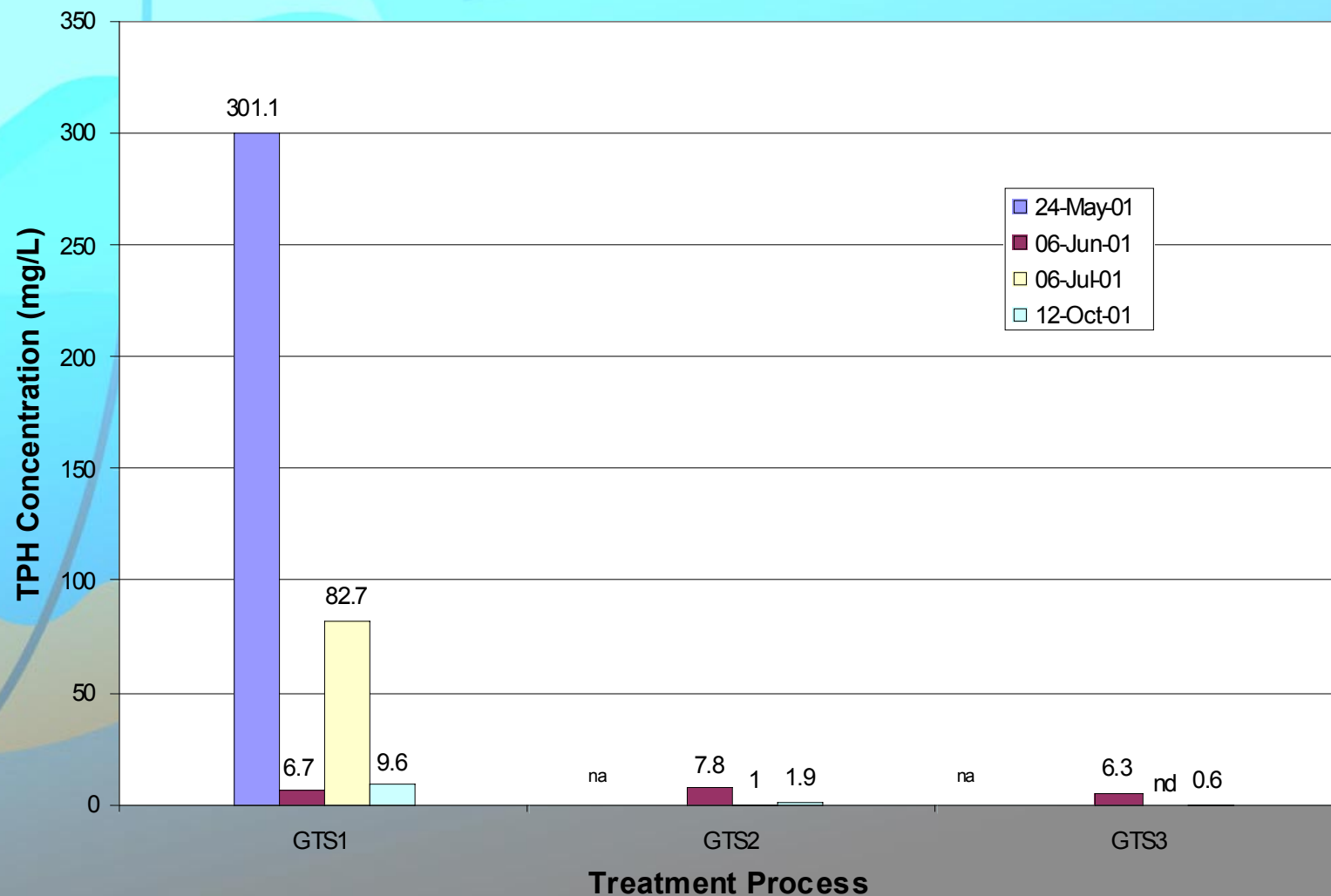


# Results



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## •Groundwater Treatment System

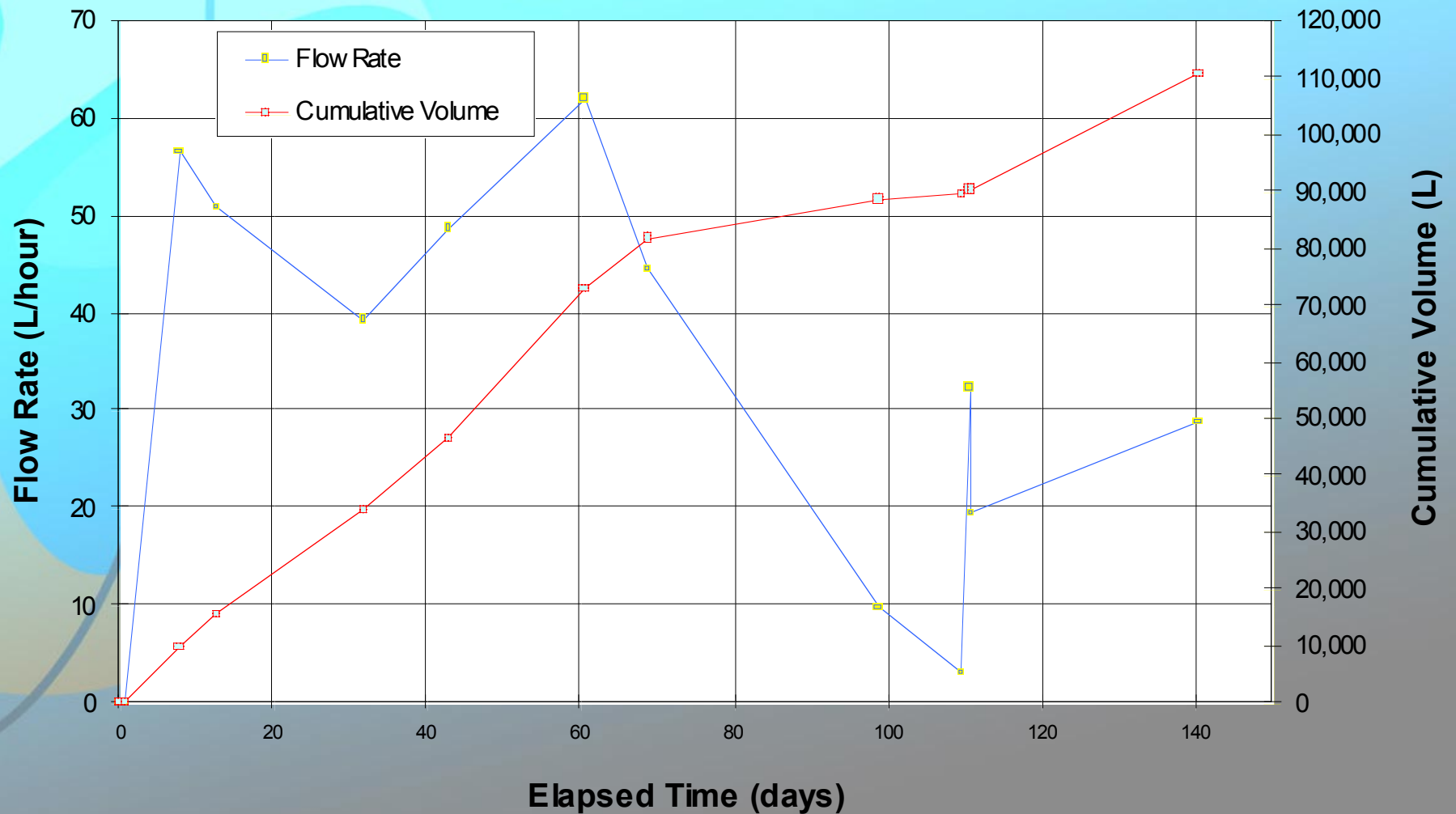


# Results



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## • Groundwater Recovery

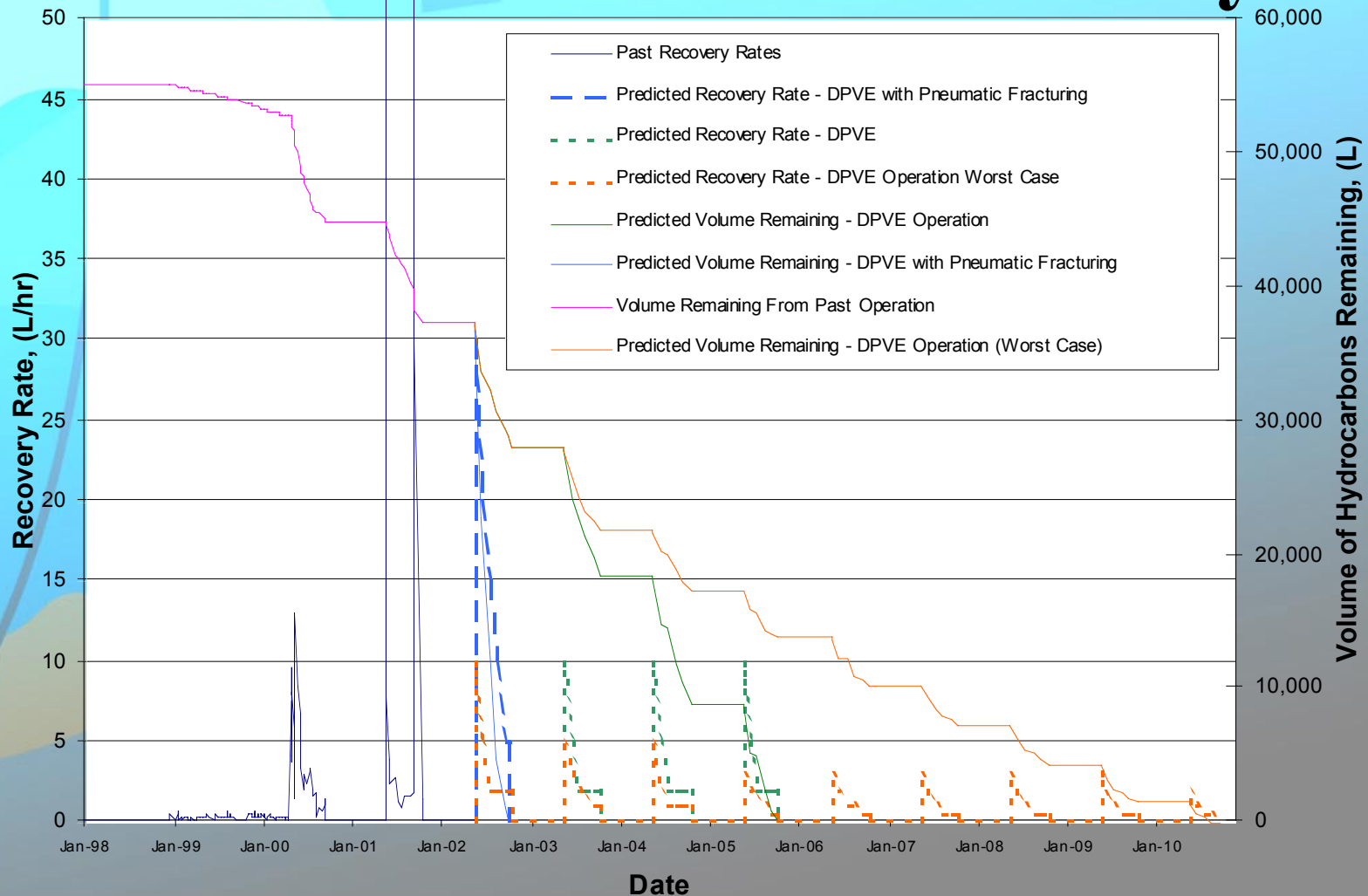


# Summary



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## • Remediation Timeline Summary



# Summary



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- **Continued DPVE operation demonstrated decreasing recovery approaching diminishing returns**
- **The pneumatic fracturing pilot study demonstrated potential to significantly increase hydrocarbon recovery rates**
- **The remedial timeline was decreased from years to months**

# Acknowledgements



**TransGas Limited**

**Ground Effects Environmental Services Inc.**