Standard Operating Procedures		SOP Ref:LTP-LAB-08	LTP-LAB-08 – Completion of Treatment Suitability Analysis	
Approved & Issued by:	Lindsey Dryden		Written by:	Stuart McNish
Operational Area:	BKP Environmental Romsey, Laboratory			
Title:	**Completion of Treatment Suitability Analysis**			

1. Activity

This activity is for assessing core samples taken from bulk road tankers or packaged wastes onsite to assess their suitability for onsite treatment processes. Only materials that are suitable for treatment may be accepted in-line with the sites environmental permit, their physical properties and chemical nature. Only wastes with the necessary pre-acceptance information supplied are accepted at the site. This process is to determine that within the treatment processes onsite that the contaminants are successfully removed in the process of phase separation, flocculation, filtration, heat-treatment, particle size separation, washing or centrifugation. The sampling process must be representative of the waste received and ensure all phases are sampled by core sampling (LTP-SOP-01-Bulk Tanker Sampling or from sampling packaged waste via the same core sampling method). This is only to be completed by the LTP Manager or Site chemist and is to mock up the treatment processes onsite on a laboratory scale.

2. Persons at Risk

- Operator
- Other yard operatives
- Driver
- General public
- Contractors and visitors
- Shared Site Occupancy

3. Hazards

- Inclement weather, ice, snow, rain or fog
- Slips, trips, falls
- Exposure to chemicals within the waste material
- Working at height

4. Procedures

a) You as the Operator

To complete this operation you will require to be working in the designated laboratory area using clean equipment to ensure no contamination in samples. The equipment below is essential. During this operation you should be wearing, gloves and safety glasses as a minimum for site PPE. There are essentially 3 treatment processes within the treatment plant with different objectives. Each treatment methodology is outlined below. Material accepted and sampled must fall within the acceptance parameters for environmental and permit compliance. Some parameters are essential safety considerations so must be strictly adhered to and will prohibit treatment. Other parameters may have only commercial considerations regarding onward processing costs to consider.

The pre-acceptance process and information supplied or samples will confirm if material is likely to be suitable for treatment onsite against the permit requirements and the acceptance criteria. The acceptance and suitability testing will confirm this using the actual waste received based on core representative sampled.

Onsite centrifugation process;

Objective;

Remove suspended solid via flocculation and centrifugation to produce a clean liquid phase (centrate) and a treated (flocculated) solid phase (Centrifuge cake). The objectve is to remove suspended contaminants from the aqueous phase to create a non-hazardous centrate (or one suitable for further treatment) free from solids and a solid cake for offsite disposal or recovery.

Assessment;

Tankers or packages are core sampled to determine solid levels and obtain a representative sample to produce a mock treatment. It is vital this is representative and sampling is supervised or completed by a chemist.

Testing parameters;

If waste streams has multiple phases then all phases must be tested and recorded. Wastes with free hydrocarbon phases are better suited to oAVC treatment and seperated residues from this process (free from hydrocarbon) are then suitable for centrifugation. Generally free phase hydrocarbons inhibit the flocculation process. Centrifugation does not treat the waste chemically, only removes suspended solids from the mixture.

- **Flash Point – Essential safety Requirement – No flammable / volatile materials are suitable for treatment –** *''LTP-LAB04-Use of Closed Cup Flash Point Tester''* – If During this test when material is heated to 60 degrees odorous then is will not be suitable for the process
- **pH – By test strip or pH Probe –** Must be within range 5-11
- **XRF Analysis – Determine chemical parameters –** *''LTP-LAB17-Use of Vanta XRF''*
- **COD/Chloride/Ammonia/Sulphide of aqueous phase – ''***LTP-02-Use of Spectrophotometer, LTP-03-Use of Heating Block and COD prepatation''*
- **Metal testing via strips –** ''*LTP-12-Use of quantofix metal test strips''*
- **Bench Top Centrifuge/Polymer Assessment – - ''***LTP-LAB06- Benchtop Centrifuge/Polymer Assessment'' - This is simply mocking up the waste with the intended polymer to be used to aid the flocculation. An amount of the polymer in solution (same concentration as the centrifuge make up) is added to the waste and the waste is shaken in a test tube.*
- **Odour assessment – Only non-odorous waste streams are suitable for this process. If in any doubt then material should not be processed and seek guidance from line manager. This is completed when doing the flash point testing as well as a general assessmend of the samples appearance**
- **Solids content –** For commercial reasons and to assess against centrifuge solids handling capacity
- **Testing of filtrate/centrate after mock treatment –** *After benchtop centrifugation / filtration efficacy of process must be checked – COD, Ammonia, Chlorides, Sulphides, Metals by strips, XRF, Fp*

If all testing above is favourable and material is suitably consigned then it may be processed via the onsite centrifuge. Process controls and testing of efficacy on larger scale are covered as ongoing process monitoring such as monitoring the centrate quality in line with receiving end treatment quality requirements.

All results would be recorded on ''LTP-LAB08 – Suitability for treatment analysis" and electronically on the LTP server against the inbound weighsoft ticket number.

Onsite Oil Water process (oAVC);

Objective;

The oAVC is an insulated vessel with an inbuilt oil skimmer designed to separate free phase hydrocarbons by gravity and with the addition of heat via a diesel powered boiler and heating elements within it's design. The objective of the process is to remove any hydrocarbons from aqueous waste streams for recovery offsite either as a fuel or to be re-refined. The effluent from the process then may be subject to further treatment by filtration by the AVC units or by centrifugation via the onsite process to remove suspended solids. This removal of solid contaminants will allow the water to be transferred to a third party waste water treatment works or a third party treatment plant if it required further physiochemical treatment to remove any aqueous metals for example.

Assessment;

Tankers or packages are core sampled to determine solid levels and obtain a representative sample to produce a mock treatment. It is vital this is representative and sampling is supervised or completed by a chemist.

Testing parameters;

oAVC treatment is to remove hydrocarbons from the waste stream. It is not effective for solids removal so high hydrocarbon solid waste streams are likely to be better suited at an energy recovery facility in Europe or High temperature incinerator in the UK. If very Oily high solid waste streams are received the site has a trans frontier shipment notification for such wastes and routes into UK Incineration plants so material can be routed and priced accordingly.

- **Flash Point – Essential safety Requirement – No flammable / volatile materials are suitable for treatment –** *''LTP-LAB04-Use of Closed Cup Flash Point Tester''* – If during this test when material is heated to 60 degrees odorous then is will not be suitable for the process
- **pH – By test strip or pH Probe –** Must be within range 5-11
- **XRF Analysis – Determine chemical parameters –** *''LTP-LAB17-Use of Vanta XRF''*
- **COD/Chloride/Ammonia/Sulphide of aqueous phase – ''***LTP-02-Use of Spectrophotometer, LTP-03-Use of Heating Block and COD prepatation''*
- **Metal testing via strips –** ''*LTP-12-Use of quantofix metal test strips''*
- **Bench Top Heat Treatment Assessment (if needed) –** Bench top heating may be completed within a sealed vessel on a stirrer hot-plate (or water bath) if any materials that require treatment by heat are needed. Typically this would be oily wastes with entrained water. This would only be completed on suitable wastes that would benefit from heat treatment to enable their recovery and typically these streams would be transferred to third party after water was removed by oAVC process without heat.

- **Odour assessment – Only non-odorous waste streams are suitable for this process. If in any doubt then material should not be processed and seek guidance from line manager. This is completed when doing the flash point testing as well as a general assessmend of the samples appearance**
- **Solids content –** For suitability for process. Pumpable Suspended solids in aqueous can be removed during the process and the aqueous stream by further treatment by centrifuge or AVC (Hazardous batch). Solids produced can be checked for flammability, XRF for metals and halogens
- **Testing of phases after mock treatment –** *After benchtop testing of process must be checked – COD, Ammonia, Chlorides, Sulphides, Metals by strips, XRF, Fp to check the Organic phase and aqueous phases for onward disposal.*

If all testing above is favourable and material is suitably consigned then it may be processed via the oAVC process. Process controls and testing of efficacy on larger scale are covered as ongoing process monitoring such as monitoring the organic and aqueous outputs.

All results would be recorded on ''LTP-LAB08 – Suitability for treatment analysis" and electronically on the LTP server against the inbound weighsoft ticket number.

<u>Onsite Non-Hazardous Fitration process (AVC);</u>

Objective;

The AVC is a filtration vessel with 600micron filter cloths within it. It is designed to have material with high suspended solids added to it with in-line flocculation to enable phase separation of solids and liquids. The Solids are stored within the unit and once suitably filled these solids can be tipped into a storage bay or transferred offsite. Liquids from the process after the solid removal can be transferred offsite to a suitable WWT works.

Assessment;

Tankers or packages are core sampled to determine solid levels and obtain a representative sample to produce a mock treatment. It is vital this is representative and sampling is supervised or completed by a chemist.

Testing parameters;

AVC treatment is to remove solids. It is only a phase seperation and no chemical treatment take place within this. It's important that solids received filter after treatment with flocculant and that the filtrate is clean and suitable for end WWT receiving site.

- **Flash Point – Essential safety Requirement – No flammable / volatile materials are suitable for treatment –** *''LTP-LAB04-Use of Closed Cup Flash Point Tester''* – If during this test when material is heated to 60 degrees odorous then is will not be suitable for the process
- **pH – By test strip or pH Probe –** Must be within range 5-11

- **XRF Analysis – Determine chemical parameters –** *''LTP-LAB17-Use of Vanta XRF''*
- **COD/Chloride/Ammonia/Sulphide of aqueous phase – ''***LTP-02-Use of Spectrophotometer, LTP-03-Use of Heating Block and COD prepatation''*
- **Metal testing via strips –** ''*LTP-12-Use of quantofix metal test strips''*
- **Odour assessment – Only non-odorous waste streams are suitable for this process. If in any doubt then material should not be processed and seek guidance from line manager. This is completed when doing the flash point testing as well as a general assessmend of the samples appearance**
- **Solids content –** For suitability for process and commercial reasons. Large solids like cement / pieces of concrete may damage plant and equipment
- **Testing of phases after mock treatment –** *After benchtop testing of process must be checked – COD, Ammonia, Chlorides, Sulphides, Metals by strips, XRF, Fp of aqueous phase. Only single phase non hazardous materials with solids are suitable for this process*

If all testing above is favourable and material is suitably consigned then it may be processed via the AVC process. Process controls and testing of efficacy on larger scale are covered as ongoing process monitoring filtrate

All results would be recorded on ''LTP-LAB08 – Suitability for treatment analysis'' and electronically on the LTP server against the inbound weighsoft ticket number.

<u>Aggregate/Road Sweeper plant;</u>

Objective;

The Aggregate / Road sweeper plant is designed to recover aggregate fractions from inorganic aqueous wastes or solid wastes. Road sweepers, gully tankers, suitable soils, minerals and desanding wastes. The idea to recover a stone fraction, a sand and an organic fraction for recovery.

Assessment;

Tankers or packages are core sampled to determine solid levels and obtain a representative sample to produce a mock treatment. It is vital this is representative and sampling is supervised or completed by a chemist.

Testing parameters;

Liquid wastes through the aggregate plant will be assessed by the below criteria. Solid wastes received will only be accepted with accredited analysis and characterisation prior to receipt. Sweepers are not able to be sampled safely so they are offloaded into a pit and visually inspected.

Liquids

- **Flash Point – Essential safety Requirement – No flammable / volatile materials are suitable for treatment (ex sweepers) –** *''LTP-LAB04-Use of Closed Cup Flash Point Tester''* – If during this test when material is heated to 60 degrees odorous then is will not be suitable for the process

- **pH – By test strip or pH Probe (ex sweepers) –** Must be within range 5-11
- **XRF Analysis – Determine chemical parameters (ex sweepers) –** *''LTP-LAB17-Use of Vanta XRF''*
- **COD/Chloride/Ammonia/Sulphide of aqueous phase (ex sweepers) – ''***LTP-02-Use of Spectrophotometer, LTP-03-Use of Heating Block and COD prepatation''*
- **Metal testing via strips (ex sweepers) –** *''LTP-12-Use of quantofix metal test strips''*
- **Odour assessment – Only non-odorous waste streams are suitable for this process. If in any doubt then material should not be processed and seek guidance from line manager. This is completed when doing the flash point testing as well as a general assessmend of the samples appearance**
- **Solids content –** For suitability for process and commercial reasons.
- **Testing of phases after mock treatment –** *After benchtop testing of process must be checked – COD, Ammonia, Chlorides, Sulphides, Metals by strips, XRF, Fp of aqueous phase. Only single phase non hazardous materials with solids are suitable for this process*

Solids;

- Must have accredited analysis prior to receipt
- **Flash Point – Essential safety Requirement – No flammable / volatile materials are suitable for treatment (ex sweepers)**
- **XRF Analysis – Determine chemical parameters (ex sweepers) –** *''LTP-LAB17-Use of Vanta XRF''*
- **Visual inspection –** Check material is rich in aggregate and check against caveats on quotation

If all testing above is favourable and material is suitably consigned then it may be processed via the Aggregate / Road sweeper process. Process controls and testing of efficacy on larger scale are covered as ongoing process monitoring filtrate, quality of sand.

All results would be recorded on ''LTP-LAB08 – Suitability for treatment analysis" and electronically on the LTP server against the inbound weighsoft ticket number.

All testing of treatment residue outputs is covered in a separate document.

Samples

Samples should be retained for a minimum of 1 month following treatment of the waste.

NB: You must not proceed to sign this form if you feel you do not fully understand the methods and procedures outlined in this Standard Operating Procedure

Print: ..... Sign: ..... Date.....

Signed off by:

..... Director / Manager / Supervisor