





HISTORICAL LEAD (Pb) EXCEEDANCES: CLEARING FOR CLOSURE

Jessica Duke, P.G.

Division of Waste Management / Petroleum Restoration Program
Florida Department of Environmental Protection

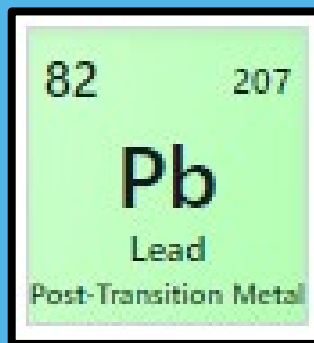
Tallahassee, FL | Feb. 22, 2024



HISTORICAL LEAD (Pb) EXCEEDANCES: CLEARING FOR CLOSURE

Presentation Agenda:

- Historical Pb Groundwater Sampling Methodology.
- Site and Data Evaluation - Are the Exceedances Real?
- Evaluate the Monitoring Data - Pre-Post Active Remediation Monitoring (PARM) review.
- Guidance on Clearing Exceedances:
 - Existing well sampling.
 - Well replacement.
- Example scenarios.



Sample		Lead
Location	Date	(µg/L)
GCTLs		15
NADCs		150
MW-9	8/15/1994	51
	3/21/1995	12.20
	DESTROYED	
MW-10	8/15/1994	121
	3/21/1995	17.70
	4/13/1995	NS
	DESTROYED	



HISTORICAL Pb SAMPLING METHODOLOGY

3.4.1 Sampling Methodology

- To prevent potential cross-contamination of groundwater samples, the following guidelines were applied:
 - Prior to well sampling efforts, all equipment used was decontaminated using the following protocol:

Teflon® bailers used to purge and collect the groundwater samples for analysis were washed with Liquinox® soap and water, rinsed with deionized water, rinsed with a weak nitric acid solution, double rinsed with isopropanol, and allowed to air dry. Following this procedure, all sampling and purge bailers were wrapped with aluminum foil prior to use and transport.
 - A dedicated decontaminated teflon bailer was used for sampling each monitor well

On July 6, 1995, the standing volume of groundwater within the well casing was first calculated and then consecutive volumes of water were removed from the well and tested for temperature, pH and conductivity until three (3) consecutive measurements were within 5%. A total of fifteen (15) gallons was removed from the well prior to sample collection. Samples were then collected utilizing a 2 foot teflon bailer fitted with burette attachment. Samples were placed in laboratory supplied vials and containers, capped, labeled, packed on ice and transported to Progress Environmental Laboratories in Tampa. The water quality sampling data sheet, chain-of-custody form and laboratory analysis are included as Appendix III of this report.

DEP-SOP-001/01
FS 2200 Groundwater Sampling
Form FD 9000-24
GROUNDWATER SAMPLING LOG

SITE NAME: PALMER DELTA AIR LINES FUEL TANK	SITE LOCATION: TAMPA INT. AIRPORT			
WELL NO: MW-1	SAMPLE ID: MW-1	DATE: 6-7-07		
PURGING DATA				
WELL DIAMETER (inches): 2	TUBING DIAMETER (inches): 1/4	WELL SCREEN INTERVAL DEPTH: 3 feet to 13 feet	STATIC DEPTH TO WATER (feet): 6.95	PURGE PUMP TYPE OR BAILER: RFP
WELL VOLUME PURGE: 1 WELL VOLUME = (TOTAL WELL DEPTH - STATIC DEPTH TO WATER) X WELL CAPACITY				

Historical Pb Sampling Methodology – Groundwater:

- Bailer sampling can yield unreliable Pb data.
- Increased turbidity associated with bailer sampling method can result in high Pb readings in groundwater sampling due to sediment particulates in the sample.
- Bailer sampling was most often used in the 1980s and 1990s. Review old sampling reports and logs for sampling methodology.



SITE AND DATA EVALUATION

Site and data evaluation: Are the Pb exceedances real?

Storage Tank Contamination Monitoring database (STCM) and Oculus: Review registration data and site history in STCM and in the Oculus site file.

Review site data:

- How high are the exceedances?
- How widespread are they?
- Where were exceedances relative to the source?
- Have any historical exceedances been confirmed in more recent sampling?

Is high Pb due to natural background?



SITE AND DATA EVALUATION - REVIEWING TANK REGISTRATION

STCM stores tank registration information.

*Historical information may not be complete.

*The discharge may or may not have come from a leaded gas tank.

Florida Department of Environmental Protection - Enterprise Applications

Detail Facility RePorts Help Exit Window

Storage Tank/Contamination Tracking - Facility Detail

Facility ID: 8510367 Facility Status: CLOSED Create Date:
County: 37 LEON District: NWD Name Update:
Name *: R&R SERVICE CENTER Addr Update:
Address *: 208 W TENNESSEE ST Comments?(Y/N): Y Account Status: INVOICE DUE
Address2: ASTC: 0 USTC: 4
City: TALLAHASSEE FL: 32301 1320
Facility Contact Name: NORMAN RAGANS Facility Contact Phone: 904-224-4165 Ext: Phone #:
Invoice Activity Date: 05/12/1997 Contact Phone Verified By: Changes Verified?:
Current Placard Date: Contact Phone Last Verified:

Storage Tank/Contamination Tracking - Tank List

Tk ID *	A/U	Gallons	Substance	Installed Date	Status/Effective Date	PD	Replics
1	UN	4000	A	Leaded Gas	B 02/28/1993	Y	
2	UN	4000	A	Leaded Gas	B 02/28/1993	Y	
3	UN	4000	D	Vehicular Diesel	B 02/28/1993	Y	
4	UN	4000	B	Unleaded Gas	B 02/28/1993	Y	



SITE AND DATA EVALUATION - TANK REGISTRATION AND SITE HISTORY

List 14

Tank contents are:

- A. leaded gasoline.
- B. unleaded gasoline.
- C. Alcohol enriched gasoline.
- D. diesel fuel.
- E. aviation fuel.
- Z. other.

INSTRUCTIONS: Use one row across for each tank counted in question 8. The tank number must agree with the number on the sketch of your facility. A new tank installed where a registered tank was removed should be given the number of the removed tank with an R and a number added. Example: Tank 3R1 is first replacement for tank 3. It is in the same place where tank 3 was. Tank 3R2 is the second replacement for tank 3. Attach extra pages if necessary. Write your facility number, if known, or name and address, exactly as it appears on the front of the form, on all extra pages.

DER FORM 17-1.218(2) 9/1/81 (2/2)

(12) Tank Number	(13) Tank Size in Gallons	(14) Tank Contents (see List 14 below)	(15) Tank Installation Date. Month/Year (put X if unknown)	(16) Underground or Aboveground Tank (write U or A)	(17) Tank Construction Specifics (see List 17U or 17A below)	(18) Integral Piping System Construction Specifics (see List 18 below)	(19) Monitoring System Type (see List 19)	(20) Tank Disposal Method (see List 20)
1	4000	A	APP 12 YRS	UNDERGROUND	STEEL C	Y	Y	
2	4000	A	APP 12 YRS	UNDERGROUND	STEEL C	Y	Y	
3	4000	D	APP 12 YRS	UNDERGROUND	STEEL C	Y	Y	
4	4000	B	APP 12 YRS	UNDERGROUND	STEEL C	Y	Y	

Tank registration forms can be found in Oculus to identify what petroleum products were likely stored on site. Assessment reports can also be reviewed for information on site history.



EVALUATE THE MONITORING DATA – PRE-PARM REVIEW

Review and evaluate monitoring data prior to Post Active Remediation Monitoring (PARM).

Identify early any exceedances in Pb or other contaminants that need to be re-sampled prior to well abandonment and closure.

Approximate cost to add Pb analysis to a well that is already being sampled during a monitoring event is \$15.

Costs increase if an extra monitor event is required and increase even more if wells need to be reinstalled after abandonment to obtain samples.



GUIDANCE ON CLEARING EXCEEDANCES

Clearing Exceedances: 2014 Guidance memo on Closure Sampling Guidelines.

SUBJECT: Petroleum Restoration Program Closure Sampling Guidelines for Groundwater

DATE: January 27, 2014

results toward NAM or PARM. Individual wells that are not part of the approved monitoring network are not required to achieve two clean quarters before the site can be issued a SRCO. However, any MW that has had documented contamination must have at least one clean sampling event unless and pursuant to 62-780.680(1)(c), F.A.C., the FDEP or the FDEP local program has concurred that groundwater sampling is unnecessary based on site-specific conditions (for example, a compliance well or MW of questionable integrity, a MW impacted by another discharge, or other MW(s) in the vicinity that adequately represent(s) the groundwater quality at that well).



GUIDANCE ON CLEARING EXCEEDANCES

Subject: Clarification to Petroleum Restoration Program
Closure Sampling Guidelines for Groundwater

Date: January 12, 2022

Individual wells that are not part of the approved monitoring network do not need to be sampled for four quarters of PARM or NAM. However, all site monitoring wells not included in the PARM or NAM monitoring network with previously documented contamination should have had a clean sampling event the last time the well(s) was sampled for the site to meet SRCO criteria. If a well with documented contamination was destroyed or abandoned before having a clean sampling event, then one of the following options should be utilized to meet SRCO criteria.

- The FDEP professional may allow data from an existing representative well with similar construction to satisfy SRCO criteria if it had similar or higher historic concentrations and is in close proximity to the destroyed or abandoned well.
- A replacement monitoring well may be installed and sampled to satisfy SRCO criteria.
- A grab groundwater sample may be collected and used to satisfy SRCO criteria.



CLEARING HISTORICAL Pb EXCEEDANCES

Obtaining at least one clean sample for closure is preferred: if the well still exists, resample.

What if the well has been abandoned/destroyed? Do not need to reinstall wells to resample every single well with a historical Pb exceedance on a 1:1 basis.

- Are there existing wells onsite that can be used as proxy wells to clear the old exceedance?
- If there are multiple abandoned wells with exceedances, can a few representative wells be installed to serve as proxy wells?
- Some flexibility in distance.

Use best professional judgment.



CLEARING EXCEEDANCES - EXAMPLES

Example – scenario one:

Site review: No history of leaded gasoline stored onsite. All Pb exceedances are historical.

Existing conditions: Most on-site wells destroyed/abandoned; some wells have been replaced.

Strategy: Review data to determine how to clear historical Pb exceedances.

The screenshot shows a software window titled "Storage Tank/Contamination Tracking - Tank List". The window contains a table with the following columns: Tk ID *, A/U, Gallons, Substance, Installed Date, Status/Effective Date, PD, and Replics. The table lists six storage tanks with their respective details.

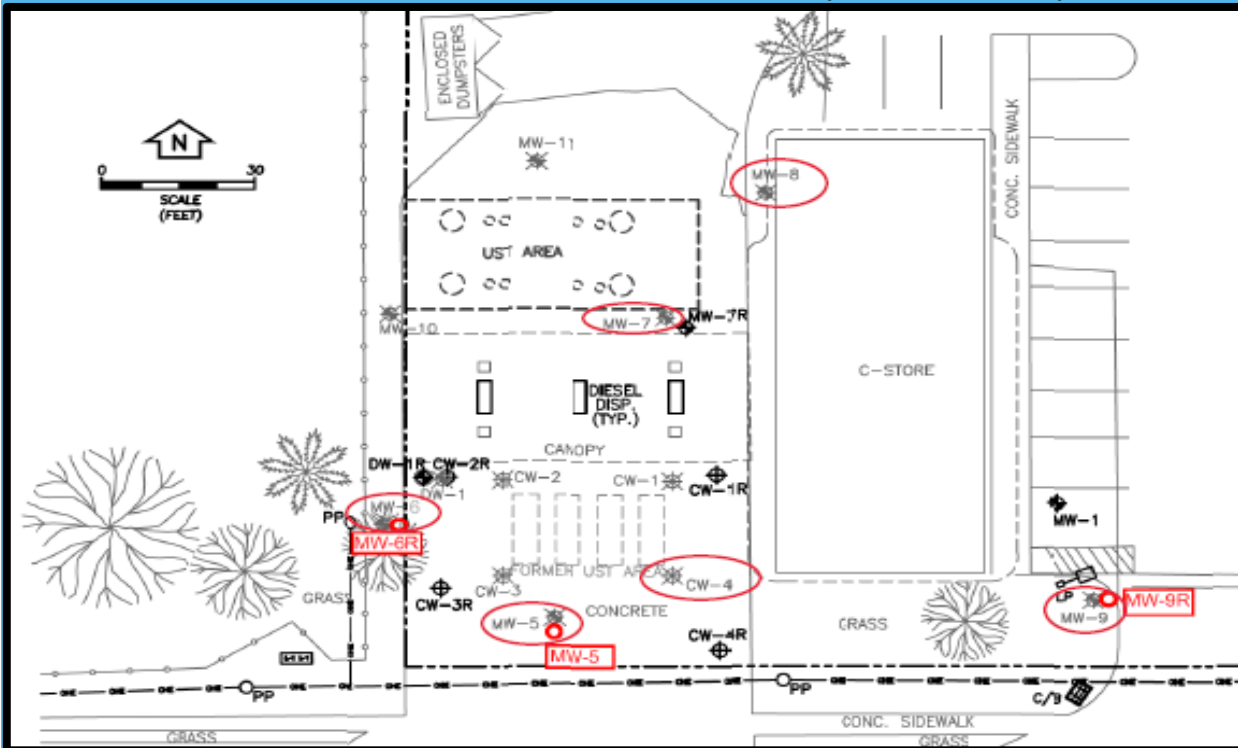
Tk ID *	A/U	Gallons	Substance	Installed Date	Status/Effective Date	PD	Replics		
1	UN	12000	D	Vehicular Diesel	05/01/1985	A	02/12/2007	Y	
2	UN	8000	B	Unleaded Gas	05/01/1985	B	01/01/2007	Y	
3	UN	8000	B	Unleaded Gas	05/01/1985	B	01/01/2007	Y	
4	UN	8000	B	Unleaded Gas	05/01/1985	A	02/12/2007	Y	
5	UN	20000	D	Vehicular Diesel	12/01/2006	U	12/01/2006		1
6	UN	20000	B	Unleaded Gas	12/01/2006	U	12/01/2006		2



EXAMPLES

SCENARIO ONE

Red circle= historical Pb exceedance (zero clean).



- Six wells with historical Pb exceedances.
- Five wells also had historical exceedances in other contaminants.
- How would you clear the Pb exceedance for closure?

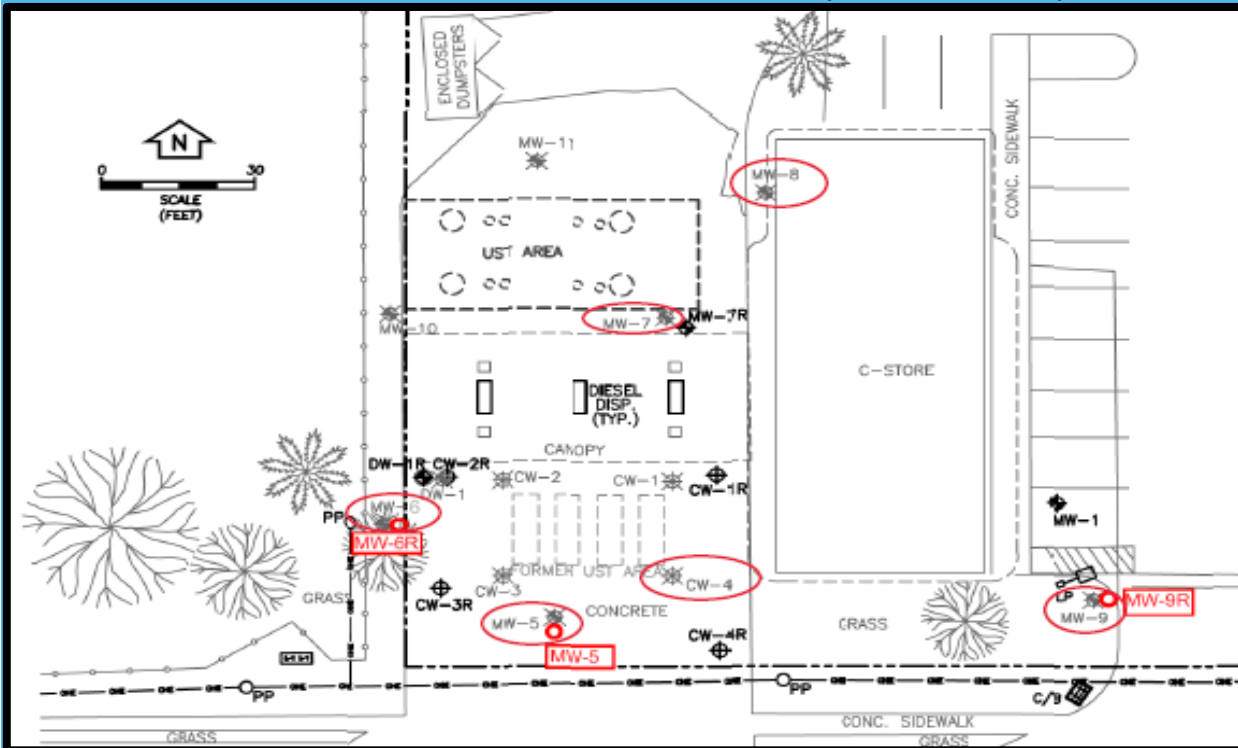
Sample Location	Date	Benzene	Ethylbenzene	MTBE	Toluene	Total Nylenes	Lead	EDB	1,2,4-Tri-methyl-benzene	1,3,5-Tri-methyl-benzene	Cumene (Isopropyl benzene)	FL-PRO TRPH
GCTLs		1	30	20	40	20	15	0.02	10	10	.8	5000
NADCs		100	300	200	400	200	150	2	100	100	8	50000
1994 Compliance and Assessment Wells (Eligible)												
CW-1	5/16/1994	2570	1150	590	319	3299	4.3	0.2 U				16700
CW-1R	11/29/2023	0.30 U	0.46 I	1.6 I	0.33 U	2.1 U						1800
CW-2	5/16/1994											
CW-2R	11/29/2023	0.30 U	0.30 U	1.2 U	0.33 U	2.1 U	2.1 U	0.0075 U	0.24 U	0.24 U	17.2	760 U
CW-3	5/16/1994	40.6	7.68	64.2	3.83	13.9	12	0.2 U				9230
CW-3R	11/29/2023	0.30 U	0.30 U	1.2 U	0.33 U	2.1 U						790 U
CW-4	5/16/1994	89.7	21.7	86	4.23	21.23	130	0.2 U				2740
CW-4R	11/29/2023	0.30 U	0.30 U	3.1 I	0.33 U	2.1 U						1300
MW-5	9/2/1994	0.86 U	0.87 U	55.6	0.83 U	1.6 U	25.5	0.019 U				280
MW-6	9/2/1994	0.86 U	0.87 U	60.5	0.83 U	1.6 U	46.2	0.019 U				
MW-7	9/2/1994	27	0.87 U	127	0.83 U	1.6 U	53.3	0.019 U				330
MW-7R	11/29/2023	0.30 U	0.30 U	1.2 U	0.33 U	2.1 U						770 U
MW-8	9/2/1994	0.86 U	0.87 U	0.96 U	0.83 U	1.6 U	104	0.019 U				330
MW-9	9/2/1994	0.86 U	0.87 U	186	0.83 U	2.5 U	40.7	0.019 U				250
MW-10	10/13/1994	0.86 U	0.87 U	0.96 U	0.83 U	1.6 U	8.55	-				-
MW-11	10/13/1994	0.86 U	0.87 U	0.96 U	0.83 U	1.6 U	1.25	-				-



EXAMPLES

SCENARIO TWO

Red circle= historical Pb exceedance (zero clean).



- What if there were no exceedances in the wells for other contaminants?
- How would you clear the Pb exceedances for closure?

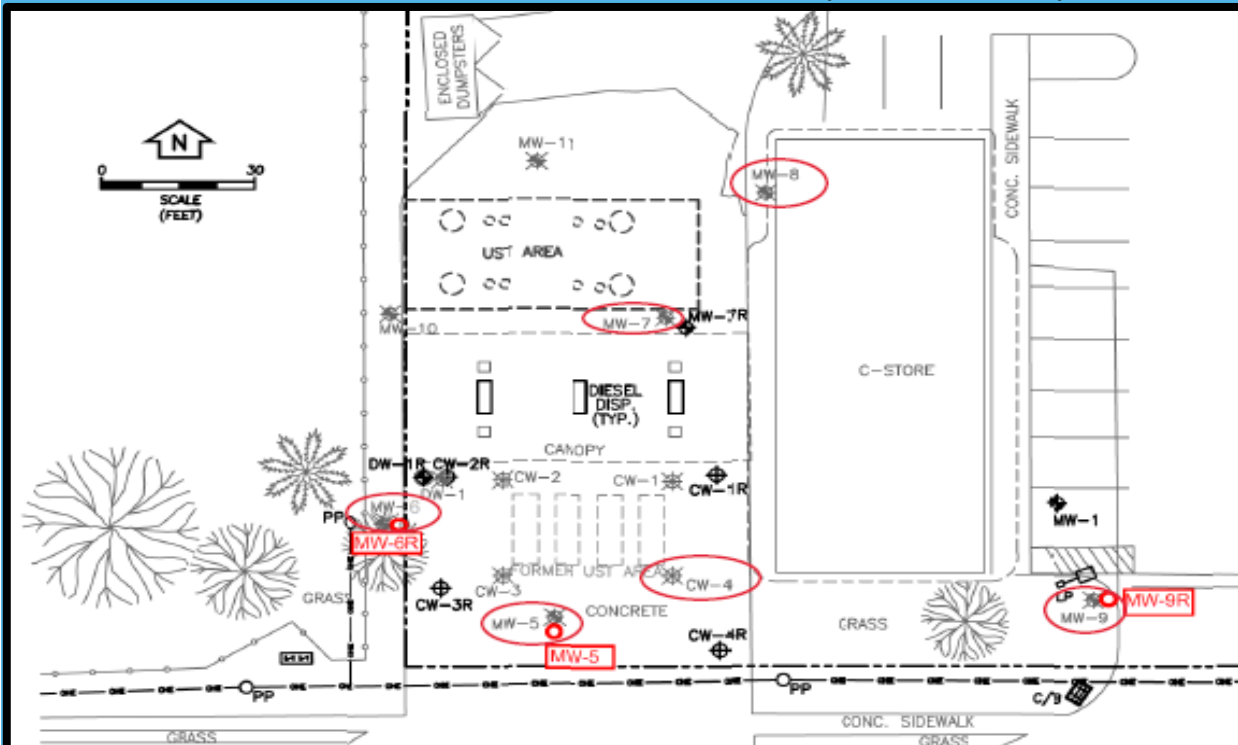
Sample Location	Date	Benzene	Ethylbenzene	MTBE	Toluene	Total Nylenes	Lead	EDB	1,2,4-Tri-methyl-benzene	1,3,5-Tri-methyl-benzene	Cumene (Isopropyl benzene)	FL-PRO TRPH
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NADCs		100	300	200	400	200	150	2	100	100	8	50000
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CW-2	5/16/1994											
CW-2R	11/29/2023	0.30 U	0.30 U	1.2 U	0.33 U	2.1 U	2.1 U	0.0075 U	0.24 U	0.24 U	17.2	760 U
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MW-5	9/2/1994	0.86 U	0.87 U	55.6	0.83 U	1.6 U	25.5	0.019 U				280
MW-6	9/2/1994	0.86 U	0.87 U	60.5	0.83 U	1.6 U	46.2	0.019 U				
MW-7	9/2/1994	27	0.87 U	127	0.83 U	1.6 U	53.3	0.019 U				330
MW-7R	11/29/2023	0.30 U	0.30 U	1.2 U	0.33 U	2.1 U						770 U
MW-8	9/2/1994	0.86 U	0.87 U	0.96 U	0.83 U	1.6 U	104	0.019 U				330
MW-9	9/2/1994	0.86 U	0.87 U	186	0.83 U	2.5 U	40.7	0.019 U				250
MW-10	10/13/1994	0.86 U	0.87 U	0.96 U	0.83 U	1.6 U	8.55	-				-
MW-11	10/13/1994	0.86 U	0.87 U	0.96 U	0.83 U	1.6 U	1.25	-				-



EXAMPLES

SCENARIO THREE

Red circle= historical Pb exceedance (zero clean).



- What if there was also an historical exceedance in a deep well that had been abandoned/destroyed?
- How would you clear the Pb exceedance for closure?

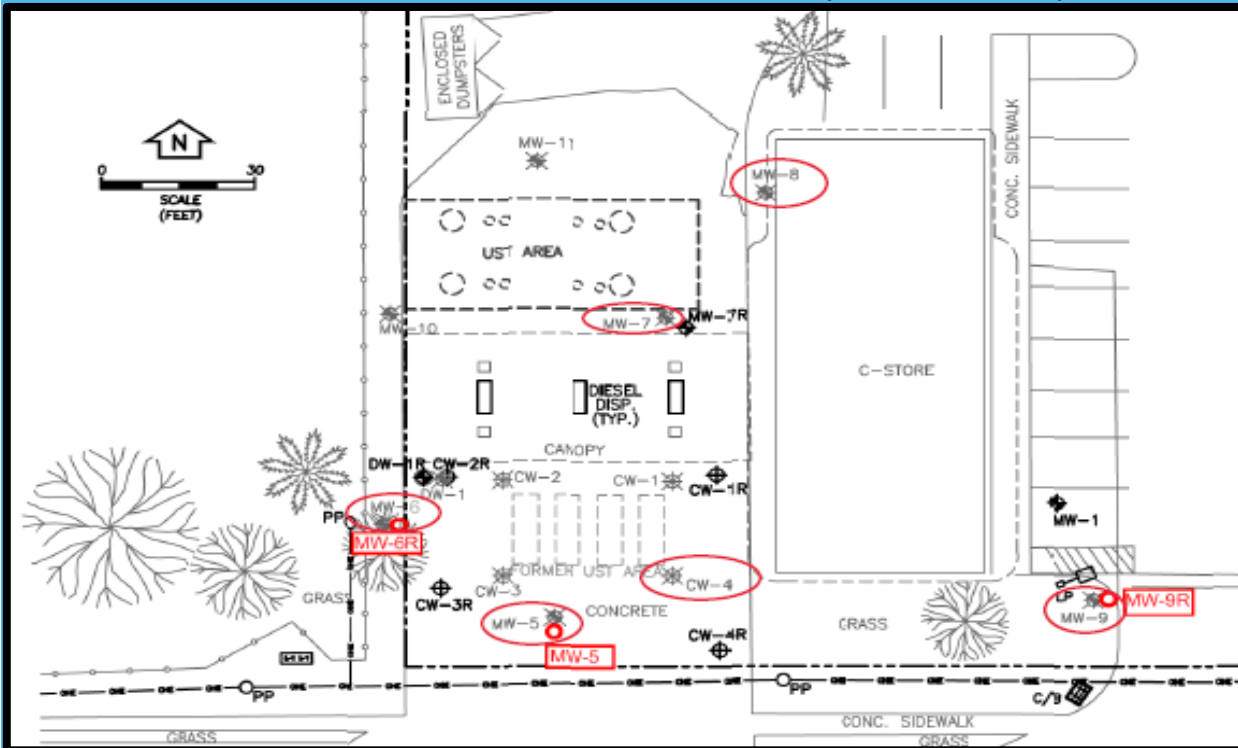
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NADCs		100	300	200	400	200	150	2	100	100	8	50000
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CW-2	5/16/1994											
CW-2R	11/29/2023	0.30 U	0.30 U	1.2 U	0.33 U	2.1 U	2.1 U	0.0075 U	0.24 U	0.24 U	17.2	760 U
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CW-4R	11/29/2023	0.30 U	0.30 U	3.1 I	0.33 U	2.1 U						1300
MW-5	9/2/1994	0.86 U	0.87 U	55.6	0.83 U	1.6 U	25.5	0.019 U				280
MW-6	9/2/1994	0.86 U	0.87 U	60.5	0.83 U	1.6 U	46.2	0.019 U				
MW-7	9/2/1994	27	0.87 U	127	0.83 U	1.6 U	53.3	0.019 U				330
MW-7R	11/29/2023	0.30 U	0.30 U	1.2 U	0.33 U	2.1 U						770 U
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MW-9	9/2/1994	0.86 U	0.87 U	186	0.83 U	2.5 U	40.7	0.019 U				250
MW-10	10/13/1994	0.86 U	0.87 U	0.96 U	0.83 U	1.6 U	8.55	-				-
MW-11	10/13/1994	0.86 U	0.87 U	0.96 U	0.83 U	1.6 U	1.25	-				-



EXAMPLES

SCENARIO FOUR

Red circle= historical Pb exceedance (zero clean).



- What if there was also a **recent** Pb exceedance that wasn't collected using bailer sampling?
- How would you clear the Pb exceedance for closure?

Sample Location	Date	Benzene	Ethylbenzene	MTBE	Toluene	Total Nylenes	Lead	EDB	1,2,4-Tri-methyl-benzene	1,3,5-Tri-methyl-benzene	Cumene (Isopropyl benzene)	FL-PRO TRPH
GCTLs		1	30	20	40	20	15	0.02	10	10	.8	5000
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MW-5	9/2/1994	0.86 U	0.87 U	55.6	0.83 U	1.6 U	25.5	0.019 U				280
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MW-7	9/2/1994	27	0.87 U	127	0.83 U	1.6 U	53.3	0.019 U				330
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MW-10	10/13/1994	0.86 U	0.87 U	0.96 U	0.83 U	1.6 U	8.55	-				-
MW-11	10/13/1994	0.86 U	0.87 U	0.96 U	0.83 U	1.6 U	1.25	-				-



CONCLUSION

How to clear historical Pb exceedances?

Resample existing wells if available: If the well still exists, resample it; if the wells has been abandoned or destroyed but a nearby well exists that can serve as a proxy, sample it.

Install replacement wells if necessary: Install replacement wells, if needed, at representative locations.

Use best professional judgment: Try to obtain data that is representative of site conditions.



THANK YOU

Jessica Duke

Division of Waste Management / Petroleum
Restoration Program
Florida Department of Environmental Protection

Contact Information:

850-245-8891

Jessica.Duke@floridaDEP.gov

