

# DECODING LAB REPORTS: BEST PRACTICES FOR EVALUATING LABORATORY DATA

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# Overview

- NELAP Statements, Accreditation, and DEP-Approved Subcontractors for ATC
- Chain of Custody (COC) Review
- Sample Handling & Preservation Verification
- Key Laboratory Report Checks
- Understanding Qualifiers & Analytical Bias
- Determining Data Acceptability
- References



State of Florida  
Department of Health, Bureau of Public Health Laboratories  
This is to certify that



E83018

EUROFINS ORLANDO  
481 NEWBURYPORT AVENUE  
ALTAMONTE SPRINGS, FL 32701


has complied with Florida Administrative Code 64E-1,  
for the examination of environmental samples in the following categories

DRINKING WATER - GROUP I UNREGULATED CONTAMINANTS, DRINKING WATER - GROUP II UNREGULATED CONTAMINANTS, DRINKING WATER - MICROBIOLOGY, DRINKING WATER - OTHER REGULATED CONTAMINANTS, DRINKING WATER - PRIMARY INORGANIC CONTAMINANTS, DRINKING WATER - SECONDARY INORGANIC CONTAMINANTS, DRINKING WATER - SYNTHETIC ORGANIC CONTAMINANTS, NON-POTABLE WATER - EXTRACTABLE ORGANICS, NON-POTABLE WATER - GENERAL CHEMISTRY, NON-POTABLE WATER - METALS, NON-POTABLE WATER - MICROBIOLOGY, NON-POTABLE WATER - PESTICIDES-HERBICIDES-PCB'S, NON-POTABLE WATER - VOLATILE ORGANICS, SOLID AND CHEMICAL MATERIALS - EXTRACTABLE ORGANICS, SOLID AND CHEMICAL MATERIALS - GENERAL CHEMISTRY, SOLID AND CHEMICAL MATERIALS - METALS, SOLID AND CHEMICAL MATERIALS - MICROBIOLOGY, SOLID AND CHEMICAL MATERIALS - PESTICIDES-HERBICIDES-PCB'S, SOLID AND CHEMICAL MATERIALS - VOLATILE ORGANICS

Continued certification is contingent upon successful on-going compliance with the NELAC Standards and FAC Rule 64E-1 regulations. Specific methods and analytes certified are cited on the Laboratory Scope of Accreditation for this laboratory and are on file at the Bureau of Public Health Laboratories, P. O. Box 210, Jacksonville, Florida 32231. Clients and customers are urged to verify with this agency the laboratory's certification status in Florida for particular methods and analytes.

Date Issued: July 01, 2023 Expiration Date: June 30, 2024



  
Susanne Crowe, MHA  
Interim Chief Bureau of Public Health Laboratories  
DH Form 1697, 7/04  
NON-TRANSFERABLE E83018-95-07/01/2023  
Supersedes all previously issued certificates

# NELAP Statement & Approved Subcontractor

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The accredited lab utilized  
must be a DEP-approved  
subcontractor.





# Preservation Verification

Utilize the most recently updated version of DEP Standard Operation Procedure (SOP) 001/01, Table FS1000.

# Sample Preservation: Temperature & pH

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Why is sample preservation important?

Do samples really expire?

Does proper preservation ensure high-quality results?

# Sample Preservation: Temperature & pH

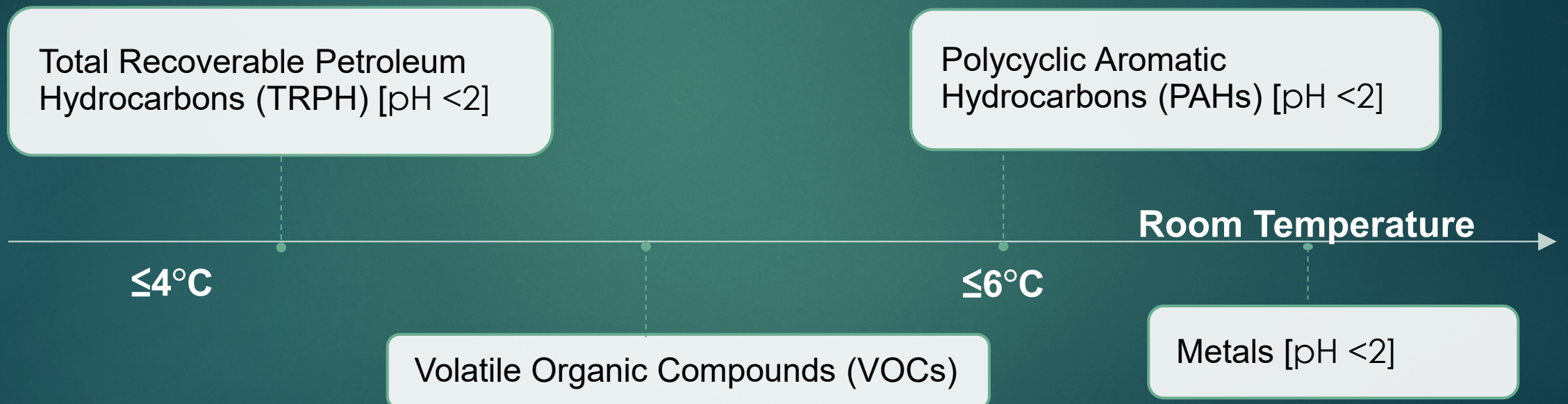
- Samples held beyond acceptable temperature or pH range may **impact holding time and data usability.**

Sample will degrade faster than the acceptable holding time.

# Sample Preservation: Temperature & pH

Soil: 2-6°C

Groundwater: 0-6°C\*



\*Note: Acceptable groundwater temperature as per "Chapter 4: ORGANIC ANALYTES" states that Table 4-1 is guidance, not Environmental Protection Agency (EPA) requirement. See also SW-846 Test Method 8260D: Volatile Organic Compounds.

# Sample Preservation: Temperature & pH

- Check SOP periodically for sample temperature, pH, & holding-time updates.
- DEP data qualifier associated with temperature and/or pH exceedance: “Y” - Improper preservation.

# Key Laboratory Report Checks

- Summary Sheets 10
- Dilution Factors (DF)
- Collection, Preparation, Analysis Dates/Time
- Percent (%) Moisture and Natural Dilutions
- Reporting Units
- Method Detection Limit (MDL) & Practical Quantitation Limit (PQL)
- Data Qualifiers & Quality Control (QC) Data

Verify:

The project and sample identification are listed.

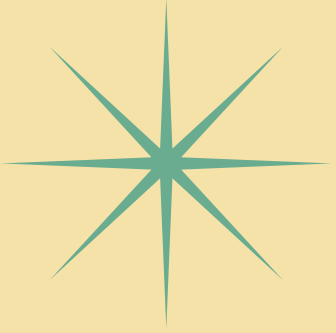
The appropriate methods are used.

Quality Control (QC) summary is included.

Issues are explained (e.g., dilutions, QC failures, etc.).

# Lab Summary Sheets

Case Narrative	
Client: [REDACTED] Project: [REDACTED]	Job ID: 670-55204-1
<hr/> <b>Job ID: 670-55204-1</b> [REDACTED]	
<b>Job Narrative</b> 670-55204-1	
<b>Receipt</b> The samples were received on 1/17/2025 10:44 AM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperatures of the 2 coolers at receipt time were 0.8° C and 1.2° C.	
<b>GC/MS VOA</b> Method 8260D: The following samples were diluted due to the nature of the sample matrix: SB-4R1 (670-55204-5), SB-4R2 (670-55204-6), SB-26 (670-55204-7), SB-27 (670-55204-8) and SB-29 (670-55204-10). Elevated reporting limits (RLs) are provided.	
No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.	



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**Consider Dilution Factors (DF)**

# DF: Is the sample overdiluted?

- **A:** Was a DF appropriately applied?
- **B:** Did the analysis yield a high-value result?
- **C:** Could the sample have been analyzed at a lower dilution before sample expiration date?
- **D:** Refer to DEP's 05/21/2010 Guidance document, "Quality Assurance – Basic Dilution Principles."



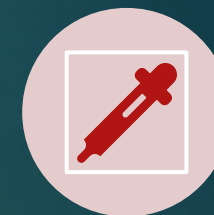
**A:** DILUTIONS ARE THE ANALYST'S ATTEMPT AT NOT DAMAGING THE INSTRUMENT WHEN A SAMPLE IS OILY, VISCOUS, OR EXTREMELY COLORED.



**B:** IF AT LEAST ONE (1) ANALYTE WAS AT 60% OF THE CALIBRATION RANGE, THEN THE DATA MAY BE ACCEPTABLE AT THAT DILUTION.



**C:** ALL ANALYTE VALUES OF "U" WITH A DF SIGNIFIES AN OVER-DILUTION AND MAY RENDER THAT DATA UNUSABLE.



**D:** ALL ANALYTE VALUES OF "I" WITH DF MEANS THAT A LESSER DILUTION SHOULD BEEN UTILIZED TO RENDER MORE ACCURATE DATA.

# Verify Collection, Preparation, & Analysis dates/times

- Sample Collection Date matches Chain of Custody
- Digestion/Extraction (where applicable) are performed within appropriate method-established timeframe.
- Analyses are performed before sample expiration.



<b>Analyses' Holding-Times (days)</b>	<b>To Preparation</b>	<b>To Analysis</b>	<b>Total Holding-Time</b>
VOAs	-	*7 or 14	28
PAHs	7	40	47
TRPH	7	40	47
Metals	-	180	180

- If 28-day holding-time, then count by days. If 48-hour holding-time, then count by hour & minute. Sample collection date/time begins the countdown.
- Sample must be digested/analyzed within the associated method's acceptable holding-time requirements.
- DEP data qualifier associated with holding-time exceedance: "Q" - Sample analyzed beyond holding-time.



## Samples Degrade Over Time

Each analyte type has been verified per sample method to determine how long it can maintain accurate results.

# Percent (%) moisture



Lab results are reported on a dry-weight basis for soil samples (Verify that % moisture was measured and applied correctly).



High moisture creates a natural dilution & reduces extraction efficiency in Semi-volatiles.



Elevated % Moisture can also affect MDL, because the dried soil sample will weigh less than the wet soil did.



## Method Detection Limit (MDL) & Practical Quantitation Limit (PQL)

Values between MDL and PQL are unreliable due to inaccurate reproducibility.



# Data Qualifiers

## 62-160.700 Tables.

The following table have been referenced in this chapter and is identified by this Title:

Table 1: Data Qualifier Codes.

**Table 1**  
**DATA QUALIFIER CODES**

The following codes shall be used by laboratories and/or field organizations when reporting sample data values that either meet the specified descriptions outlined below or do not meet the applicable quality control criteria specified for the laboratory or field result. Data qualifier codes listed in summary reports or other presentations comprising information that has been reformatted from original reports generated by field or laboratory organizations or individuals shall meet the requirements of subsections 62-160.240(4) and 62-160.340(7), F.A.C. Data qualifier codes added to sample results during data review procedures conducted by organizations or individuals other than the generators of original reports shall meet the requirements of subsections 62-160.240(5) and 62-160.340(8), F.A.C.


CODE	DEFINITION
A	Value reported is the arithmetic mean (average) of two or more determinations. This code shall be used if the reported value is the average of results for two or more discrete and separate samples. These samples shall have been processed and analyzed independently. Do not use this code if the data are the result of replicate analysis on the same sample aliquot, extract or digestate.
B	Results based upon colony counts outside the acceptable range. This code applies to microbiological tests and specifically to membrane filter colony counts. The code is to be used if the colony count is generated from a plate in which the total number of coliform colonies is outside the method indicated ideal range. This code is not to be used if a 100 mL sample has been filtered and the colony count is less than the lower value of the ideal range.
F	When reporting species: F indicates the female sex.
H	Value based on field kit determination; results may not be accurate. This code shall be used if a field screening test (e.g., field gas chromatograph data, immunoassay, or vendor-supplied field kit) was used to generate the value and the field kit or method has not been recognized by the Department as equivalent to laboratory methods.
I	The reported value is greater than or equal to the laboratory method detection limit but less than the laboratory practical quantitation limit.
J	Estimated value. A "J" – qualified sample value shall be accompanied by a detailed explanation to justify the reason(s) for designating the value as estimated. Where possible, the organization shall report whether the actual sample value is estimated to be less than or greater than the reported value, to assist data users in any evaluation of the usability of the sample value. A "J" data qualifier code shall not be used as a substitute for G, K, L, M, S, T, V, or Y, however, if additional reasons exist for identifying the value as an estimate (e.g., laboratory control spike or matrix spiked failed to meet acceptance criteria), the "J" code may be added to a G, K, L, M, T, U, V, or Y qualifier. Examples of situations in which a "J" code must be reported include: instances where a quality control item associated with the reported value failed to meet the established quality control criteria (the specific failure must be identified); instances when the sample matrix interfered with the ability to make any accurate determination; instances when data are questionable because of improper laboratory or field protocols (e.g., composite sample was collected instead of a grab sample); instances when the analyte was detected at or above the method detection limit in an analytical laboratory blank other than the method blank (such as a calibration blank) and, the blank value is greater than 10% of the associated sample value; or, instances when the field or laboratory calibrations or calibration verifications did not meet calibration acceptance criteria, including quantitative or chronological bracketing requirements for field testing data.

- “Y” - Improper preservation; Associated with temperature and/or pH exceedance.
- “Q” - Sample analyzed beyond holding-time.
- “U” - Analyzed, not detected; Associated with data values below the MDL.



## Commonly-Used DEP Qualifier Codes

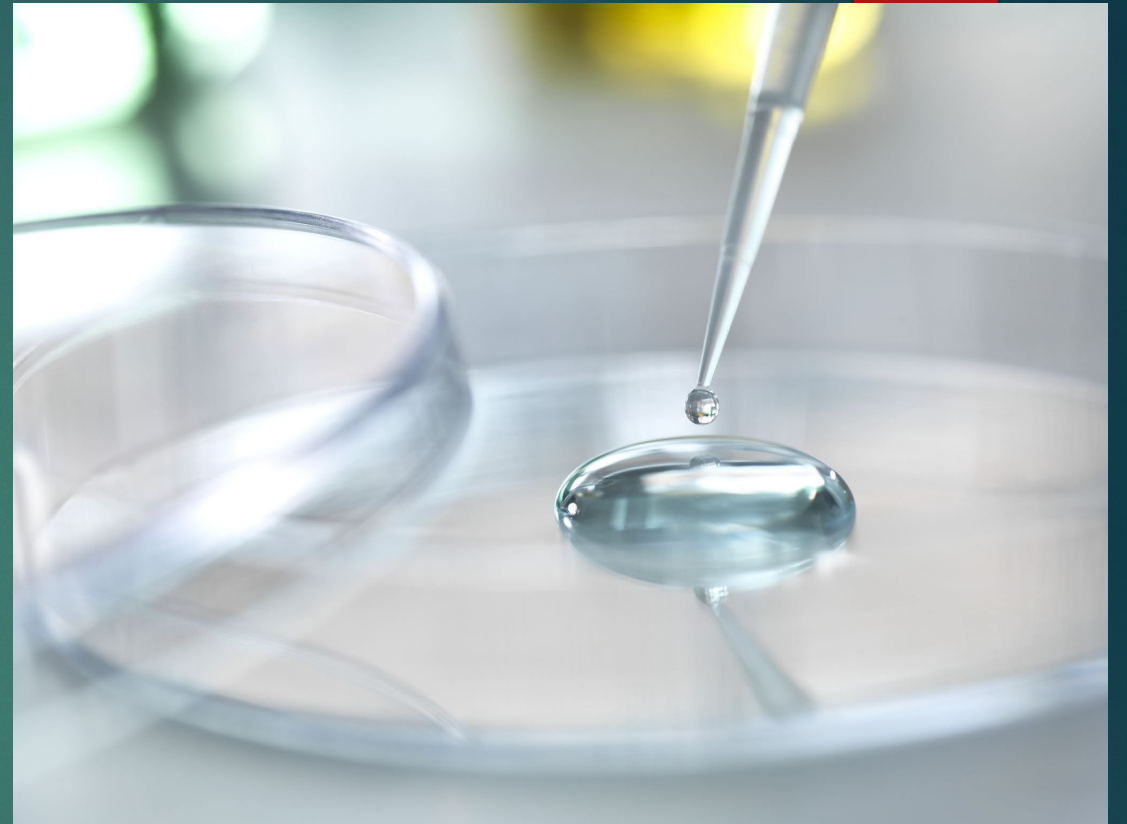
- “I” - Value is estimated; Associated with data values between the MDL and PQL; No certainty that this value can be replicated.
- “J” - Quality Control (QC) samples exceed lab range.
- “V” - Method Blank exceedance.
- “O” - Sample lost, could not perform analysis.



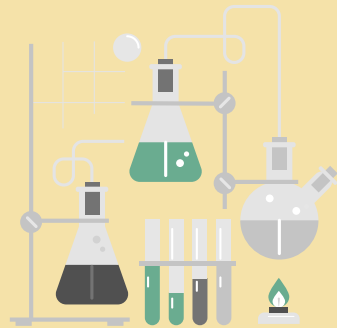
## Commonly-Used DEP Qualifier Codes, Continued

# Understanding Qualifiers & Analytical Bias

Discussion on “J” qualifier.

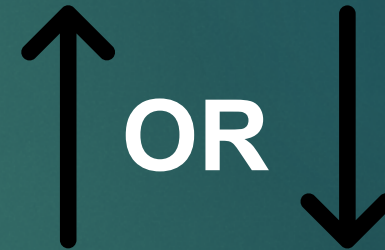


# Biased High vs Biased Low



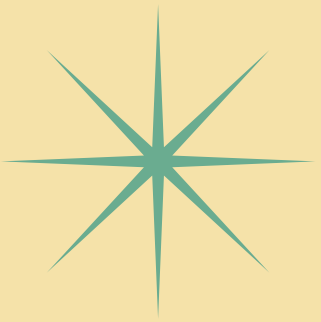
If Quality Control (QC) data exceeds the laboratory QC limit LOW (actual value  $<$  lowest acceptable value), then the sample data will be biased LOW.

This means that the true value of the sample could be a higher number than the reported value.



If Quality Control (QC) data exceeds the laboratory QC limit HIGH (actual value  $>$  highest acceptable value), then the sample data will be biased HIGH.

This means that the true value of the sample could be a lower number than the reported value.



# Determining Data Acceptability

## Is this Data Usable?



## “J” Data Acceptability Depends On Several Key Factors

J – If Matrix Spike/Duplicate exceed(s) lab limit, but Laboratory Control Sample (LCS) passes, then data may be acceptable.

J – If any calibration standard exceeds the lab limit, then all associated batch data is unusable; No exceptions.

Data biased low or high.

- A value between MDL & PQL, but the PQL is  $<$  CTL [yes]
- A value between MDL & PQL and the PQL is  $>$  CTL [If the value is  $<$ CTL, evaluate with precaution].



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**Is This Data  
Acceptable?**

- A value  $< \text{MDL}$  but sample has a DF 2+ [evaluate with precaution].
- A value  $< \text{MDL}$ , sample has a DF 2+, and at least 1 analyte from the sample analysis has an exceedance around 60% of the calibration range [yes, as per DEP dilution guidance].



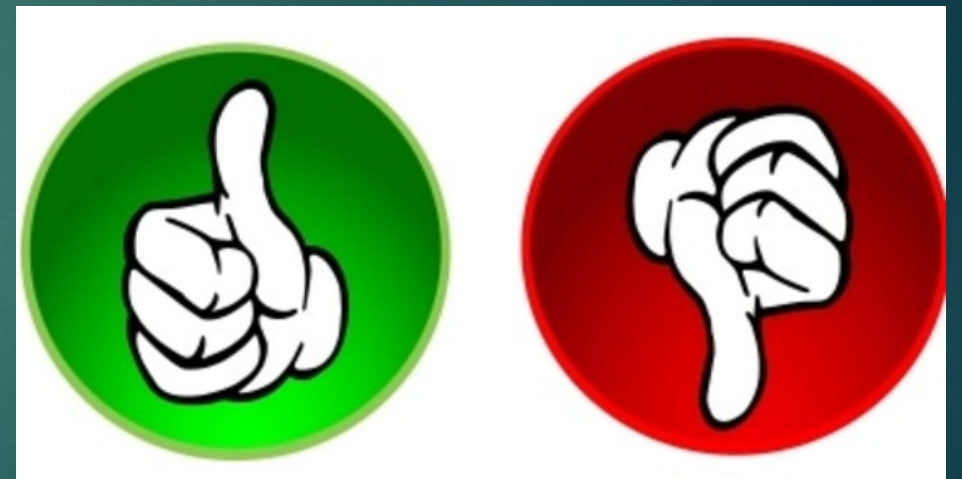
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## Is This Data Acceptable?

# POP QUIZ

## Determine if the sample data in the scenario below can be considered reliable

- A sample value yields a result below CTL;
- However, this value falls within the lab's PQL range;
- PQL value is above CTL;
- Percent Recovery is less than 20%;
- Sample is undiluted.



# References

- 40 CFR Part 136 Table II – Guidelines Establishing Test Procedures for the Analysis of Pollutants.
- Chapter 3 of the SW-846 Compendium: Inorganic Analytes.
- Chapter 4 of the SW-846 Compendium: Organic Analytes.
- Chapter 62-160, Florida Administrative Code – Quality Assurance.
- Chapter 62.169.700 Tables. / Table 1 DATA QUALIFER CODES, Florida Administrative Code.
- Chapter 62-426, Florida Administrative Code – Sampling, Testing Methods, and Method Detection Limits for Water Pollution Sources.
- Chapter 62-777, Florida Administrative Code – Contaminant Cleanup Target Levels.
- Chapter 62-780, Florida Administrative Code – Contaminant Site Cleanup Criteria.
- EPA Method 6010D (SW-846): Inductively Coupled Plasma - Atomic Emission Spectrometry.
- EPA Method 8270E (SW-846): Semi-Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC-MS).

- Florida Department of Environmental Protection, 03/11/2024, Invitation to Negotiate (ITN) For Re-advertisement For Petroleum Contamination Site Response Action Services, ITN 2024019.
- Florida Department of Environmental Protection, 05/21/2010 Guidance document, “Quality Assurance – Basic Dilution Principles.”
- Florida Department of Environmental Protection, 10/01/2001 Guidance document, Soil Assessment and Sampling Methods for Florida Bureau of Petroleum Storage System Sites.”
- Florida Department of Environmental Protection, ATC Approved Subcontractors by Contract, <https://floridadep.gov/waste/petroleum-restoration/content/atc-regional-subcontractor-lists>.
- Florida Department of Environmental Protection, Determination of Petroleum-Range Organics, Method FL-PRO, 2018.
- Florida Department of Environmental Protection, “Evaluating and Interpreting Data.”
- Florida Department of Environmental Protection , NELAP Certified Laboratory Search <https://qlik.dep.state.fl.us/anon/sense/app/17c7c199-2c02-4f1e-9288-ad20a293694a/sheet/2c856f40-bcad-4024-ba35-88276ab274c3/state/analysis>
- Florida Department of Environmental Protection SOP 001/01 & FS1000 Tables.
- SW-846 Test Method 8260D: Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS).
- TNI Standard 2016, The NELAC Institute, EL-V1-2016-Rev.2.1



# THANK YOU

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