Engineered Plans

- Scale Drawings
- UST-6C “Schedule of Materials”
- UST-20 “Alternative Fuel / Hazardous Substances Compatibility Checklist”
UST System Design

“...the design of petroleum storage tank systems, incorporating the tank, piping, ancillary equipment and containment systems, is an engineering function as defined by G.S. 89C-3 and must therefore be certified by a Professional Engineer.”

- NC Board of Examiners for Engineers and Surveyors
  (December 20, 1993)
UST System Design

Scale Drawing(s):
- 11” x 17”
- Should include the scale
- Compass rose / North arrow
- Must be sealed by a North Carolina licensed Professional Engineer
- Additional sheets showing an overview of the UST facility or UST system details may be necessary
UST System Design

Scale Drawing(s):

• Must show the proposed locations of:
  ▪ UST system features
  ▪ Tanks
  ▪ Product piping
  ▪ Vent piping
  ▪ Manifold piping
  ▪ Detectable tape
  ▪ Flex connectors
UST System Design

Scale Drawing(s):
• Must show the proposed locations of:
  ▪ UST system features (cont.)
  ▪ Leak detection equipment
  ▪ Spill prevention equipment
  ▪ Overfill prevention equipment
  ▪ Vapor recovery equipment
  ▪ Dispensers
  ▪ Containment sumps
UST System Design

Scale Drawing(s):

• Must show the locations of:
  ▪ Adjacent roadways
  ▪ Onsite structures
  ▪ Water supply wells (within 500 feet)
    ✓ If no wells exist that should be indicated.
• UST system components should be cross-referenced with UST-6C “Schedule of Materials”
UST System Design

Scale Drawing(s):

• All USTs must be noted with the following information:
  ▪ Corresponding Tank ID from UST-6A
  ▪ Tank capacity
  ▪ Tank diameter
  ▪ Product to be stored
  ▪ Method of anchoring
INSTALLATION NOTES:
1. ALL PIPING TO BE APPLIED WITH CONCRETE OR COPPER.
2. TANKS TO BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S INSTALLATION GUIDELINES AND PE RP-100.
3. PIPING TO BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S INSTALLATION GUIDELINES AND PE RP-100.
4. DETECTABLE TAPE TO BE INSTALLED ABOVE ALL PRODUCT PIPING (18" MAXIMUM BURIAL DEPTH).
5. NO WELLS SERVING PUBLIC WATER SYSTEMS OR WELLS USED FOR HUMAN CONSUMPTION LOCATED WITHIN 500 FEET OF JST SYSTEM.
6. ANY MODIFICATIONS TO THESE PLANS MUST BE APPROVED BY ENGINEER FIRST.
Complex designs may require detailed figures of the UST system.
UST System Design

Scale Drawing(s):

• Include installation notes on drawings to indicate maximum burial depth of detectable tape, absence of wells, etc.

INSTALLATION NOTES:

1. ALL TANKS TO BE ANCHORED WITH CONCRETE DEADMEN
2. TANKS TO BE INSTALLED IN STRICT ACCORDANCE WITH TANK MANUFACTURER’S INSTALLATION GUIDELINES AND PEI RP-100
3. PIPING TO BE INSTALLED IN STRICT ACCORDANCE WITH PIPING MANUFACTURER’S INSTALLATION GUIDELINES AND PEI RP-100
4. UTILITY TRACER TAPE TO BE INSTALLED ABOVE ALL PRODUCT PIPING
5. ANY MODIFICATIONS TO THESE PLANS MUST BE APPROVED BY ENGINEER FIRST
UST System Design

Scale Drawing(s):

- Use “revision cloud” and revision dates on drawings to indicate changes, as necessary
UST System Design

UST-6C “Schedule of Materials”

- Tanks
- Piping
- Spill prevention equipment
- Overfill prevention equipment
- Containment sumps
- Vapor recovery equipment
- Detectable tape
UST System Design

UST-6C “Schedule of Materials” (cont.)

• Leak detection equipment
  ▪ Leak detection monitoring console
  ▪ Interstitial sensor (tank)
  ▪ Interstitial sensor (piping)
  ▪ Automatic Line Leak Detectors (for pressurized piping)
  ▪ Containment sump monitoring
  ▪ Interstitial sensor (spill bucket)
# UST System Design

It may be useful to create a checklist to account for each needed sensor

<table>
<thead>
<tr>
<th>Enter Number of Monitoring Points</th>
<th>Monitoring Point / Sensor Location</th>
<th>Other Sensors</th>
<th>Monitoring Point / Sensor Location</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>UDC Sumps</td>
<td></td>
<td>Tank Interstitial Sensors</td>
</tr>
<tr>
<td></td>
<td>Piping Systems / STP Sumps</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Other Sumps</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Spill Buckets (for ones w/o built in sensors)</td>
<td></td>
<td>Spill Buckets (for ones w/ built in sensors)</td>
</tr>
<tr>
<td></td>
<td>Total Number of Sump Sensors Used at Site</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Application to Install or Replace Underground Storage Tank Systems
### (SCHEDULE OF MATERIALS)

<table>
<thead>
<tr>
<th>Facility ID No.</th>
<th>Facility Name</th>
<th>Attachment to (check one):</th>
<th>UST-6A □</th>
<th>UST-6B □</th>
</tr>
</thead>
<tbody>
<tr>
<td>UST System components installed (Check one):</td>
<td>If attached to UST-6B, have any modifications been made to approved design plan?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ Tanks and Piping</td>
<td>YES □</td>
<td>NO □</td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ Tanks Only</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ Piping Only</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**INSTRUCTIONS:** List the manufacturer, model or part number and quantity for the following equipment installed at the facility: tanks; piping including flexible connectors; leak detection equipment including the monitoring console, interstitial monitoring sensors and automatic line leak detectors; spill and overfill prevention equipment; vapor recovery equipment; containment sumps and method of locating the piping once it is buried. Group like categories of equipment together in the list. The item number provided below must correspond to the location(s) of the equipment shown on the scale drawing. Attach additional pages as necessary.

<table>
<thead>
<tr>
<th>ITEM NO.</th>
<th>ITEM/PART DESCRIPTION</th>
<th>MANUFACTURER</th>
<th>MODEL/PART NO.</th>
<th>QTY</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Affix PE seal here:

__________________________
Print Name of North Carolina Professional Engineer

__________________________
Company Name

__________________________
Date
UST-20

“Alternative Fuel / Hazardous Substances Compatibility Checklist”

Required for:

• Greater than 10% Ethanol
• Greater than 20% Biodiesel
• Any hazardous substance
UST-20

“Alternative Fuel / Hazardous Substances Compatibility Checklist”

Accepted documentation to be attached to UST-20 form:

- Certification by manufacturer
- UL listing
UST-20

“Alternative Fuel / Hazardous Substances Compatibility Checklist”

Must be certified as compatible:

• Tank
• Spill prevention equipment
• Overfill prevention equipment
• Submersible turbine pump
• Leak detection probes
• Interstitial and sump sensors
UST-20

“Alternative Fuel / Hazardous Substances Compatibility Checklist”

Must be certified as compatible:

- Piping material
- Pipe dope / sealant / adhesive
- Gaskets / seals
- Flex connectors
- Angle check valves
- Emergency shear valves
- Line leak detectors
Example of Corrosion Due to E-85

Standard, non-E85 fuel STP

E85 STP

Photos courtesy Iowa DNR
UST-20

“Alternative Fuel / Hazardous Substances Compatibility Checklist”
Instructions: This form is to be used to notify NC DENR that the proposed UST systems are compatible with ethanol blends greater than 10%, biodiesel blends greater than 20% or hazardous substances. This form must also be submitted prior to conversion from a conventional motor fuel to an ethanol blend greater than 10% ethanol content, a biodiesel blend greater than 20% biodiesel content or hazardous substances. Forms shall be submitted to the following address:

NC DEPARTMENT OF ENVIRONMENT & NATURAL RESOURCES
DIVISION OF WASTE MANAGEMENT / UST SECTION
1637 MAIL SERVICE CENTER, RALEIGH, NC 27699-1637
PHONE (919) 707-8171 FAX (919) 715-1117
http://portal.ncdenr.org/web/wm

Sections I, II, and VI are to be completed by the UST owner/operator. Sections III through V of this form are to be completed by a UST Equipment Contractor. Complete one form for each UST system that will be storing the ethanol, biodiesel blend fuel or hazardous substances. Keep a copy of this form and all supporting documentation for your records to be made available for inspection.

For equipment items below that have manufacturer approved checked, you must provide copies of the applicable documents from the manufacturer stating the approval for use with the ethanol, biodiesel or hazardous substance concentration to be stored. If the manufacturer provides a warranty for the item, then you must provide a copy of the manufacturer’s warranty that states the component is warranted for use with that concentration of alternative fuel blend/hazardous substance.

If any component is not Underwriters Laboratory (UL) listed or manufacturer approved for use with ethanol blend fuels greater than 10%, biodiesel blends greater than 20% or hazardous substances, then it cannot be stored and/or dispensed from the UST system. For “Tank Material” in Section III, if the tank is a steel tank that has not been internally lined and will not contain...
Sections I, II, and VI are to be completed by the UST owner/operator. Sections III through V of this form are to be completed by a UST Equipment Contractor. Complete one form for each UST system that will be storing the ethanol, biodiesel blend fuel or hazardous substances. Keep a copy of this form and all supporting documentation for your records to be made available for inspection.

For equipment items below that have manufacturer approved checked, you must provide copies of the applicable documents from the manufacturer stating the approval for use with the ethanol, biodiesel or hazardous substance concentration to be stored. If the manufacturer provides a warranty for the item, then you must provide a copy of the manufacturer’s warranty that states the component is warranted for use with that concentration of alternative fuel blend/hazardous substance.

If any component is not Underwriters Laboratory (UL) listed or manufacturer approved for use with ethanol blend fuels greater than 10%, biodiesel blends greater than 20% or hazardous substances, then it cannot be stored and/or dispensed from the UST system. For “Tank Material” in Section III, if the tank is a steel tank that has not been internally lined and will not contain hazardous substances, write “steel” in the “manufacturer” box. UL or Manufacturer approval is not required.

For “Pipe Material” in Section IV, if the piping is steel and will not contain hazardous substances, write “steel” in the “manufacturer” box. UL or Manufacturer approval is not required.

Write “NA” in the manufacturer box if the UST system does not have a particular component on the list.

Please note that the Fire Marshal must be notified prior to dispensing ethanol blend fuels.

<table>
<thead>
<tr>
<th>I. Ownership of Tanks</th>
<th>II. Location of Tanks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Owner's Name (Corporation, Individual, Public Agency or Other Entity):</td>
<td>Facility Name:</td>
</tr>
<tr>
<td>Contact Person for UST Location:</td>
<td>Phone Number:</td>
</tr>
<tr>
<td>E-mail Address</td>
<td>Address:</td>
</tr>
<tr>
<td>City (nearest): County:</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>III. Tank Information</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Tank ID No.</td>
<td>Tank Size:</td>
</tr>
<tr>
<td>Product formerly stored:</td>
<td>New product stored:</td>
</tr>
<tr>
<td>Is tank lined:</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Note: Tanks that have an interior lining are not approved for storage of ethanol or biodiesel blend fuels. The exception is FRP tanks that were lined under certification by the tank manufacturer to provide the compatibility.

Detection: Automatic Tank Gauge (ATG) | Inventory control & tank tightness testing

**UST-20**

“Alternative Fuel / Hazardous Substances Compatibility Checklist”
### III. Tank Information (Continued)

<table>
<thead>
<tr>
<th>Component</th>
<th>Manufacturer</th>
<th>Model/Brand</th>
<th>UL Listed</th>
<th>UL Number</th>
<th>Manufacturer Approved</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tank material</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spill bucket</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overfill / Auto shut-off / Ball float (circle)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Submersible pump</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Leak detection probes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interstitial &amp; sump sensors</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Attach* documents from the manufacturer stating the approval and warranty (if one is provided) for use with specific alternative fuel/hazardous substance.

### IV. Pipe Information

<table>
<thead>
<tr>
<th>Component</th>
<th>Manufacturer</th>
<th>Model/Brand</th>
<th>UL Listed</th>
<th>UL Number</th>
<th>Manufacturer Approved</th>
</tr>
</thead>
<tbody>
<tr>
<td>Configuration</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ Single wall</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ Double wall</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ Steel</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ Fiberglass</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ Flexible</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ Other (specify)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pipe material</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pipe dope/sealant / adhesive</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gaskets / Seals</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flex connector</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Angle check valve (suction pipe systems)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Emergency shear valve</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Line leak detector</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Attach* documents from the manufacturer stating the approval and warranty (if one is provided) for use with specific alternative fuel/hazardous substance.
Attach documents from the manufacturer stating the approval and warranty (if one is provided) for use with specific alternative fuel/hazardous substances.

V. Petroleum Equipment Contractor Signature

I certify by signing below that the components checked in the “UL” and/or “Manufacturer Approved” columns of sections III through IV are UL listed and/or manufacturer approved for use with the specified ethanol blend, specified biodiesel blend or specific listed hazardous substances.

______________________________  ______________________
Signature of petroleum equipment contractor   Date

______________________________
Print petroleum equipment contractor name

Contractor Company Name: __________________________  Phone: _______________________

Address: __________________________  City: __________________________  State: __________________________  Zip: __________________________

VI. Owner / Operator Signature

By signing below you are acknowledging that all of the items in sections I through V have been completed.

______________________________  ______________________
Tank owner / operator signature   Date

______________________________
Print tank owner / operator name

Company: __________________________

Failure to submit this form with all sections completed and any appropriate attachments could result in an enforcement action and/or non-issuance of your operating permit.
Questions?