SUCCESSFUL FIELD SAMPLING: A FOCUS ON REDUCING REGULATORY RISK

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LEARNING OBJECTIVES

- Understand sample, subsample, extract, and digestate
- Realize the importance of sample handling and sample integrity, preservation, holding time, and collection container
- Understand activities around sample collection, receiving, chains-of-custody, sample identification, and storage
- Recognize potential issues related to sample requirements
- The importance of unique ID codes to ensure sample traceability requirements throughout the laboratory process
- Understand the purpose of legal chain-of-custody and routine sample handling

A TALE OF TWO SAMPLES: REDUCING RISK IN THE FIELD

Hot Summer Day

Windy & Humid

Sampling: VOAs, Micro, Metals, SVOAs, Anions Solids pH

REDUCING RISK: FIRST CONSIDERATION

HEALTH AND SAFETY

- Conduct a health risk assessment
- Ensure all personnel wear appropriate PPE
- Establish and communicate emergency procedures
- Recognize hazards that require special or additional training. ie HAZWOPER

	**Exploding bomb** (for explosion or reactivity hazards)		**Flame** (for fire hazards)		**Flame over circle** (for oxidizing hazards)
	**Gas cylinder** (for gases under pressure)		**Corrosion** (for corrosive damage to metals, as well as skin, eyes)		**Skull and Crossbones** (can cause death or toxicity with short exposure to small amounts)
	**Health hazard** (may cause or suspected of causing serious health effects)		**Exclamation mark** (may cause less serious health effects or damage the ozone layer*)		**Environment*** (may cause damage to the aquatic environment)
	**Biohazardous Infectious Materials** (for organisms or toxins that can cause diseases in people or animals)				

KNOW THE TYPES OF SAMPLES

← Laboratory Field Collection →

- Field Sample
- Subsample
- Extract
- Digestate

PROCEDURES/REQUIREMENTS

National Environmental Field Activities Program (NEFAP) is a voluntary accreditation program for field sampling and measurement organizations(FSMOs).

NEFAP focuses on field activities and is a separate program from the National Environmental Laboratory Accreditation Program (NELAP). Both were developed by TNI.

The NEFAP Standards also follow ISO/IEC 17025 and 17011.

Some laboratories have both NEFAP and NELAP accreditation. *Accreditation is not required for Field Sampling Management Organizations (FSMO) at this time.*

QUESTION

The laboratory and customer sampling personnel must be certified in order to collect environmental samples.

TRUE **FALSE**

STANDARDS/REQUIREMENTS

2016 TNI Standard; DOD QSM

Laboratories need to consider other requirements:

- 40 CFR 136
- 40 CFR 141
- 40 CFR 50-63
- Reference methods
- SW846 - RCRA
- Client Specifications/QAPPs
- EPA Drinking Water Certification Manual
- State Specific or other gov't criteria

Conflicting or vague requirements – use the most stringent.

No specification – ask for assistance & provide technical justification

QUESTION

Labs or Field Sample professionals can combine requirements as long as the most stringent from each one is honored.

TRUE **FALSE**

PLAN AHEAD

Sampling Plan:

- General sampling procedures based on method or program requirements.
- Determine specific project requirements

Understand:

- The goal of the sampling event
- The design of the sampling event
- Number of sampling locations, dates, analytes, etc.

Prepare:

- Equipment and Supplies
- Ensure all equipment is in good working condition
- Monitor weather conditions for outdoor sampling

SAMPLE INTEGRIGY = REDUCED RISK

- Identify areas of risk by conducting a risk assessment
- Build risk reduction into the plan
- Communicate areas of risk
- Mitigate risk

WHERE DOES SAMPLE INTEGRITY START?

ACTIVITY	PURPOSE - RISK
Sampling Plan	Provides direction and details; defines representative sample;
Standard Operating Procedures (SOPs)	Provides process requirements resulting in consistency.
Regulatory or other Governing Requirements for: • Required/appropriate sample containers • Proper preservation • Required temperature • Chain of custody documentation	Provides necessary guidance for compliance and criteria to meet regulatory and scientific objectives.

FIELD BLANKS

Equipment Blank (Rinsate Blank)

- Description: Analyte-free water poured over or through decontaminated field sampling equipment before collecting environmental samples.
- Purpose: Assess the adequacy of the decontamination process and contamination from the sampling, sample preparation, and measurement process.
- Frequency: 1 blank/day/matrix or 1 blank/20 samples/matrix

Field Blank

- Description: Analyte-free water poured into the container in the field, preserved, and shipped to the laboratory with field samples.
- Purpose: Assess contamination from field conditions during sampling.
- Frequency: 1 blank/day/matrix or 1 blank/20 samples/matrix

Trip (Travel) Blank

- Description: A clean sample of a matrix taken from the laboratory to the sampling site and transported back to the laboratory without exposure to sampling procedures. Typically analyzed only for volatile compounds.
- Purpose: Assess contamination introduced during shipping and field handling procedures.
- Frequency: 1 blank/cooler containing volatiles

FIELD QA/QC: WHERE'S THE RISK?

ACTIVITY	PURPOSE
Blanks - Collect field blanks	Contamination
Duplicate samples	Technique
Field Equipment - Regularly calibrate field instruments and equipment	Accuracy of results/collection volumes
Training - Ensure all personnel are trained and familiar with SOPs	Correct and representative sample
Logbook for recording info.	Documented details and verification of completion

SAMPLE CONTAINERS: WHERE'S THE RISK?

Glass vs. Plastic
Reaction, adherence

Look for method, rule, standard, & other specifications
Nonconformance

Decisions: i.e. Dark/Amber bottles or store protected rom light: Chlorophylls, chlorinated acids, other organics, TOC, etc.
Protection of unstable and/or light sensitive compounds

Look for method, rule, standard, & other specifications
Nonconformance

How is the cleaning process verified? (Can containers be reused?)
Must have scrupulous procedures and documentation

FIELD DOCUMENTATION: WHERE'S THE RISK?

ACTIVITY	PURPOSE
Logbook & Marker - Record activities in a field logbook	Record in real time – details fade
Container Labels - Each sample container should have unique identifiers	Must be able to accurately identify – Easy to transpose labels
Photo documentation – Visual record of sampling locations and procedures	Photos are convenient ways to verify conditions

SAMPLE COLLECTION: WHERE'S THE RISK?

ACTIVITY	PURPOSE
During sampling, it's important to follow the instructions provided in the field sampling plan	Improper collection: grab or random vs composite, containers (glass vs plastic), wrong sampling point, etc
Use the appropriate personal protective equipment (PPE) to avoid contamination	Gloves, mask, eye protection….all as needed depending upon the type of sampling
Follow Standard Operating Procedures	Guarantees a higher degree of accuracy and representativeness

PRESERVE THE SAMPLE

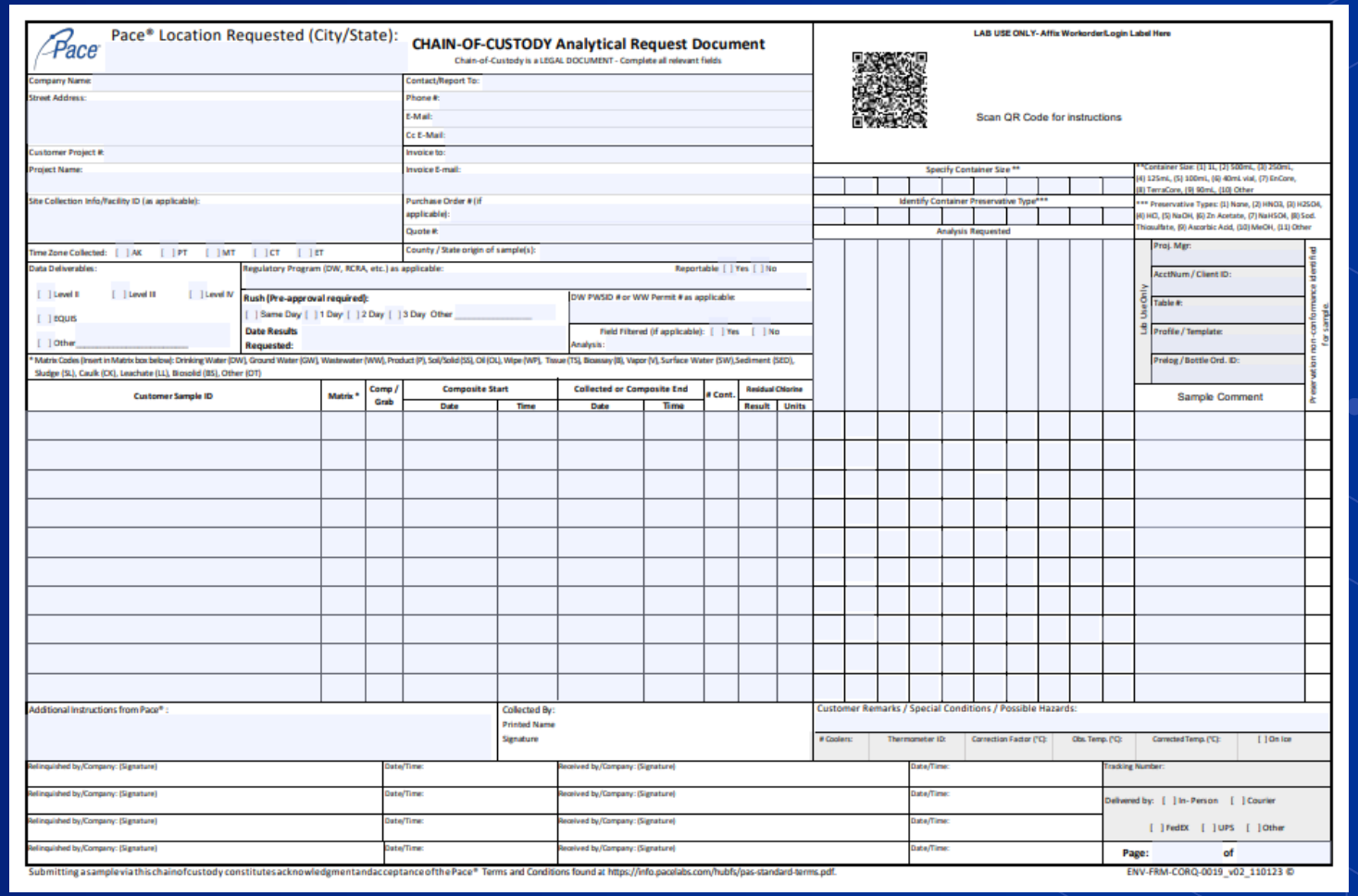
ACTIVITY	PURPOSE
What to add to the sample?	Valid results? Qualifiers?
All preservation chemicals must be contaminant free and traceable	Non-traceable or lack of proof, cannot verify contamination without documentation
Preserve in the field with appropriate reagents.	Some flexibility, may require qualifiers
After the fact preservation is only allowed in certain circumstances.	Must be documented, may be qualified or require comment on the report
When is it added?	Strict….can invalidate
What to record: Traceable? Correct concentration? ID Number?	Essential for verification of concentration, chemical name, and traceability
Verify the adequacy once received	Must be verified when received at the lab

PACK & TRANSPORT THE SAMPLE

- Transport samples under appropriate thermal conditions & protect against cross contamination
- Store samples in a secure, controlled environment, at all times, to ensure custody integrity
- All custody should be traceable, documented, and verifiable

PAPERWORK

- Fill out container labels with indelible or permanent ink/marker
- Each sample container should have unique identifiers
- Complete all necessary details on the Chain of Custody



Pace® Location Requested (City/State):

CHAIN-OF-CUSTODY Analytical Request Document

Chain-of-Custody is a LEGAL DOCUMENT - Complete all relevant fields

LAB USE ONLY- Affix Workorder/Login Label Here

Scan QR Code for instructions

Company Name:
Street Address:
Contact/Report To:
Phone #:
E-Mail:
Cc E-Mail:
Customer Project #:
Project Name:
Invoice to:
Invoice E-mail:
Site Collection Info/Facility ID (as applicable):
Purchase Order # (if applicable):
Quote #:
Time Zone Collected: [ ] AK [ ] PT [ ] MT [ ] CT [ ] ET
County / State origin of sample(s):
Data Deliverables: [ ] Level II [ ] Level III [ ] Level IV [ ] EQUIS [ ] Other
Regulatory Program (DW, RCRA, etc.) as applicable:
Reportable [ ] Yes [ ] No
Rush (Pre-approval required): [ ] Same Day [ ] 1 Day [ ] 2 Day [ ] 3 Day Other
Date Results Requested:
DW PWSID # or WW Permit # as applicable:
Field Filtered (if applicable): [ ] Yes [ ] No
Analysis:

Specify Container Size **
Identify Container Preservative Type***
Analysis Requested

** Container Size: (1) 1L, (2) 500mL, (3) 250mL, (4) 125mL, (5) 100mL, (6) 40mL vial, (7) EnCore, (8) TerraCore, (9) 90mL, (10) Other

*** Preservative Types: (1) None, (2) HNO3, (3) H2SO4, (4) HCl, (5) NaOH, (6) Zn Acetate, (7) NaHSO4, (8) Sod. Thiosulfate, (9) Ascorbic Acid, (10) MeOH, (11) Other

Lab Use Only: Proj. Mgr: AcctNum / Client ID: Table #: Profile / Template: Prelog / Bottle Ord. ID:

Preservation non-conformance identified for sample:

* Matrix Codes (Insert in Matrix box below): Drinking Water (DW), Ground Water (GW), Wastewater (WW), Product (P), Soil/Solid (SS), Oil (OL), Wipe (WP), Tissue (TS), Bioassay (B), Vapor (V), Surface Water (SW), Sediment (SED), Sludge (SL), Caulk (CK), Leachate (LL), Biosolid (BS), Other (OT)

Customer Sample ID	Matrix *	Comp / Grab	Composite Start Date	Composite Start Time	Collected or Composite End Date	Collected or Composite End Time	# Cont.	Residual Chlorine Result	Residual Chlorine Units	Sample Comment

Additional Instructions from Pace® :

Collected By: Printed Name Signature

Customer Remarks / Special Conditions / Possible Hazards:

Coolers: Thermometer ID: Correction Factor (°C): Obs. Temp. (°C): Corrected Temp. (°C): [ ] On Ice

Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:
Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:
Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:
Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:

Tracking Number:

Delivered by: [ ] In-Person [ ] Courier [ ] FedEX [ ] UPS [ ] Other

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Submitting a sample via this chain of custody constitutes acknowledgment and acceptance of the Pace® Terms and Conditions found at https://info.pacelabs.com/hubfs/pas-standard-terms.pdf.

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Where's the risk?

QUESTION

A properly filled out COC is completed in pencil, in case an error is found and needs to be corrected.

TRUE **FALSE**

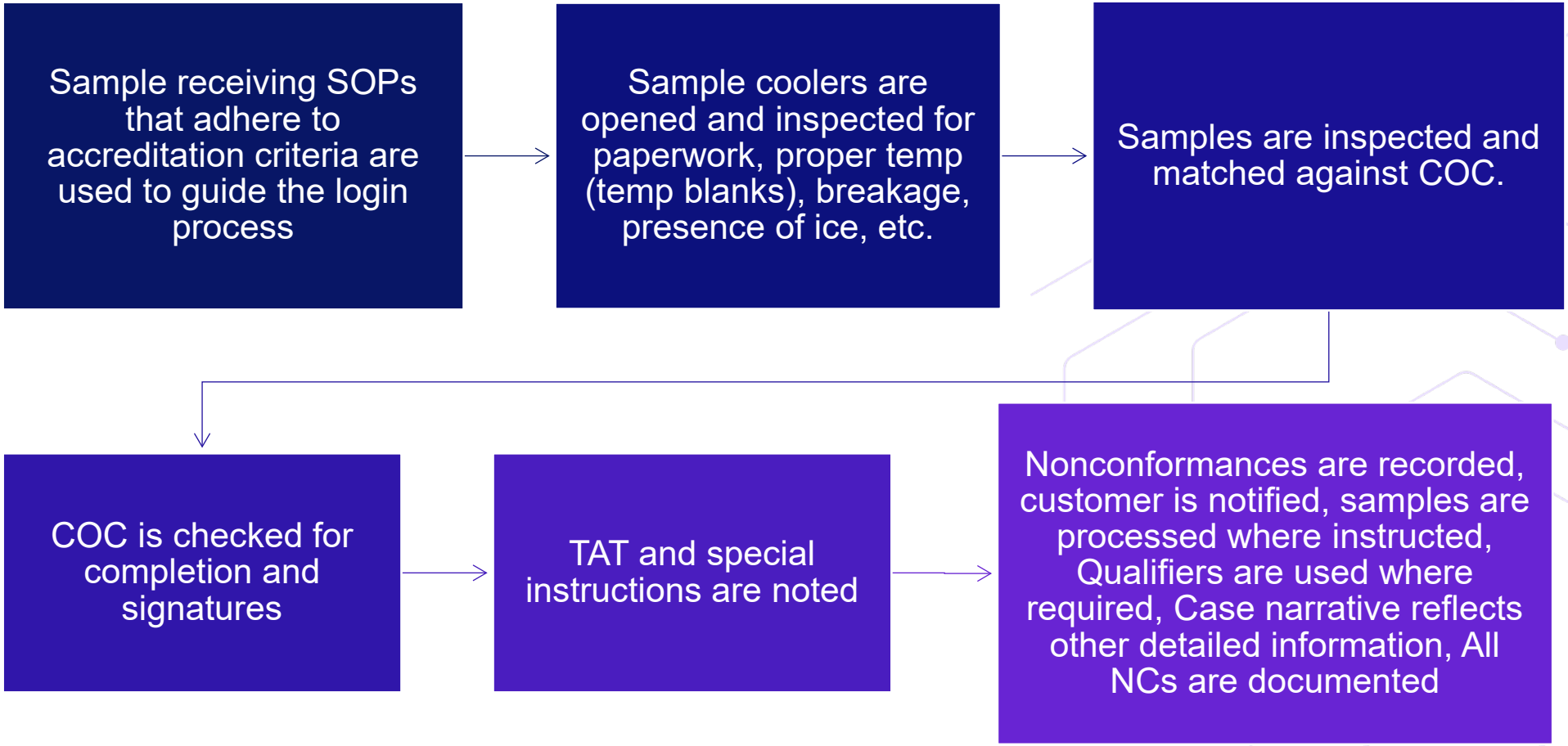
DELIVER SAMPLES TO THE LAB

Same day - On ice, if recently collected

Store samples cold & secure if cannot be delivered same day

Drop samples at lab and obtain acknowledgement of receipt

SAMPLES ARRIVE AT LABORATORY



RECORDING THE TEMPERATURE (LAB)

- Where to record the receipt temperature: LIMs? Chain of Custody?
- Thermometer: Traceable? Verification? ID Number? Correction factor?
- Is temperature taken from the actual sample? or a temperature blank?

PREP AND ANALYZE THE SAMPLE FOR COMPLIANCE AND REPORTING

Adhere to relevant regulatory requirements with proper and required accreditations and credentials

Prepare detailed reports including methods, results, and quality control measures

Regularly review and audit procedures and documentation

QUESTION

A simple but uncaught error in the field can cause huge data impacts, but most notably can be enough to invalidate the entire testing process and associated results.

TRUE **FALSE**

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A TALE OF TWO SAMPLES: REDUCING RISK IN THE FIELD

- Sample containers – acceptable
- Paperwork – complete and in order
- All things appear to be equal when the samples arrive at the lab
- Handling and Details are different
- What are the consequences?
- Are failures allowed?
- COC, Nonconformance forms (sample receipt), Case narratives and qualifiers tell the story.

Reducing Risk in the Field

- Safety - #1
- Regulations, standards, methods, accreditations - requirements
- Field Sampling Plan is a must
- Sample/Data Integrity, Traceability, Documentation
- Understand that everything cannot always be perfect. Case narratives and qualifiers are important.
- Take a minute to dot the “i’s” and cross the “t’s”!

THANK YOU

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