C1.06 – Raptor Refinery Environmental Remediation

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Project Overview

The Raptor refinery site is undergoing corrective actions to address soil and groundwater contamination caused by refinery operations. The project focuses on mitigating environmental risks to nearby residential areas, ecosystems, and the Tyrannosaurus River while ensuring regulatory compliance and protecting public health.

Alternatives Considered

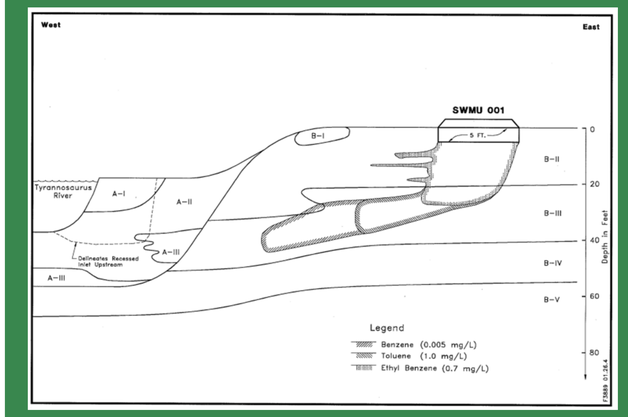
Chosen Alternative:

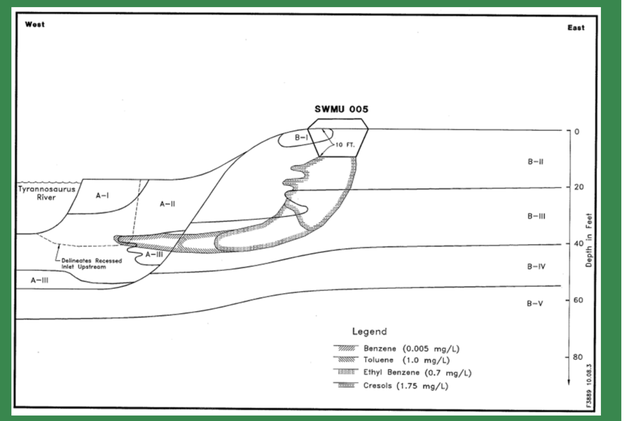
- 4” wells
  - 6 at a depth of 5’
  - 6 at a depth of 40’
- Air Compressor: 25 hp
- Vacuum Pump: 20 hp

Other Alternative:

- 4” wells
  - 12 at a depth of 40’
  - 25 hp wells
- 1 hp pumps
- 1.5 million gallons COC’s
- 15 exchanges
- 5 GPM

Groundwater Contamination





Cost Analysis

Alternative 1: Capital Cost

Item	Quantity	Unit	Unit Cost	Cost
Mobilization/Demobilization	1	LS	$1,500	$1,500
Drilling/Installation	270	LF	$65	$17,500
Redevelop Existing Monitoring Wells	270	LF	$12	$3,240
Air Compressor	1	LS	$21,000	$21,000
Vacuum Pump	1	LS	$17,500	$17,500
Equipment Accessories	1	LS	$10,000	$10,000
Monitoring/Control System	1	LS	$15,000	$15,000
Electrical/Utility Connections	1	LS	$10,000	$10,000
Carbon Treatment Unit	1	LS	$12,500	$12,500
			Subtotal	$200,000
Engineering	1	LS	10%	$11,000
Construction Oversight	1	LS	10%	$11,000
Construction Contingency	1	LS	25%	$27,000
Electricity/Utilities	1	LS	15%	$16,000
Permits	1	LS	5%	$5,500
			Subtotal	$100,000
Project Management	1	LS	10%	$18,000
Contingency	1	LS	15%	$27,000
			Total	$300,000

Alternative 2: Capital Cost

Item	Quantity	Unit	Unit Cost	Cost
Mobilization/Demobilization	1	LS	$600	$600
Drilling/Installation	480	LF	$65	$31,200
Redevelop Existing Monitoring Wells	480	LF	$12	$5,760
Pumps	12	EA	$18,000	$216,000
			Subtotal	$300,000
Engineering	1	LS	10%	$30,000
Construction Oversight	1	LS	10%	$30,000
Construction Contingency	1	LS	25%	$75,000
Electric/Utilities	1	LS	15%	$45,000
Permits	1	LS	5%	$15,000
			Subtotal	$200,000
Project Management	1	LS	10%	$50,000
Contingency	1	LS	15%	$75,000
			Total	$700,000

Alternatives 1 & 2: Life Cycle Cost

Annual Costs	In Situ Flushing and Bioremediation	Air Sparging and Soil Vapor Extraction
Total Annual O&M	$400,000	$32,000
Total Capital Costs	$600,000	$300,000
Total O&M for 20 Years	$8,000,000	$700,000
LCC	$8,600,000	$1,000,000
NPV	$5,800,000	$900,000

Team Members

Francisco T, Baylee H, Erika C

Sustainability

Air Sparging and Soil Vapor Extraction

Credit Category	Applicable	Submitted	Percentage
Quality of Life	152	59	39%
Resource Allocation	182	84	46%
Natural World	128	64	50%
Climate and Risk	91	44	48%
Total Points (%)	553	251	45%

In-Situ Flushing with Bioremediation

Credit Category	Applicable	Submitted	Percentage
Quality of Life	152	45	30%
Resource Allocation	182	62	34%
Natural World	164	77	47%
Climate and Risk	91	56	62%
Total Points (%)	589	240	41%

Award Level: ENVISION GOLD

Constraints & Standards

- Environmental Protection Agency (EPA)
- Texas Commission on Environmental Quality
- Texas Risk Reduction Program