Underground Storage Tank Investigation Technical Guidance

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Presentation Outline

- Overview
- Applicability
- Triggers
- Assessment
- Investigation of USTs in service
- Investigation of USTs undergoing closure
- Soil Re-use
- Piping

Overview

UST Sampling requirements used to be provided in:

Technical Requirements for Site Remediation
N.J.A.C. 7:26E-3.9(a)3 & 6.3(b)

Now sampling recommendations are provided in:

Technical Guidance for Investigation of Underground Storage Tank Systems

Applicability

- Many underground storage tanks (USTs) regulated by Underground Storage Tank Rules N.J.A.C. 7:14B.
- Some USTs specifically exempt (unregulated) from UST regs.
- However - exempted USTs still required to comply with other DEP regulations such as:
  - "Administrative Requirements for the Remediation of Contaminated Sites" (ARRCs) [N.J.A.C. 7:26C], &
  - "Technical Requirements for Site Remediation", [N.J.A.C. 7:26E].

Scope of Guidance

- The guidance applies to typical UST situations.
- Investigations should also be conducted based on:
  - Soil Investigation Technical Guidance
  - Ground Water Investigation Technical Guidance
- If site-specific considerations differ from scenarios presented in guidance, use **professional judgment** to determine appropriate sampling protocols to effectively identify discharge.

Triggering Events

- Suspected release from UST requires further confirmation.
- Information indicates UST may be discharge source – requires unknown source investigation.
- UST temporarily taken out of service more than 1 year.
- Substance stored in UST changes (regulated>unregulated).
- ISRA triggering event - Entire SI including assessment of USTs containing hazardous substance/waste.
- UST Closure.

Underground Storage Tank (UST) ASSESSMENT

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UST ASSESSMENTS

Provide the following information:

- Description of UST system including # of USTs, location & sizes, along with the location of associated piping
- What USTs & piping are made of (i.e. metal/fiberglass)
- Associated leak detection methods and recordkeeping
- Depth to bottom of USTs
- Approximate depth to ground water (if available)

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UST ASSESSMENTS (continued)

Provide the following information (continued):

- Age of the UST system
- Types of products stored in the UST(s) over the life of the tank(s) with duration each product was stored
- Any net product loss and amounts
- Records of tank testing
- Type & depth of UST, Overburden, & Surface Material

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UST ASSESSMENTS (continued)

Provide the following information (continued):

- Type of product pumps (American/European suction or pressurized)
- Any part of UST system replaced or repaired (why)
- Reported discharges (releases) from system
- Remedial activities resulting from releases
- Cause & source of releases (N.J.A.C. 7:14B-8.3)

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UST
Site Investigation

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Safety First

- Prior to conducting intrusive activities – take all safety precautions.
- Recommend - New England Interstate Water Pollution Control Commission publication:

"Tank Closure without Tears: An Inspector's Safety Guide".
http://www.neiwpcc.org/neiwpcc_docs/NEI_ResourceGuide.pdf

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Sampling Parameters

- If history of substances stored in UST is known refer to N.J.A.C. 7:26E-Table 2.1

Example:

Table 2-1 Analytical Requirements for Petroleum Storage and Discharge Areas		
Petroleum Product	**Soil/Sediment**	**Water**
Unleaded Gasoline	VO+TICs, TBA	VO+TICs, TBA
Fuel Oil No. 2, Diesel Fuel	EPH, 25%> 1,000 analyze for 2-Methyl Naphthalene & Naphthalene	VO+TICs, SVO+TICs

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Sampling Parameters

If history of substances stored in UST is unknown or unclear initial sampling parameters should include:

- Target Compound List plus TICs/Target Analyte List (TCL + TICs/TAL),
- Hexavalent chromium,
- Petroleum hydrocarbons (EPH), and
- pH

Scale back once contaminants-of-concern (COCs) fully characterized

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SI for In-Service USTs

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In Service UST Sampling Frequency

Total Tank Capacity (Gallons)	Approximate Tank Length (Feet)	Recommended Number of Boring Locations per Tank
56-2,000	to 10'	4
2,001-10,000	to 30'	6
10,001-25,000	to 40'	8
25,000+	to 40'+	10

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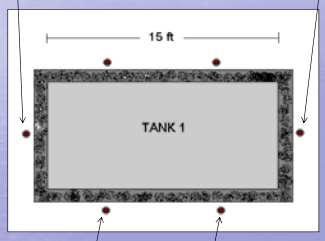
Borings

Install boring at each end of the tank



Install additional borings equally distributed along length on both sides

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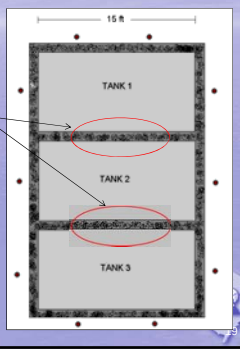
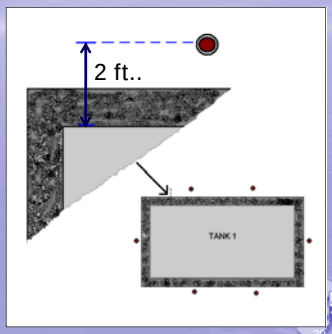
Borings

Borings between USTs immediately adjacent to each other not required



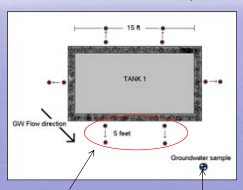
Borings

Borings should be conducted w/n 2 ft.. of the sides of the tank if possible.



Borings - Alternate Approach

- If borings cannot be conducted w/n 2 ft. of UST, due to:
  - Bedding gravel,
  - Concrete pads,
  - Utilities, or
  - Safety considerations



- Conduct borings no further than 5 ft. from sides & ends of tank.
- Plus take a ground water sample in expected downgradient ground water flow direction w/n 10 ft. of tank.

Soil Boring Screening

- Field screen soil borings for contamination pursuant to screening guidelines in the Department's Field Sampling Procedures Manual (FSPM).
- Begin screening at ground surface, extend boring several ft. below depth of UST bottom or to the top of bedrock.

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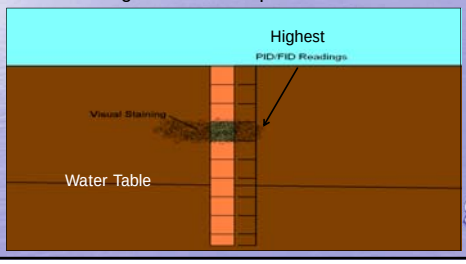
Sample Collection

- Discreet 6 inch depth interval
- Interval of highest field screening
- Interval of greatest staining/odors
- Collect regardless of GW presence.



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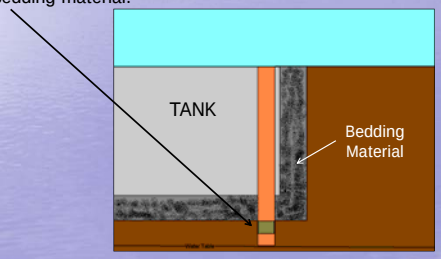
Sample Collection

If no indication of contamination & no ground water present:

Collect soil sample from 0-6" depth interval below bottom of UST bedding material.



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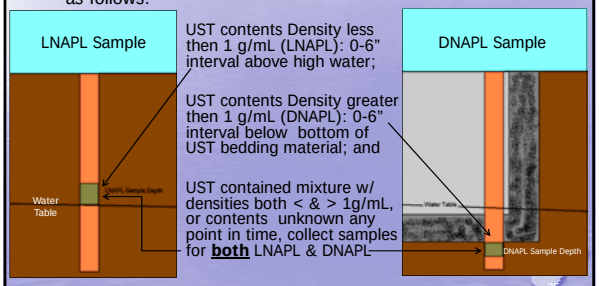
Sample Collection

If no indication of contamination & GW Present:

If any portion of UST at or below high water table collect sample as follows:



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SI for Service USTs undergoing Closure

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Closure of USTs - General

- UST contents unknown - sample & analyze product or residue remaining in tank. Use appropriate analytical method to identify substance. Indicated method w/n QAPP.
- Document evidence of discharge. Include written & photographic depiction of condition of UST (cracks, holes or tank corrosion) as well as the excavation.
- Note type & quantity of any product spilled along with remedial action taken if discharge from UST occurs during closure.

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Closure of USTs - removal

- Collect samples same day as the tank removal.
- Examine floor/sidewalls of excavation for contamination:
  - VOCs (No.2 fuel oil/diesel/gasoline/kerosene/jet fuel/waste oil) field screen soil from bottom & sidewalls as soil excavated.
  - Non-VOCs (No. 4 or No. 6 fuel oil) examine for evidence of discharge (soil discoloration & odor).



- Bias sample collection to areas of likely highest concentration
- If no bias, select locations based on professional judgment.

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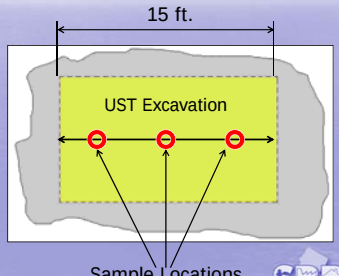
USTs removed & no ground water encountered in excavation

- Collect 1 sample along UST centerline footprint for each 5 ft. of tank length/fraction thereof
- Distribute sample locations equally along the centerline
- If the excavation enlarged, conduct additional sampling in accordance with section 6.3.1 of DEP's Soil Investigation Guidance document.



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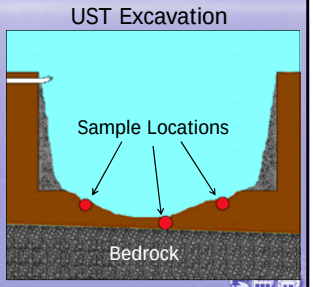
USTs removed & no ground water encountered in excavation

- Collect samples 0-6 inches below excavation
- Collect samples 0-6 inches above bedrock if encountered
- If insufficient soil to collect sample -> GW Investigation
- Bias samples to suspect highest contamination



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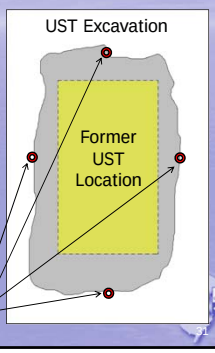
USTs removed & ground water encountered in excavation

UST contents Density less then 1 g/mL (LNAPL):

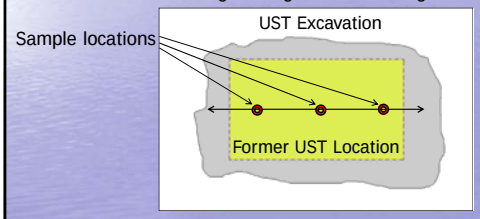
- 0-6" interval above high water
- 1 sample/30 linear ft. of sidewall
- Minimum of 1 sample/ sidewall
- Bias samples to locations of elevated field screening readings/ visual staining



USTs removed & ground water encountered in excavation

UST contents Density greater then 1 g/mL (DNAPL):

Collect samples every 5 ft. along centerline of UST footprint with samples taken w/n 2.5 ft. from each end of UST. Bias samples to elevated field screening readings/ visual staining.

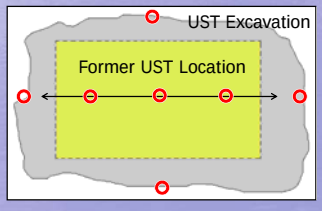


Sample Depth – 1st 0-6 inches at bottom of excavation

USTs removed & ground water encountered in excavation

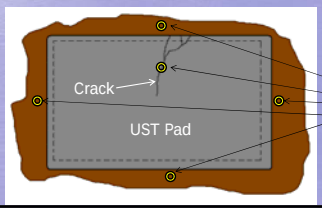
UST contained mixture w/ densities both < & > 1g/mL, or contents unknown any point in time:

Collect samples as sampling for both LNAPL & DNAPL



USTs removed installed on concrete pad

- No cracks, pad not compromised - 1 sample/30 linear ft. - each side w/n 2 ft. of pad - minimum of 1 sample/side
- Cracks evident, pad compromised - collect additional samples below pad biased to cracks/ compromised areas of greatest deterioration; or
- If ground water encountered in excavation, collect soil samples at depth intervals as indicated in previous slides.



When can an UST be closed in Place?

(In best interest of all parties that UST is removed)

- Pursuant to N.J.A.C. 7:14B-9.2(e), an UST may be abandoned in place if:
  - there is no contamination detected above remediation standards, or
  - when there is evidence of a discharge but removal is not feasible

USTs closed (abandoned) in place: Ground Water not present

- If tank isn't w/n water table sample as follows:
  - Bore through UST bottom. 1 boring/5 ft. or fraction thereof;
  - 1 boring w/n 2.5 ft. of each end of UST + borings equally distributed along centerline;
  - 1 sample from centerline/5 ft. or fraction thereof. Collect samples equally along centerline;
  - Collect samples from 0-6 inches below UST bottom bedding material. If bedrock encountered, collect samples 0-6 inches above bedrock.

USTs closed (abandoned) in place: Ground Water present

- When the density of the tank contents is/was less then 1 g/mL (LNAPL), collect the soil sample from the 0-6 inch depth interval above the high water table;
- When the density of the tank contents is/was greater then 1 g/mL (DNAPL), collect the soil sample from the 0-6 inch depth interval below the bottom of the tank bedding material; and
- When the UST contained a mixture of substances with densities both less then and greater then 1g/mL, or when the tank contents is unknown for any point in time, collect soil samples as indicated in both bullets above.

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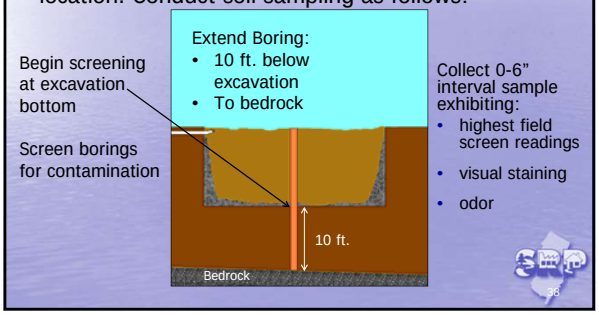
Closure of USTs – Release Identified

If release identified, install boring at former UST location. Conduct soil sampling as follows:



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Ground Water Investigation of UST recommended when:

- Any portion of UST located at or below known/ estimated high water table;
- Soil borings/samples cannot be collected w/n 2 ft. of UST (for in-service tanks);
- Investigation triggered-contaminant concentrations exceed impact to ground water (IGW) Standards.
- Ground water investigation pursuant to the Ground Water Investigation Technical Guidance

1st step in investigation: Collect GW sample w/n 10 ft. UST expected downgradient GW flow direction.

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Piping & Associated Loading/Unloading Areas

- Sample piping associated with USTs, including fill ports, and dispensers in accordance with section 3.6.2 within the Department's Soil Sampling Technical Guidance Document.
  - Immediately below piping depth
  - No further than 2 ft. from piping
  - 1 sample/every 15 ft. of piping (>50 ft., can reduce frequency)
  - Bias samples to joints, dispensers & other areas of potential discharge
  - Piping runs w/n 2 ft. of each other may be treated as one
  - Special circumstances allow for in-line video inspection as alternative

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Reuse of Excavated Soils

Soil excavated to access UST systems may be reused within the excavation that it was taken from without sample analysis if no physical evidence of a discharge

Reuse of any contaminated soil excavated due to a discharge from the tank system - follow Department's Alternative and Clean Fill Technical Guidance to determine its' acceptability for reuse.

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Decision Time:

- Contamination detected above standards – conduct Remedial Investigation & Remedial Action pursuant to N.J.A.C. 7:26E & Technical Guidance
- No contamination detected above standards – Remedial Action Outcome for UST AOC

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THE END

QUESTIONS???

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