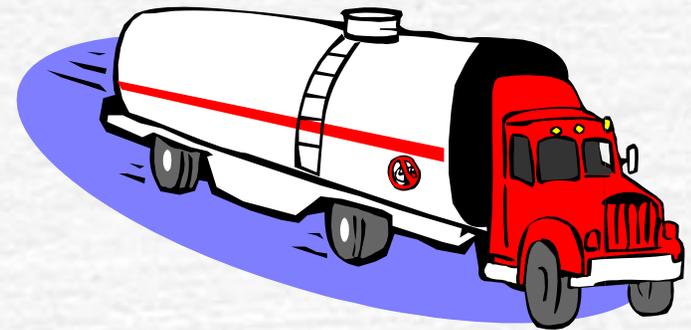


WV CASE STUDY

NAPL

Trouble at the Truck Stop



Presented
by

Dr. Pasupathy Ramanan

W.V. Department of Environmental Protection

K & T Truck Stop Incident

- On April 16th 2002 while delivering Diesel at K & T Truck Stop in Fairmont 7500 gallons of diesel was offloaded into the UST pit monitoring well, instead of into the UST.
- The West Virginia Department of Environmental Protection was informed when the owner found this out on April 19th 2002.

Site Overview

- K & T Truck Stop is located in Fairmont, West Virginia.
- The location sells both Gasoline and Diesel Fuels.
- Gasoline UST's are housed in a separate tank field.
- Diesel Fuel supplied from a 40,000 gallon UST.
- The site offers a convenience store, restaurant, and a lodging to commercial truck drivers.

Site Overview Cont.

- The site is located in a rural residential neighborhood 1050 ft. above mean sea level.
- A steep bluff is located Northwest of the site.
- The bluff slopes downward to the Marion County Rails to Trails which is currently utilized as a hiking / biking pathway.
- The Site has 4 ft. to 24 ft. of fill materials overlaying clayey residuum. Fill consists of heterogeneous assortment of large concrete slabs/ gravel / brick and etc. Sandstone bedrock encountered at 35 ft. below grade.

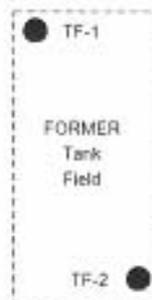
Marion County Rails to Trail



Steep Topographic Slope

Truck Parking

- Monitoring Well
- Observation Well
- Dispenser Island



FORMER
Tank
Field

TF-1

TF-2

Truck
Entrance



Station Building

(including Restaurant,
Convenience Store,
Office, and Lodging)

Gasoline Dispenser



Canopy

Diesel Dispensers



Truck
Exit



Not To Scale

Site Investigations revealed:



- The UST observation well in the front of the picture had 5" of free product.
- The person at the far end is standing at the UST pit observation well TF-1, where product was off loaded (7500 gallons of Diesel).
- This monitoring well had 21" product.

The UST pit monitoring well near the STP manholes.

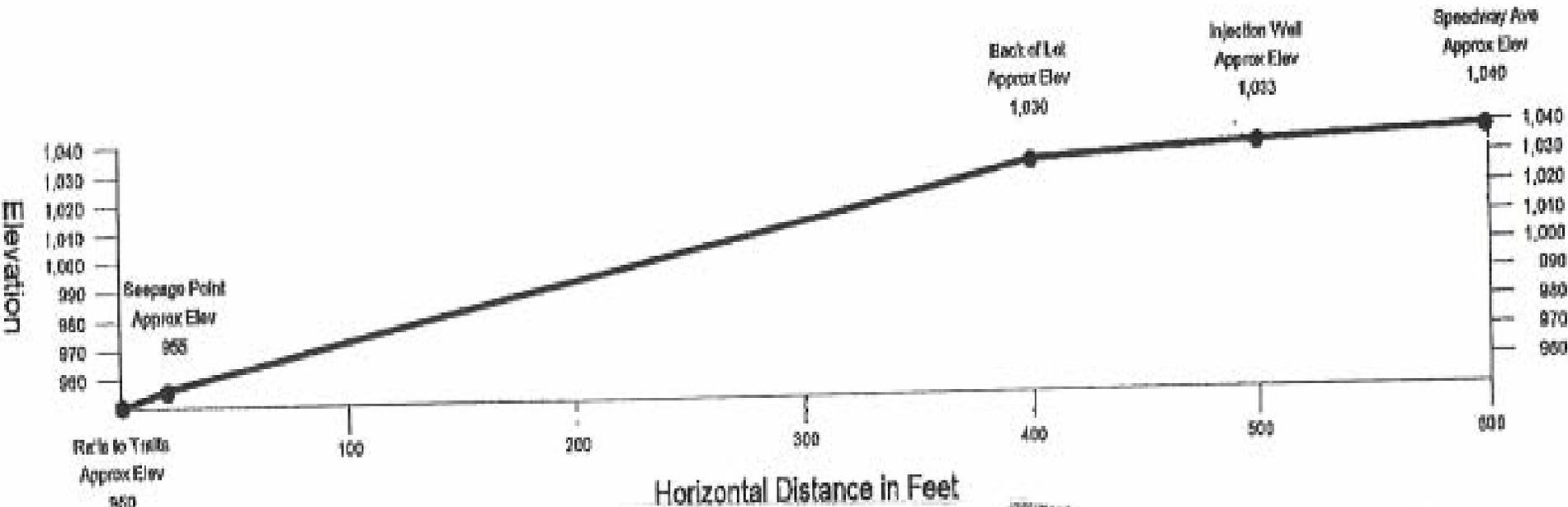
Site investigations

04-19-02

- The site investigation also included a site walk round to the rails to trails about 800 ft. Northwest of site and 200 ft. below the station.

K&T Truck Stop

Cross Sectional View of Topography from Marion County Rails to Trails to Speedway Ave.



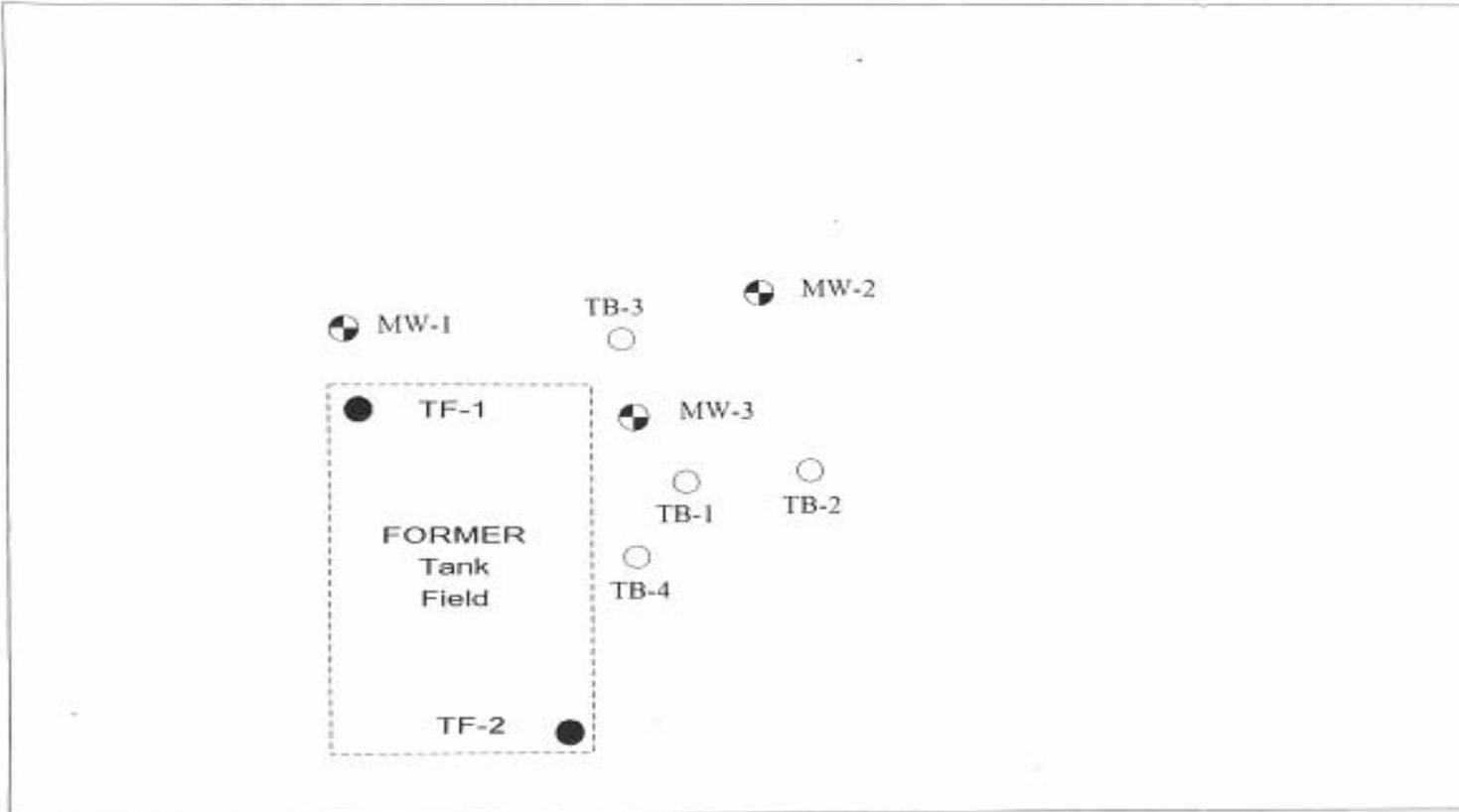
2200 Morgantown Industrial Park
Morgantown, WV 26501
Phone: (304) 252-8855
FAX: (304) 252-8854
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**Miller Environmental,
Inc.**

Ram:

Attached is the diagram you requested showing vertical elevation and horizontal distances. The data is based off of the Fairmont East topographic map and GPS readings from the Rails to Trails and injection well.



- ☉ Monitoring Well
- Observation Well
- Soil Boring



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Environmental Consulting,
Contracting & Remediation

Well and Boring Locations
K&T Truck Stop
Speedway Ext., Fairmont, WV

Figure 3
Project No.
02002.001

April 19th/20th- 2783 gallons of product was recovered from *TF-1/TF-2*

April 22- 3880 gallons of NAPL product was recovered.

April 24- *TF-1* was over drilled and deepened to enhance product recovery, three monitoring wells were installed and advanced additional 4 soil test borings were performed to delineate NAPL plume. (*MW-1, MW-2, MW-3* and *TB-1, TB-2, TB-3, TB-4* as listed above)

Remedial Actions



- Pumping product from UST pit and recovery wells.

Continuing Remedial Actions



- By April 22nd 3880 gallons of product had been extracted from the UST pit wells and a recovery well.



On May 13th a sheen of product was discovered in the drainage ditch along the rails to trails pathway below K&T Truck stop, the sheen was traced back upstream and it was determined that the product was coming from joints and bedding planes within the sandstone bedrock on the hillside along the western flank of the subject site

Inspection of Seep at Rails to Trails





Construction fence was installed to keep the general public out of the area

Sampling of Seep at Rails to Trails



Conditions

- The site is about 1050 ft. above MSL, and topography is rugged with a relief of approximately 250 ft. within one mile of the site.
- Test borings advanced to 102' and 60' below grade at site, using an air rotary drill rig, indicating no groundwater.



- Booms and Pads were installed at the creek by the Rails to Trails (downhill from site) - where product was visible



With permission from the parks and recreation director an underflow dam was constructed to prevent NAPL migration. Absorbent pads were placed along 2 impacted strips which lead from the sandstone outcrop to the underflow dam.



Resuming Business



A 10000 gallon above ground tank was installed temporarily to enable business to proceed normally

[with approval from fire marshal]



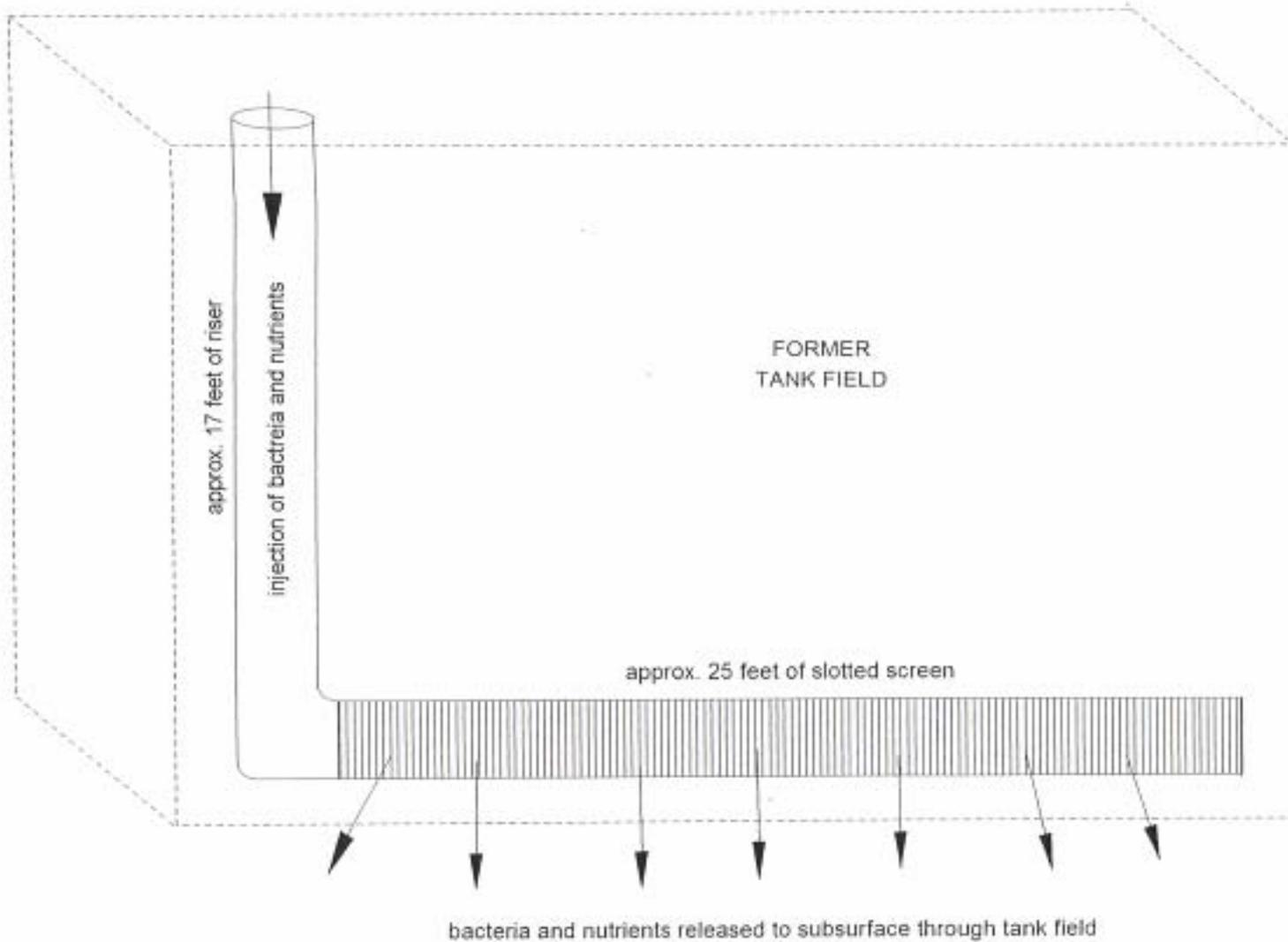
**On May
17th, the
40000-
gallon UST
was
relocated
at site**

On April 30th – an exploratory pit was excavated around the Northwest portion of the UST. Product saturated soils were observed at 14 ft. to 18 ft. below grade.





**Approximately
975 tons of
contaminated soil
was excavated
and sent to a
Landfill**



Not To Scale

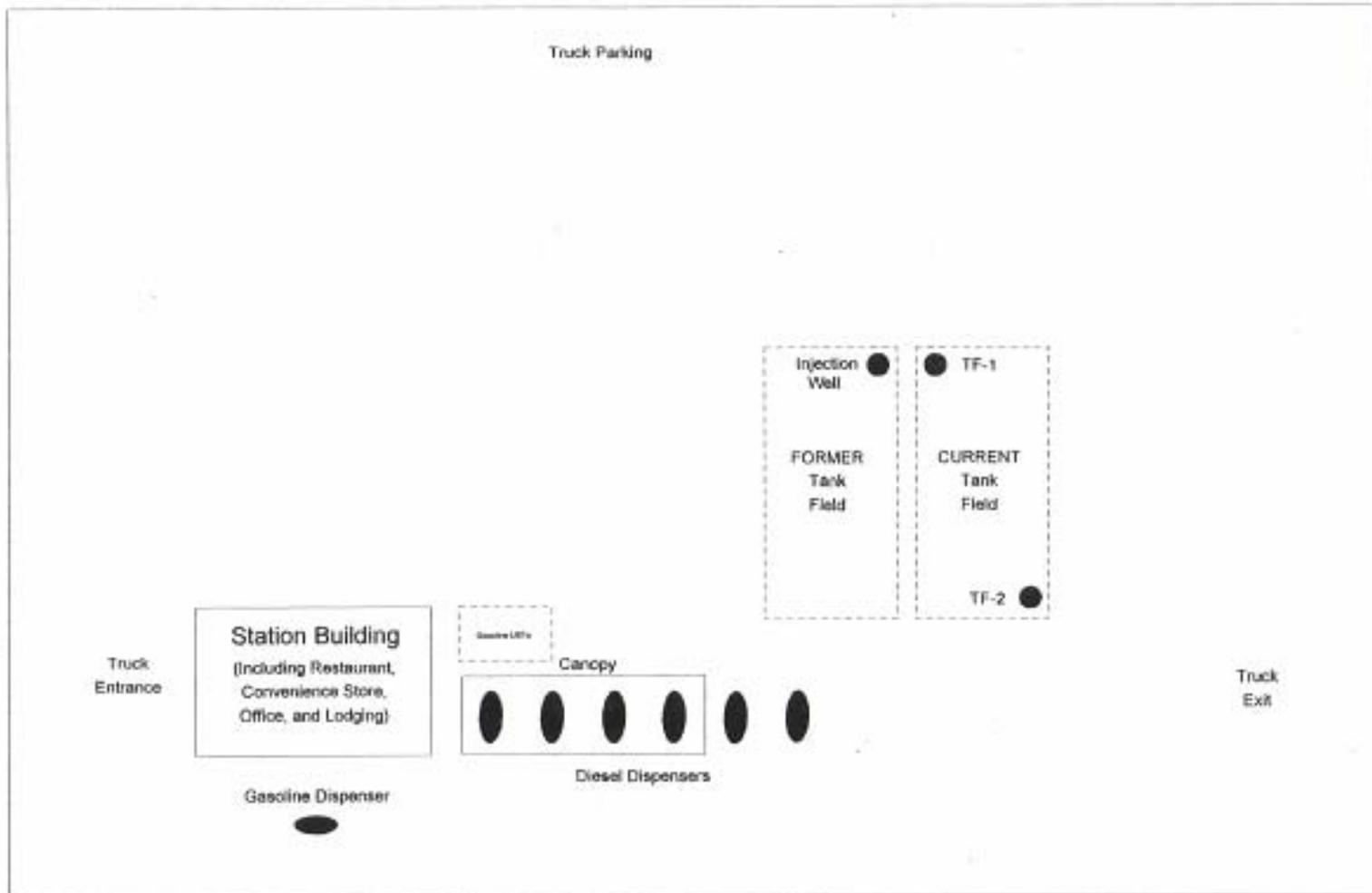
An injection well was installed before backfilling the former tank field





UST Reinstalled





- Monitoring Well
- Observation Well
- Dispenser Island



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Contracting & Remediation

Site Plan
K&T Truck Stop
Speedway Ext., Fairmont, WV

Figure 1
Project No.
02002.001

Further Remediation



- A Bioremediation method of remediation was approved in October 2002.
- Adjacent residences were informed, and monthly injection of bacteria/nutrients/oxygen (air) was carried out.

Bioremediation



Totally 10,000 gallons of diluted mixture of petroleum degrading bacteria / water / nutrients was injected.

- The injection liquid was a mixture of petroleum degrading bacteria, nutrients.
- Six bio augmentation events occurred during March 2003 to August 2003, and more during May 2004 to November 2004 at the approximate location of the former tank field observation well so the flow path of the released diesel fuel may be duplicated.



Results of Remediation

Samples of liquid (water) from the old tank-field observation well / new tank-field observation well, seep and underflow at rails to trails were taken and analyzed for TPH-DRO, mg/l. The results were:

<u>Date</u>	<u>Seep</u>	<u>Underflow</u>	<u>Old Tank-field</u>	<u>New Tank-field</u>
09-27-02	8780	ND		
06-13-03	17.8	10.5		
09-24-03	ND	ND		
10-08-03			5.33	558
08-09-04			1.33	19.4
12-13-04			Buried	35.5
02-08-05				26.0
12-29-05				51.6

Present Status

- There is plant growth throughout the fall slope. The County Park and Recreation has expanded the path with provision for water flow on either sides of the pathway.
- More Bioremediation injection events are planned in 2006.
- There has not been any seepage observed at the rails to trails area.

Acknowledgements

- DEP & Don Martin, my supervisor.
- Travis Wilfong, my colleague.
- EPA – for the opportunity to present this case study.
- Site and consultant.
- Audience.