Weldon Spring Ordnance Site

NPRE 397: Independent Study

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May 3, 2022

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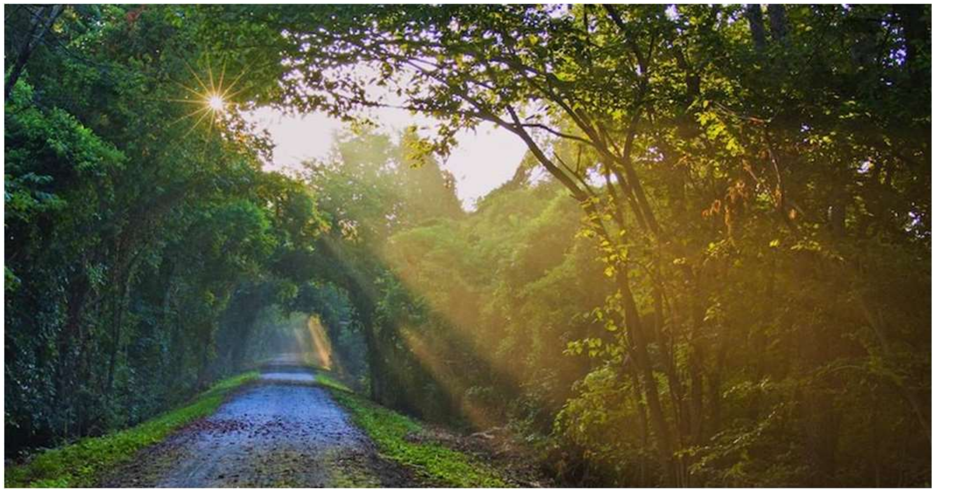
Present Day

- Home to many different public uses
- Conservation
  - Katy Trail State Park
  - August A. Busch Memorial Conservation Area
  - Other small parks



Present Day

- Home to many different public uses
- Police and Defense
  - Police Training Range
  - US Army Reserve base

Present Day

- Home to many different public uses
- Department of Energy
  - Storage site
  - Weldon Spring Interpretive Center


Hamburg
Trail

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Aerospace Engineering
Elevating ideas since 1944

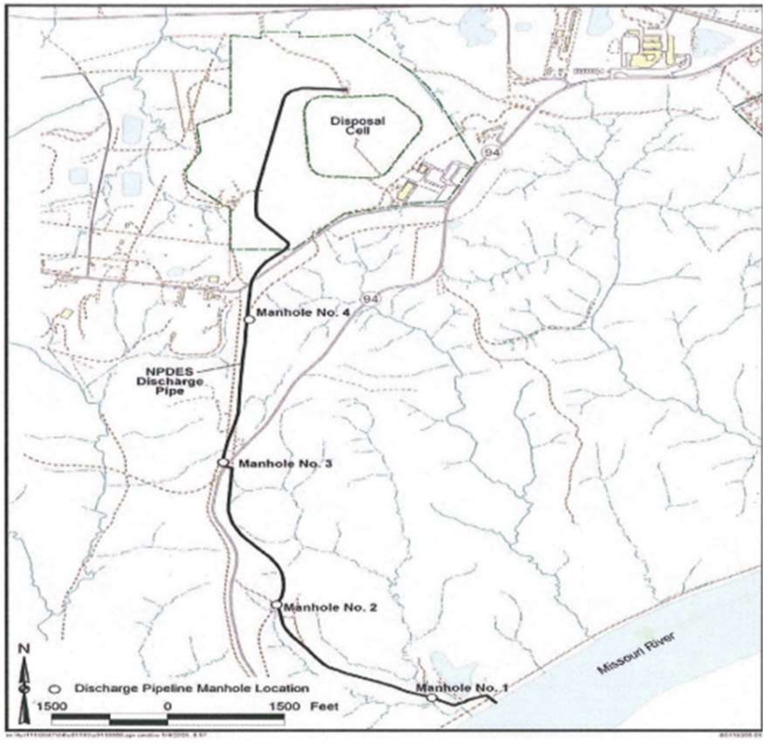
Literature Review

"Visualizing the Normalization of Remediated Landscapes"

- Waste stored permanently on site
- Trust in our nation's engineers allowed this.
- Trust is gained by reputation, availability to data, information, and records.

Leachate Disposal

- The leachate is pretreated for uranium and then disposed of by hauling to the MSD Bissel Point Plant.
- NPDES Pipeline maintained as contingency method



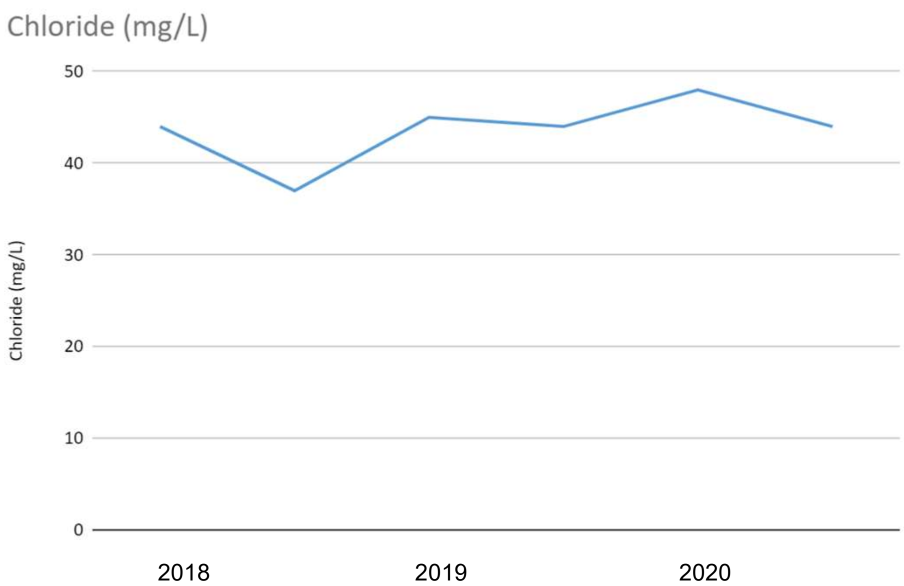
Trends in Data

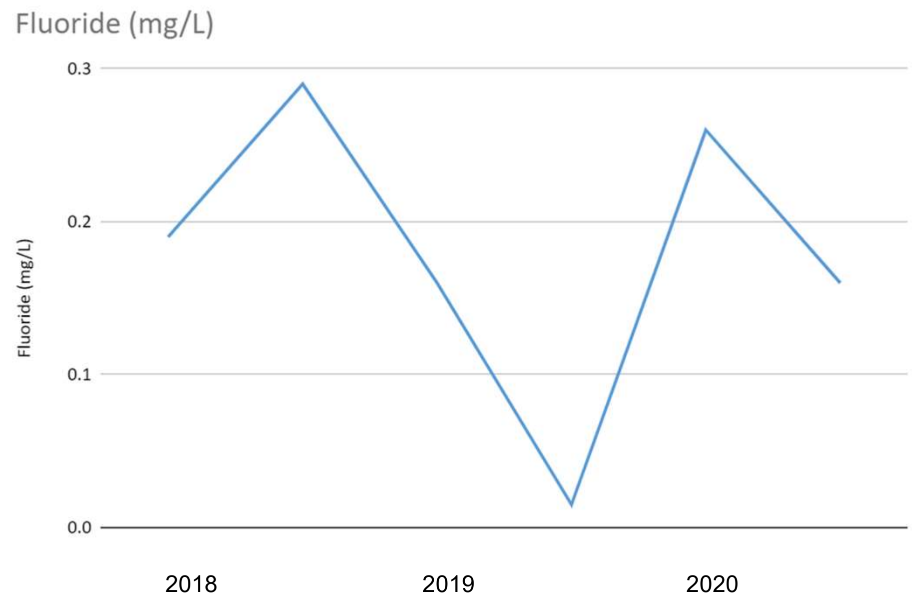
- First step: Tabulated leachate concentrations over the past 3 years
- Plotted data to visualize any trends

Disposal Cell Leachate Monitoring Data

	Table 25 - 2018		Table 25 - 2019		Table 25 - 2020	
	Concentrations					
Parameters	Jun-18	Dec-18	Jun-19	Dec-19	Jun-20	Dec-20
Chloride (mg/L)	44	37	45	44	48	44
Fluoride (mg/L)	0.19	0.29	0.16	0.015	0.26	0.16
Nitrate (as N) (mg/L)	4.6	5.5	5.5	5.4	4.5	7.6
Sulfate (mg/L)	121	117	101	115	116	105
Arsenic (µg/L)	3.2	3.3	4.7	3.4	3.6	3.1
Barium (µg/L)	216	126	320	299	255	271
Chromium (µg/L)	ND	ND	ND	ND	ND	ND
Cobalt (µg/L)	ND	ND	ND	0.35	ND	ND
Iron (µg/L)	74	73	41	24	ND	ND
Lead (µg/L)	ND	ND	ND	ND	ND	ND
Manganese (µg/L)	278	2	50	39	78	52
Nickel (µg/L)	3 (J)	ND	2.4	5	3	3
Selenium (µg/L)	ND	ND	ND	ND	ND	ND
Thallium (µg/L)	ND	ND	ND	ND	ND	ND
COD (mg/L)	ND	???	21.9	21.9	33	41
TDS (mg/L)	846	834	849	809	811	823
TOC (mg/L)	10.5	???	11.3	11	11.6	10.8
1,3,5-TNB (µg/L)	ND	ND	ND	ND	ND	ND
1,3-DNB (µg/L)	ND	ND	ND	ND	ND	ND
2,4,6-TNT (µg/L)	ND	ND	ND	ND	ND	ND
2,4-DNT (µg/L)	ND	ND	ND	ND	ND	ND
2,6-DNT (µg/L)	ND	ND	ND	ND	ND	ND
NB (µg/L)	ND	ND	ND	ND	ND	ND
Radium-226 (pCi/L)	ND	ND	ND	ND	0.72	0.54
Radium-228 (pCi/L)	ND	ND	ND	ND	ND	ND
Thorium-228 (pCi/L)	ND	ND	ND	ND	ND	ND
Thorium-230 (pCi/L)	ND	0.38	ND	ND	ND	ND
Thorium-232 (pCi/L)	0.39	0.17	ND	ND	ND	ND
Uranium (pCi/L)	21	25	20	30	25	24
PAHs (µg/L)	ND	ND	ND	ND	ND	ND
PCBs(µg/L)	ND	ND	ND	ND	ND	ND
DO (mg/L)	2.5	9.4	2.5	2.6	2.5	2.6
ORP (mV)	154	169	175	341	175	341
pH (s.u.)	7.12	7.34	7.51	7.28	7.51	7.24
SC (µS/cm)	979	959	1083	1298	1083	1298
Temperature (°C)	19.4	12.1	21.1	13.2	21.1	13.2
Turbidity (NTU)	2.4	1.2	1.6	1.04	1.56	1.04

Trends in Data





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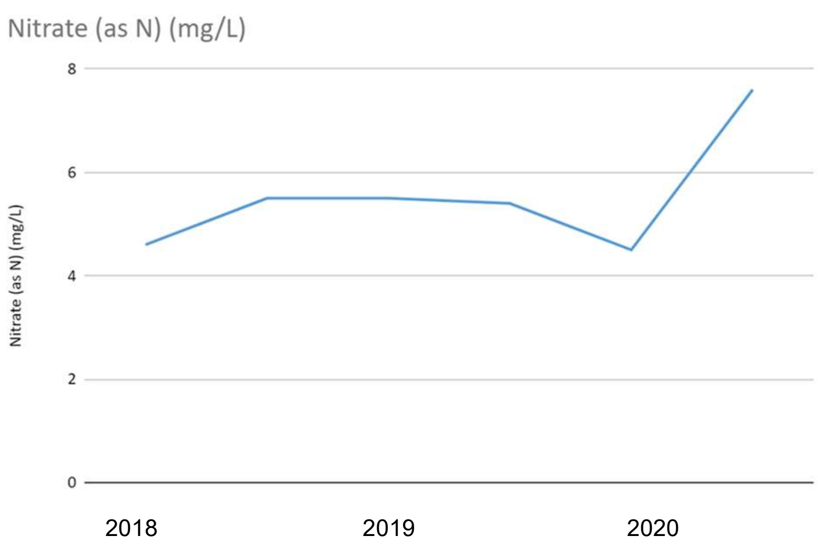

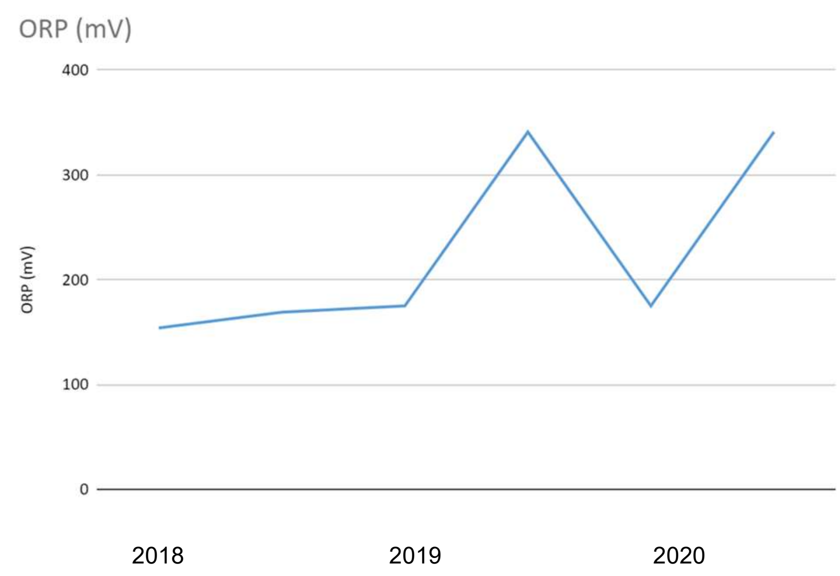

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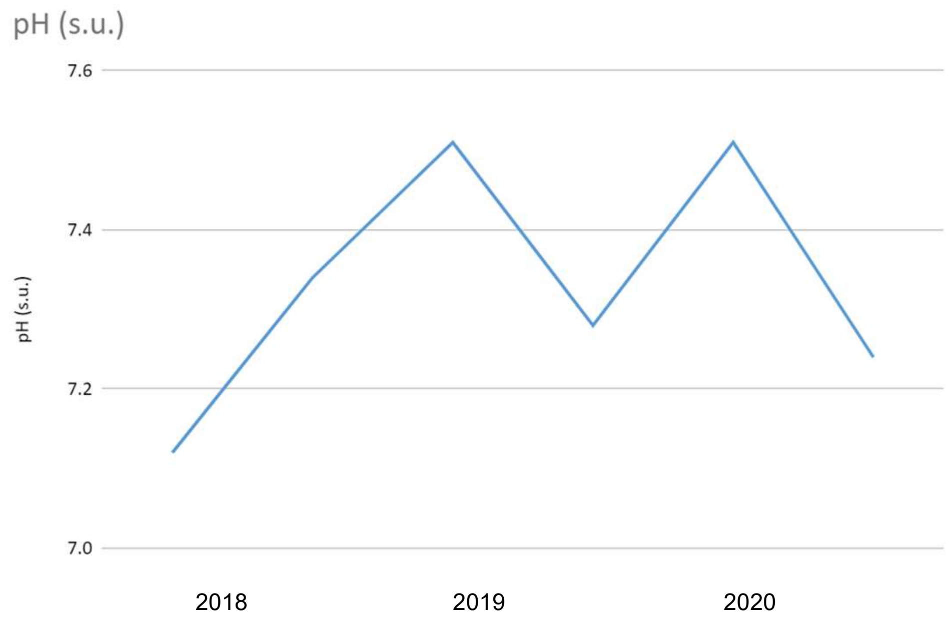

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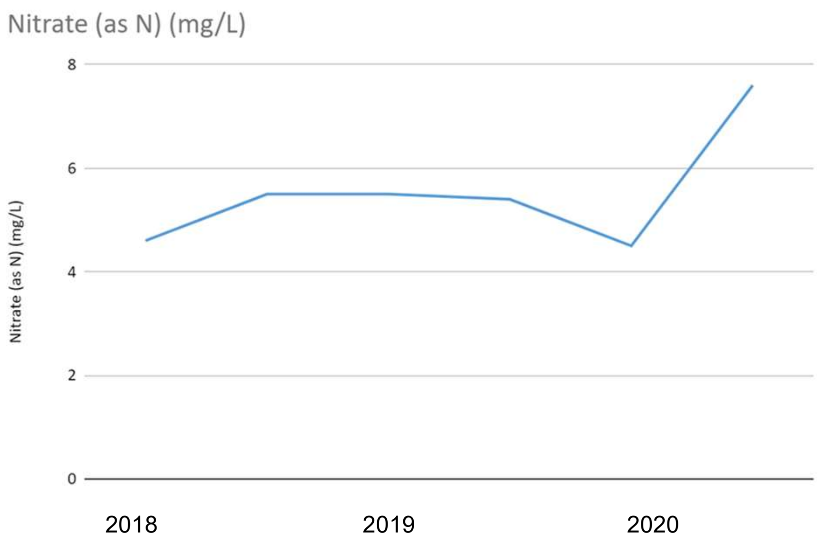

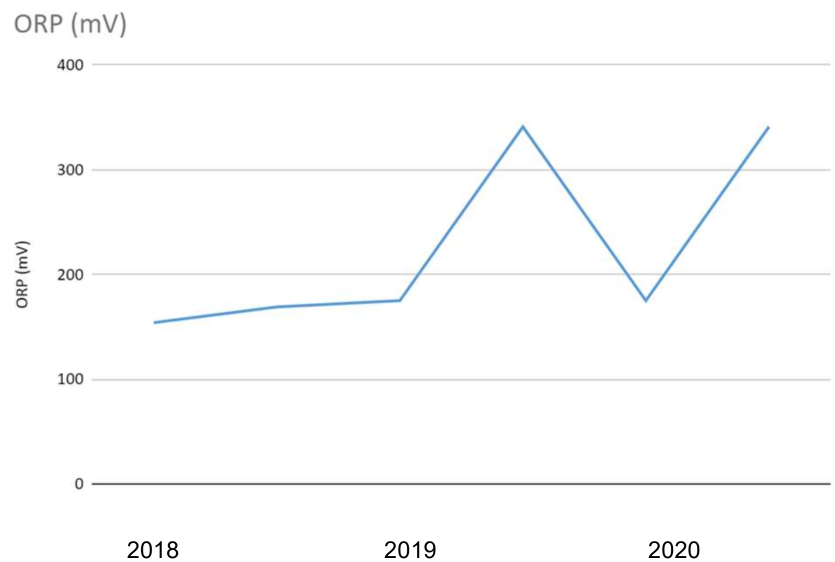

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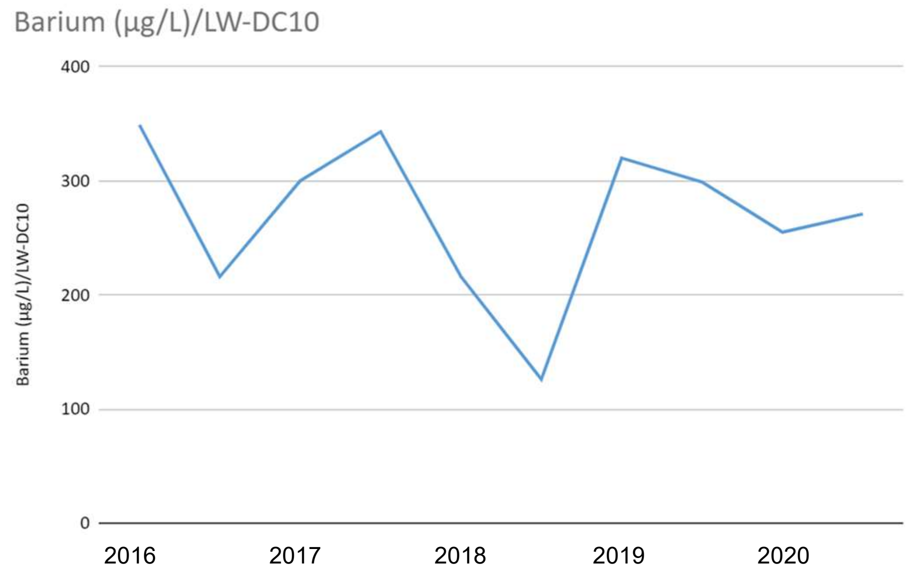
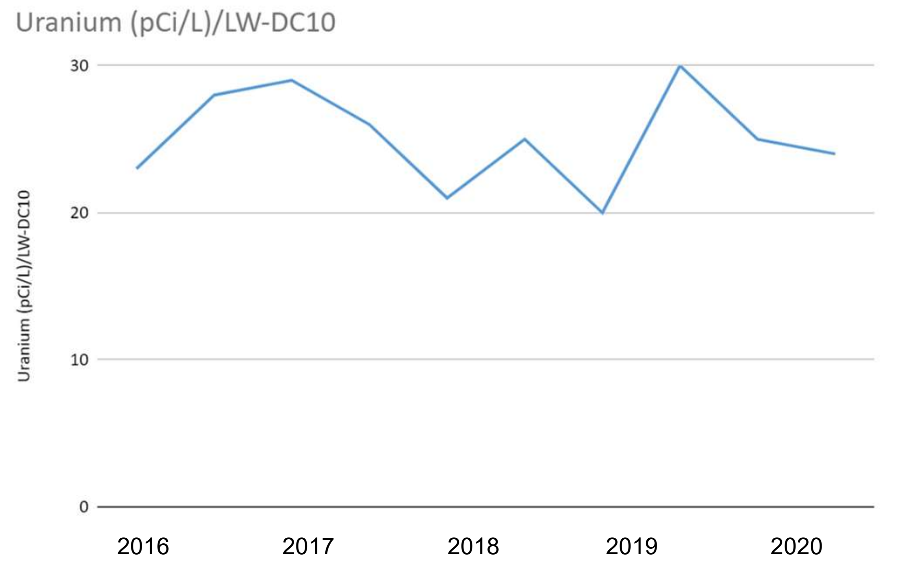
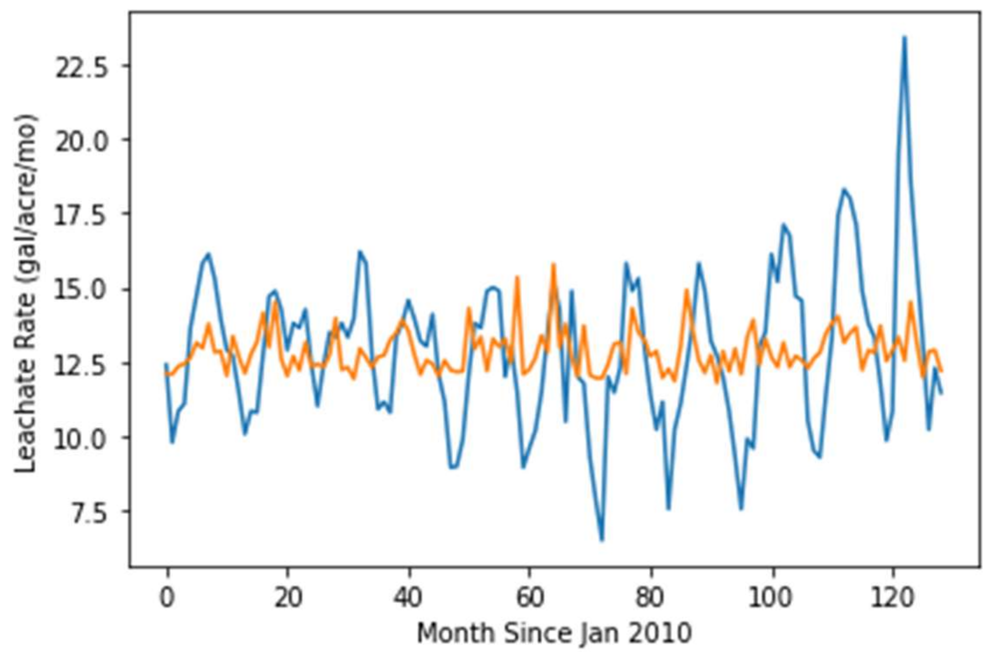




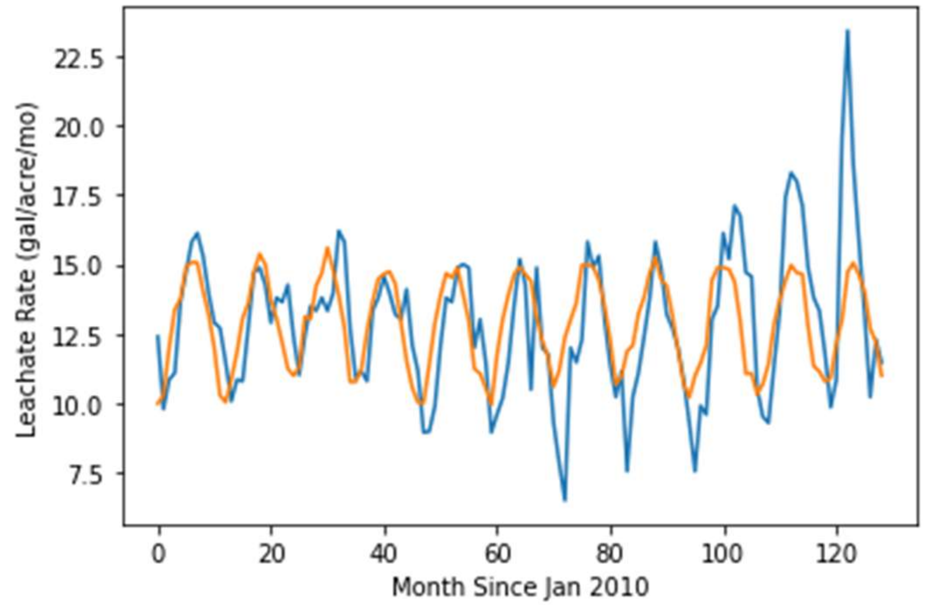
Linear Regression Based on Rainfall

- Disappointing
- $R^2 = 0.08$



Linear Regression Based on Temperature

- Shows a correlation between Temperature and Leachate Rate
- $R^2 = 0.40$

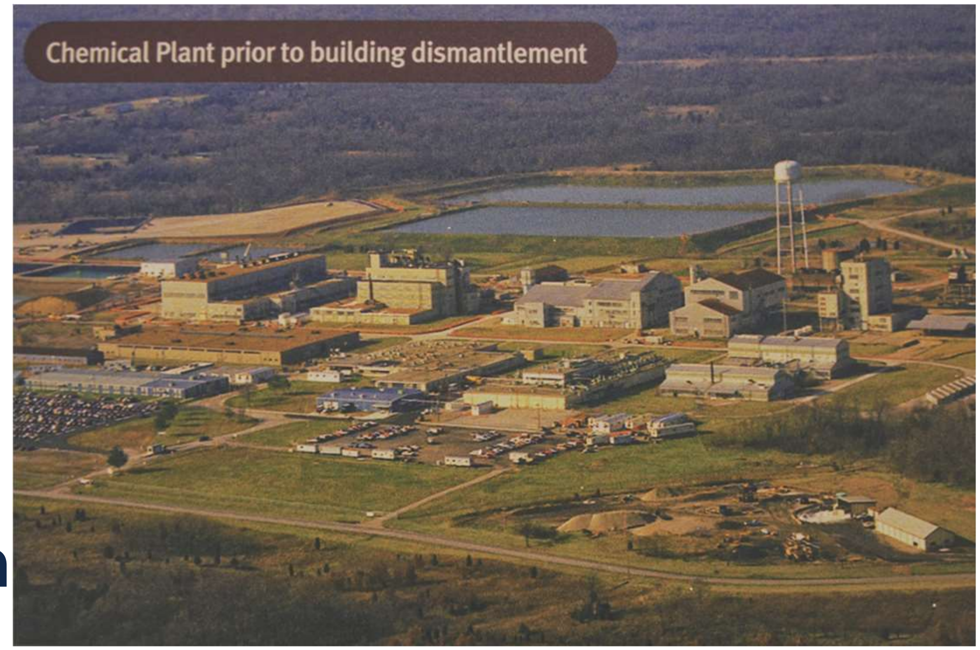


Conclusions

- Unable to definitively reach a conclusion from the data on the "end date" Weldon Spring Site
- No significant trends in concentration levels or leachate production rates
- Leachate rates correlate with weather

Conclusions

- The actions of the past will continue to have lasting effects on the future
- Weldon Spring is an important case study in mixing hazmats and radioactive materials



Conclusions

- It is possible for radioactive waste management sites to co-exist with population centers
- After proper clean-up, sites can be put to great public uses