



September 25, 2017

Brooks Stanfield, OSC
U.S. EPA Region 10
1200 Sixth Ave. Suite 900 (ECL-116)
Seattle WA 98101

Reference: Contract No. EP-S7-13-02, EPA Task Order 0045

Subject: FINAL Summary of Above Ground Storage Tanks (AST's) located at the Treoil Industries Biorefinery Oil Site after July-August 2017 Removal Activities, EQM PN 030309.0045

Dear Mr. Stanfield,

EQM is pleased to submit this detailed summary of the 50 AST's that are located at the Treoil Industries Biorefinery Oil site (4242 Aldergrove Road, Ferndale, WA 98248). Tank measurements and observations were collected during the EPA emergency response at this facility that occurred between 3/13/17 and 4/7/17. This report also includes updated changes to select tank contents and conditions after the supplemental removal activities that occurred at the site between July 24 and August 7, 2017.

Tank soundings were collected utilizing an interphase probe that differentiates between water and oil and/or a tape measure coated with water-detecting paste. Tank volume and material quantity estimates are approximate, and based on relative height of material compared to the total volume of the tank, and were not based on more accurate tank level/volume charts. The summary is itemized for each AST, and includes volume estimates as originally observed/measured in each tank, and also includes any changes in material volume that occurred as of 4/7/17, such as tanks that were pumped out using a vacuum (vac) truck. As of 4/7/17, all open ports 2-inches and larger on the tops of all of the AST's were covered with either flange blanks, threaded caps or drum lids secured to the flange ports, as feasible.

Based on tank soundings, much of the non-pumpable tall oil in the tanks had converted to a more pumpable phase, attributable to warmer ambient temperatures between April and July. EPA, ERRS and START contractors re-mobilized to the site between 7/24/17 and 8/7/17 to remove additional pumpable water/tall oil liquids (using vacuum trucks), and semi/non-pumpable tall oil material (using a vactor truck and vacuum sludge boxes) from nine AST's that were located outside of containment areas (Tanks T-1, T-2, T-3, T-11, T-12, T-13, T-14, T-15 and T-20). In addition, a mixture of tall-oils solids, and water/tall oil liquid were physically removed from Tank T-50; The Tank T-50 shell was cut up for scrap metal and removed from the site for recycling during this time frame. Changes to contents and conditions of the tanks that were addressed during these pumping activities are summarized in the itemized tank discussions below.

Approximately 93,000 gallons of combined water/tall oil/tall oil sludge and tall oil solids were removed from the AST's at the site during the combined EPA removal activities that occurred March-April and July-August 2017. These activities reduced that total estimated quantity of material in the tanks at the Treoil Industries facility from approximately 206,344 gallons down to 113,423 gallons. The majority of the material remaining in the AST's at the site, post August 2017 is semi/non-pumpable tall oil sludge.

Schematic drawings (provided by the START Contractor, Ecology and Environment, Inc.) showing the relative locations of the 50 AST's on the Treoil property, as referenced in this report, are included on Figure 1 (original disposition as encountered on 3/13/17) and Figure 2 (final disposition as of 8/7/17), respectively. The colorations on the Figures indicate tank contents as originally observed on 3/13/17. Tanks identified as empty, or containing residual contents, as marked with an "X" through the tank figure, are either empty, or contain a residual amount of water and/or tall oil material (generally less than 5% of tank capacity) that could not be recovered without damaging the integrity of the tank, i.e., cutting a hole in the top or the side of the tank to remove the remaining material.

Regarding Tank T-20, when the tank was originally sounded in March, 2017, it was determined that the tank was filled with non-pumpable sludge, with approximately 0.6 feet of pumpable tall oil on top of the sludge. However, when pumping operations commenced to remove the 0.6-foot layer of pumpable tall oil, it was observed that the layer of non-pumpable tall oil was actually only about 1 foot thick, and was overlying additional pumpable tall oil. The sludge layer makes it impractical to remove the material in Tank T-20 utilizing vacuum trucks without getting non-pumpable sludge in the vacuum truck. Tank T-20 contents were removed with available sludge boxes, but a mix of pumpable and non-pumpable tall oil material remain in the tank.

Spreadsheets summarizing the tank sizes and estimated contents, as initially observed in March 2017, and remaining as of August 2017, are also attached.

If you require further information please call me at (206) 445-4556.

Sincerely,

ENVIRONMENTAL QUALITY MANAGEMENT, INC.

Tony Bahnick

Tony Bahnick
Senior Response Manager

lp/tb

enclosure

cc: Jeff Fowlow, EPA Region 10 OSC
Laurie Palmer, EQM Subcontract Mgr.
Ron McManamy, EQM Program Mgr.



Figure 1- Initial Tank Disposition as of 031717

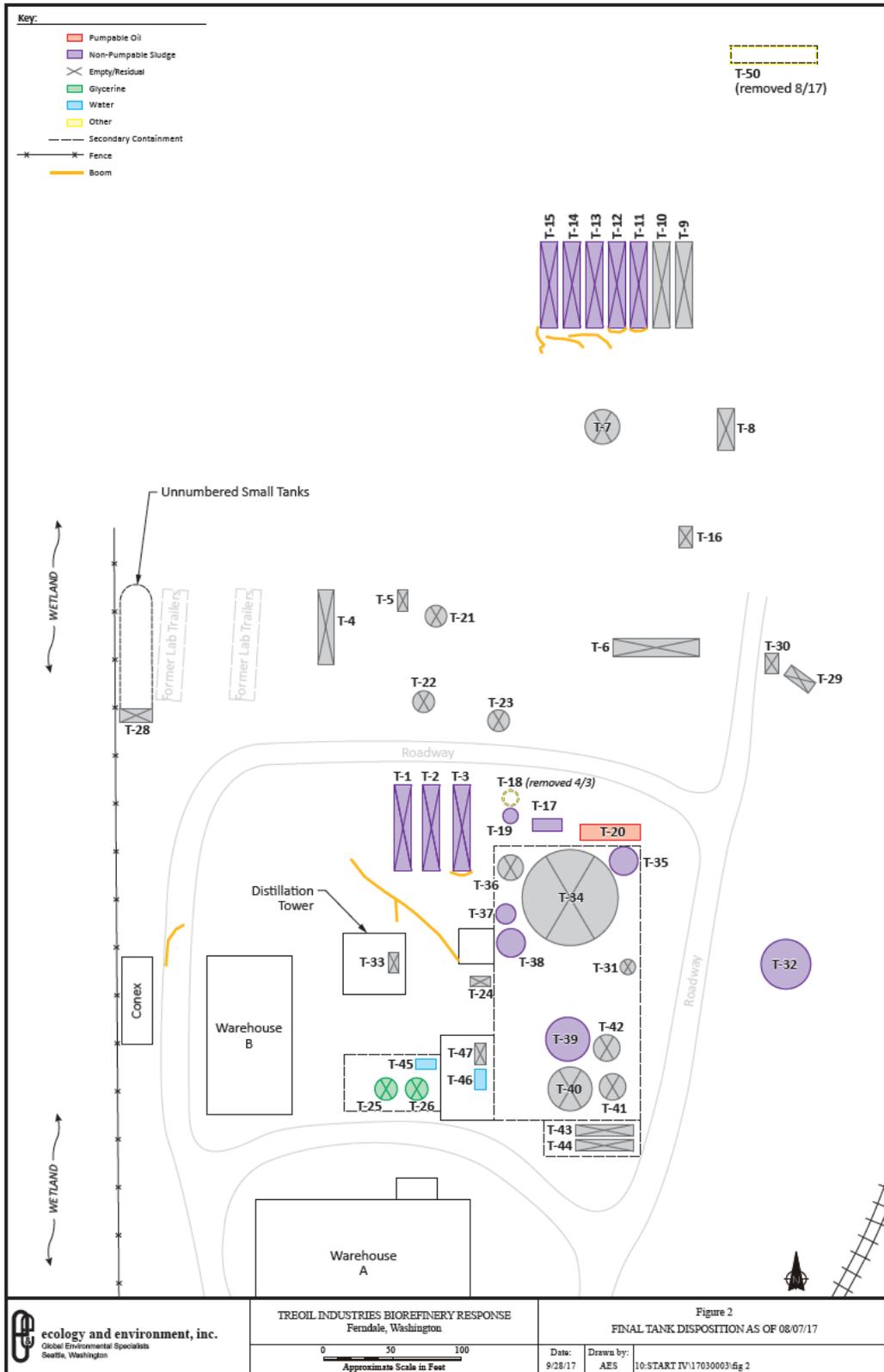


Figure 2 – Final Tank Disposition as of 080717

T-1

Tank Capacity Calculation: 37.5' length x 10.5' diameter = 24,289 gallons

Measured tank contents:

0.42' = 962 gallons - pumpable tall oil

1.33' = 3,077 gallons - oily water

3.17' = 7,333 gallons - non-pumpable tall oil

6.34' = 11,372 gallons - total material in the tank

Measured tank contents as of 4/7/17:

1.33' = 3,077 gallons - pumpable tall oil /oily water

3.17' = 7,333 gallons - non-pumpable tall oil

4.59' = 10,410 gallons - total material in the tank

Notes: Approximately 4,000 gallons of oily water was pumped out of tank T-1 using a vac truck; other oily water from Tank T-18 and sumps adjacent to Warehouse B were also pumped into Tank T-1 prior to T-1 being pumped.

Measured tank contents as of 8/7/17:

Trace - pumpable tall oil /oily water

3.83' = 8,860 gallons - non-pumpable tall oil

3.83' = 8,860 gallons - total material in the tank

Notes: A total of approximately 5,550 gallons of mixed water/pumpable tall oil was pumped out of tank T-1 using vac trucks.

T-2

Tank Capacity Calculation: 37.5' length x 10.5' diameter = 24,289 gallons

Measured tank contents:

1.50' = 3,470 gallons - pumpable tall oil

4.00' = 9,253 gallons - non-pumpable tall oil

5.50' = 12,723 gallons - total material in the tank

Measured tank contents as of 4/7/17:

0.08' = 192 gallons - pumpable tall oil

4.00' = 9,253 gallons - non-pumpable tall oil

4.08' = 9,445 gallons - total material in the tank

Measured tank contents as of 8/7/17:

Trace - pumpable tall oil /oily water

1.17' = 2,707 gallons - non-pumpable tall oil

1.17' = 2,707 gallons - total material in the tank

Notes: A total of approximately 10,016 gallons of tall oil was pumped out of tank T-2 using vac trucks.

T-3

Tank Capacity Calculation: 37.5' length x 10.5' diameter = 24,289 gallons

Measured tank contents:

2.00' = 4,627 gallons - pumpable tall oil

3.50' = 8,096 gallons - non-pumpable tall oil

5.50' = 12,723 gallons - total material in the tank

Measured tank contents as of 4/7/17:

0.50' = 1,157 gallons - pumpable tall oil

3.50' = 8,096 gallons - non-pumpable tall oil

4.00' = 9,253 gallons - total material in tank

Notes: Tank T-3 is leaking from a bottom valve on the north side of the tank, and from a bolt fitting on the south side of the tank. Approximately 3,470 gallons of tall oil was pumped out of tank T-3 using a vac truck

Measured tank contents as of 8/7/17:

Trace - pumpable tall oil /oily water

0.25' = 578 gallons - non-pumpable tall oil

0.25' = 578 gallons - total material in the tank

Notes: A total of approximately 12,145 gallons of tall oil liquid/sludge was pumped out of tank T-3 using a combination of vac trucks and vactor/vacuum sludge boxes. The tank is essentially empty, as the residual sludge layer is below the internal steam pipes located at the bottom of the tank, and below the level of the leaking valve.

T-4



Tank Capacity Calculation: 37.5' length x 10.5' diameter = 24,289 gallons

Measured tank contents:
The tank is empty

T-5



Tank Capacity Calculation: 4 ea x 6' height x 2.67' diameter = 1005 gallons

Measured tank contents:
The four tanks are empty

T-6



Tank Capacity Calculation: 37.5' length x 10.5' diameter = 24,289 gallons

Measured tank contents:

The tank is empty

Notes: The tank is placed upside down

T-7



Tank Capacity Calculation: 20' height x 16' diameter = 30,080 gallons

Measured tank contents:
The tank is empty

T-8



Tank Capacity Calculation: 37.5' length x 10.5' diameter = 24,289 gallons

Measured tank contents:
The tank is empty

T-9



Tank Capacity Calculation: 37.5' length x 10.5' diameter = 24,289 gallons

Measured tank contents:
The tank is empty

T-10



Tank Capacity Calculation: 37.5' length x 10.5' diameter = 24,289 gallons

Measured tank contents:
The tank is empty

T-11

Tank Capacity Calculation: 37.5' length x 10.5' diameter = 24,289 gallons

Measured tank contents:

1.00' = 2,313 gallons - pumpable tall oil

8.00' = 18,506 gallons- non-pumpable tall oil

9.00' = 20,819 gallons - total material in the tank

Measured tank contents as of 4/7/17: No change.

Notes – Tank T-11 has leaks at the valve and seam/weld points on the south end of the tank.

Measured tank contents as of 8/7/17:

Trace - pumpable tall oil /oily water

4.67' = 10,803 gallons - non-pumpable tall oil

4.67' = 10,803 gallons - total material in the tank

Notes: A total of approximately 10,016 gallons of tall oil liquid/sludge was pumped out of tank T-11 using a combination of vac trucks and vector/vacuum sludge boxes.

T-13

Tank Capacity Calculation: 37.5' length x 10.5' diameter = 24,289 gallons

Measured tank contents: 1.00' = 3,313 gallons pumpable tall oil
 8.00' = 18,506 gallons non-pumpable tall oil
 9.00' = 20,819 gallons total material in the tank

Measured tank contents as of 4/7/17: No change.

Measured tank contents as of 8/7/17:
Trace - pumpable tall oil /oily water
5.00' = 11,566 gallons - non-pumpable tall oil
5.00' = 11,566 gallons - total material in the tank

Notes: A total of approximately 9.253 gallons of tall oil liquid/sludge was pumped out of tank T-13 using a combination of vac trucks and vactor/vacuum sludge boxes.

T-14

Tank Capacity Calculation: 37.5' length x 10.5' diameter = 24,289 gallons

Measured tank contents:

1.00' = 2,313 gallons - pumpable tall oil

5.00' = 11,566 gallons - non-pumpable tall oil

6.00' = 13,879 gallons - total material in the tank

Measured tank contents as of 4/7/17: No Change.

Notes: Tank T-14 has a leak at a lower weld seam on the south end of the tank.

Measured tank contents as of 8/7/17:

Trace - pumpable tall oil /oily water

3.67' = 8,490 gallons - non-pumpable tall oil

3.67' = 8,490 gallons - total material in the tank

Notes: A total of approximately 5,389 gallons of tall oil liquid/sludge was pumped out of tank T-14 using a combination of vac trucks and vector/vacuum sludge boxes.

T-15

Tank Capacity Calculation: 37.5' length x 10.5' diameter = 24,289 gallons

Measured tank contents: 1.00' = 2,313 gallons pumpable tall oil
 4.00' = 9,253 gallons non-pumpable tall oil
 5.00' = 11,566 gallons total material in the tank

Measured tank contents as of 4/7/17: No Change.

Measured tank contents as of 8/7/17:
Trace - pumpable tall oil /oily water
3.25' = 7,518 gallons - non-pumpable tall oil
3.25' = 7,518 gallons - total material in the tank

Notes: A total of approximately 4,048 gallons of tall oil liquid/sludge was pumped out of tank T-15 using a combination of vac trucks and vactor/vacuum sludge boxes.

T-16



Tank Capacity Calculation: 7.5' length x 7.5' width x 4' height elliptical = 1,322 gallons

Measured tank contents:

The tank is empty

T-17

Tank Capacity Calculation: 8' length x 5.5' width x 3.75' height elliptical = 969 gallons

Measured tank contents:

2.00' = 517 gallons – non-pumpable tall oil

Measured tank contents as of 4/7/17 and 8/7/17: No Change

Notes: material is dense – tar/asphalt - like

T-18

Tank Capacity Calculation: $10.5'$ height x $10.5'$ diameter = 6,169 gallons

Measured tank contents:

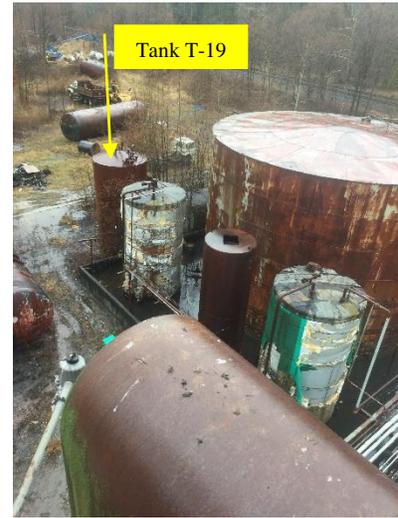
$3.92'$ = 2,303 gallons – oily water

$0.50'$ = 294 gallons - non-pumpable tall oil

$4.42'$ = 2,597 gallons - total material in the tank

Measured tank contents as of 4/7/17: The tank was demolished and hauled off-site as scrap metal

Notes: 53-55-gallon drums were stored in tank T-18. Most of the drums had holes punched in them and contained varying amounts of sludge and liquid. After the drums /water/sludge were removed from tank - tank was demolished and hauled off site for scrap metal recycling

T-19

Tank Capacity Calculation: 21' height x 12' diameter = 17,766 gallons

Measured tank contents:

12.2' = 10,321 gallons - non-pumpable tall oil

Measured tank contents as of 4/7/17 and 8/7/17: No change.

T-20

Tank Capacity Calculation: 37.5' length x 10.5' diameter = 24,289 gallons

Measured tank contents:

0.60' = 1,388 gallons - pumpable tall oil

9.45' = 21,860 gallons - non-pumpable tall oil

10.05' = 23,248 gallons - total material in the tank

Measured tank contents as of 4/7/17: No change

Notes: Pumpable tall oil has leaves, sticks / organic debris mixed with the liquid at the manhole.

Measured tank contents as of 8/7/17:

2.58' = 5,968 gallons - pumpable tall oil /oily water

1.00' = 2,313 gallons - non-pumpable tall oil

3.58' = 8,281 gallons - total material in the tank

Notes: As liquid was being removed from T-20, it was observed that the sludge layer was actually a 12" layer of sludge floating on pumpable tall oil/water mix. A total of approximately 14,967 gallons of tall oil liquid/sludge was pumped out of tank T-20 using a combination of vac trucks and vector/vacuum sludge boxes.

T-21



Tank Capacity Calculation: 4.75' length x 3.45' diameter = 332 gallons

Measured tank contents:
The tank is empty

T-22

Tank Capacity Calculation: 5.0' length x 2.55' width x 3.67' height elliptical = 275 gallons

Measured tank contents:

0.08' = 7.7 gallons – residual gasoline

Measured tank contents as of 4/7/17 and 8/7/17: No change

T-23



Tank Capacity Calculation: 4.17' length x 3.83' diameter = 360 gallons

Measured tank contents:

The tank is empty

T-24

Tank Capacity Calculation: 6.33' length x 4.5' diameter = 753 gallons

Measured tank contents:
0.60' = 100 gallons – fuel oil

Measured tank contents as of 4/7/17 and 8/7/17: The tank has no drainable liquid.

Notes: This tank supplied fuel to the boiler that serviced the tank farm area. The measured tank contents was based on the level of visible liquid in the sight glass – when the drain valves on the bottom of the tank were opened, no liquid came out.

T-25

Tank Capacity Calculation: 18' Height x 8' diameter = 6,768 gallons

Measured tank contents:
9' = 3,384 gallons – crude glycerin

Measured tank contents as of 4/7/17: The tank was pumped empty.

Notes: Tank contents estimated as liquid was not visible in the site glass – assumed tank was full just below the site glass.

T-26

Tank Capacity Calculation: 18' Height x 8' diameter = 6,768 gallons

Measured tank contents:

15' = 5,640 gallons – crude glycerin

Measured tank contents as of 4/7/17: The tank was pumped empty.

Notes: Measured tank content based of the level of liquid visible in the site glass.

T-27



Tank Capacity Calculation: 5' length x 3.17' diameter = 295 gallons

Measured tank contents:
The tank is empty

T-28



Tank Capacity Calculation: 7' length x 3.83' diameter = 603 gallons

Measured tank contents:
The tank is empty

T-29



Tank Capacity Calculation: 20' length x 6.75' diameter = 5,353 gallons

Measured tank contents:
The tank is empty

T-30



Tank Capacity Calculation: 5.8' length x 4' width x 0.54' height = 94 gallons

Measured tank contents:
The tank is empty

T-31



Tank Capacity Calculation: 6' length x 3.83' diameter = 517 gallons

Measured tank contents:
The tank is empty

T-32

Tank Capacity Calculation: 30' Height x 18' diameter = 57,105 gallons

Measured tank contents:

0.10' = 190 gallons – oily water

3.50' = 6,662 gallons - non-pumpable tall oil

3.60' = 6,852 gallons - total material in the tank

Measured tank contents as of 4/7/17 and 8/7/17: No change.

Notes: Leakage observed around lower valve.

T-33



Tank Capacity Calculation: 6' length x 2.33' width x 4.08' height = 335 gallons

Measured tank contents:
The tank is empty

Notes: Tank located on top of frac tower structure.

T-34



Tank Capacity Calculation: 30' height x 40' diameter = 282,000 gallons

Measured tank contents:
The tank is empty

T-35

Tank Capacity Calculation: 15' height x 5' diameter = 2,203 gallons

Measured tank contents:

2.0' = 294 gallons – oily water

7.75' = 1,138 gallons - non-pumpable tall oil

9.75' = 1,432 gallons - total material in the tank

Measured tank contents as of 4/7/17 and 8/7/17: No Change.

T-36

Tank Capacity Calculation: 20' height x 10' diameter = 11,750 gallons

Measured tank contents:

0.04' = 25 gallons – oily water

0.50' = 294 gallons - non-pumpable tall oil

0.54' = 319 gallons - total material in the tank

Measured tank contents as of 4/7/17 and 8/7/17: No change

T-37

Tank Capacity Calculation: 20' height x 6' diameter = 4,230 gallons

Measured tank contents:

1.75' = 370 gallons - pumpable tall oil

13.78' = 2,915 gallons - non-pumpable tall oil

15.53' = 3,285 gallons - total material in the tank

Measured tank contents as of 4/7/17 and 8/7/17: No change.

T-38

Tank Capacity Calculation: 20' height x 10' diameter = 11,750 gallons

Measured tank contents:

0.30' = 176 gallons – oily water

0.90' = 529 gallons - pumpable tall oil

7.20' = 4,230 gallons - non-pumpable tall oil

8.40' = 4,935 gallons - total material in the tank

Measured tank contents as of 4/7/17 and 8/7/17: No change.

T-39

Tank Capacity Calculation: 24' height x 20' diameter = 56,400 gallons

Measured tank contents:

0.30' = 705 gallons – oily water

1.90' = 4,465 gallons - non-pumpable tall oil

2.20' = 5,170 gallons - total material in the tank

Measured tank contents as of 4/7/17 and 8/7/17: No change.

T-40

Tank Capacity Calculation: 24' height x 20' diameter = 56,400 gallons

Measured tank contents:

0.10' = 235 gallons - non-pumpable tall oil

Measured tank contents as of 4/7/17 and 8/7/17: No change.

T-41

Tank Capacity Calculation: 20' height x 10' diameter = 11,750 gallons

Measured tank contents:

0.40' = 235 gallons - pumpable tall oil

0.50' = 294 gallons - non-pumpable tall oil

0.90' = 529 gallons - total material in the tank

Measured tank contents as of 4/7/17 and 8/7/17: No change.

T-42

Tank Capacity Calculation: 20' height x 10' diameter = 11,750 gallons

Measured tank contents:

0.70' = 411 gallons – oily water

0.60' = 352 gallons - non-pumpable tall oil

1.30' = 763 gallons - total material in the tank

Measured tank contents as of 4/7/17 and 8/7/17: No change.

T-43



Tank Capacity Calculation: 30' length x 6' diameter = 6,345 gallons

Measured tank contents:
The tank is empty

T-44

Tank Capacity Calculation: 30' length x 6' diameter = 6,345 gallons

Measured tank contents:
The tank is empty

T-45

Tank Capacity Calculation: 5.5' length x 2.75' diameter = 244 gallons

Measured tank contents:

0.46' = 41 gallons – oily water

Measured tank contents as of 4/7/17 and 8/7/17: No change

T-46

Tank Capacity Calculation: 4' length x 4' x 4' height = 2479 gallons

Measured tank contents:

1.00' = 120 gallons – oily water

Measured tank contents as of 4/7/17 and 8/7/17: No change

Notes: Open-top vat

T-47



Tank Capacity Calculation: 4.92' length x 3.25' width x 3.33' height = 398 gallons

Measured tank contents:
The tank is empty

Notes: Open-top vat

T-48



Tank Capacity Calculation: 30' length x 12' diameter = 25,380 gallons

Measured tank contents:
The tank is empty

T-49



Tank Capacity Calculation: 30' length x 12' diameter = 25,380 gallons

Measured tank contents:
The tank is empty

T-50

Tank Capacity Calculation: 37.5' length x 10.5' diameter = 24,289 gallons

Measured tank contents:

The tank is approximately 1/2 filled with inert soil materials with vegetation growing out of the tank.

Measured tank contents as of 4/7/17: No change.

Notes: The tank has two side panels cut out.

During the July-August 2017 site removal activities, Tank T-50 was observed to be approximately 1/2 full of soil-type materials and supersacks of tall oil - resin material with free liquid (water/tall oil mix) in bottom of tank; vegetation was growing out of tank. It was also observed that the tank had several holes in the bottom of it where oil/water were dripping from and pooling on the ground beneath the tank. The tank contents were physically removed/solidified and disposed of off-site as tall oil – solids waste. The tank was demolished, cut for scrap metal and hauled off-site for recycling in August 2017. Under the oversight of an Archeologist, the pooled oil on the ground and associated impacted soils were excavated and hauled off-site for disposal as tall oil – solid waste. The maximum depth of the excavation was 1.5 feet, and no archeological artifacts were observed during the excavation. The excavation area was recontoured as a swale and hydroseeded with wetland-mix seeds native to the area.