Attachment D3

Materials Management

D.3.1 Waste Oil recovery
D.3.2 Used Filter processing
D.3.3 Soil Remediation
D.3.4 Remaining Activities
D.3.5 Proposed additional Activities.

Attachment D3

The major process streams on site are the following

- Waste oil processing (Hazardous)
- Filter crushing (Hazardous)
- Soil remediation (Hazardous)

D.3.1. WASTE OIL RECOVERY (Principle Activity on site)-

This activity shall be classed under Class 8 of the Fourth Schedule of the Waste Management Act 1996.

D.3.1 (i) Waste Oil acceptance (including oil water mixes)
Waste oil is accepted on site as per the waste acceptance procedure attached (See attachment E3 (a)). Substances which cannot be collected are outlined in the Prohibited substances work instruction as attached in Attachment D3 (A). Where waste oil is accepted from an existing customer the collection is logged on the computer system and a call out is then routed for the following days. Where a customer is not known to Atlas a new customer application form is filled out and the relevant details are taken. Where the oil to be collected is unknown to Atlas a sample or MSDS is received and only then is it qualified for collection. Collections of waste oil are routed by the waste oil co-ordinator for the next days collections by means of a despatch docket indicating the volume, the date, name and address. Waste is returned to Atlas at the end of the day and pumped to the designated tanks as per procedure.

Samples are taken from incoming oil to determine water content for processing.

The conversion of waste oil to a fuel involves the following steps:

D.3.1 (ii) (a) Separation of Free Water from Oil
The oil/water mixtures are delivered to the plant and are initially pumped to the waste oil reception tank. Depending on the water/solids content the oil is then pumped to a storage tank (tank No.'s 18 and 19) or the sump. A waste of high water content goes into tank 18 and 19 and a waste of low water content goes into tanks 11,12,13, 14 or 15. Wastes with high solids are pumped through a sump, which separates the majority of solids through gravity separation and coarse filtering and then to the appropriate process tank. Free water from tanks 11, 12, 13, 14 and 15 is pumped into 18 and 19. After settling out any available free water is drawn off from the base of tanks 18 and 19. The effluent handling is controlled by the SCADA control system (computerised).

Separation of Entrained Water from Oil by Heating
Once free water has been removed from tanks 18 and 19 the tanks are heated to 80°C to separate further the aqueous liquids from the oils. After heating the tanks are allowed to settle and any free phase aqueous liquids are removed from the base of the tank and pumped to the effluent handling system.

Low water content waste oils, from which free water has been removed, is transferred to the waste oil processing tanks (Tank No.'s 11,12,13, 14 and 15). The waste oil is heated, often to temperatures of 80°C, this encourages the oil and water layers to separate. If water is present it is drawn off through a valve at the base of the tank. This process may take up to 36 hours per batch, depending on the source of oil and the quantities of water present.

D.3.1 (iii) Filtration
The waste oil liquids are then filtered, to remove any solids remaining. Oily solids from the filtration stages is placed in UN approved containers and disposed of via approved routes under TFS.

D.3.1(iv) Drying of waste oil

The drying of waste oil, to remove any residual water is carried out in Tanks 24, 25 and 32. The oil is heated again and air is used to assist removal of the residual water vapour. The oil is sampled regularly during drying and when the desired product specification is reached, the drying process is terminated and the oil is pumped to storage tanks.

D.3.1 (v) Blending and Storage of Final Product

Processed oils from the drying stage is blended with other processed oils to achieve the desired viscosity and specification. Once blended the recovered oil termed 11LS is stored in tanks 3, 4, 5, 6, 23, 37 and 20 prior to being sold to Atlas customers for use as a fuel.
Analysis of the final product is carried out as per Schedule 3 (ii) of our IPC license (see below).

Table D3.1 Specification of 11LS

Parameter	Limit (mg/kg)
Cadmium	25
Nickel	100
Chromium	50
Vanadium	100
Lead	800
Chlorine	3000
Sulphur	10000
Ash	15000
PCBs	10

D.3.1 (vi) Wastewater treatment

The wastewater treatment process consists of a number of unit operations. Wastewater from tanks 18 and 19 is pumped through an inclined plate separator and is then transferred to the wastewater storage tanks W3 and W4. The wastewater is then pumped through a packed coalescence separator and then pumped to a storage tank (W1 or W2) prior to discharge to sewer under license. The discharge is released to sewer at a controlled rate using an automated valve controlled by the SCADA.

The SCADA (**S**upervisory **C**ontrol And **D**ata **A**cquisition) system is a computer-controlled system allowing automation of liquid processing within the plant. Currently this can control the complete waste water handling & discharge system operating at the facility. In addition the system is currently being expanded to include most elements of the oil processing operations (high level alarms, high temperature sensors, remote contents, remote liquid transfer and overfill prevention).

A full over view of activities within the water processing system can be monitored from the central control system. Diagrams B.6.1 to 4 display an overview of the system. The availability of free effluent on the tanks is checked. If effluent is present the manual valve between 18 and 19 is opened very slightly. The operator then returns to the SCADA controls and opens the air modulated valve located before the manual valve. Opening this valve allows transfer into tank W3 or W4, transfer from W3 and 4 through the inclined plate separator and adsorbent system is also automated and fills either tank W1 or W2. If tanks W1 or W2 are releasing effluent at that time they cannot be filled into.

The operator then returns to the manual valve on 18 and 19 to regulate the flow going to the initial inclined plate separator. If tanks 3 or 4 become full the valve between 18 and 19 closes stopping the effluent flow. An audible alarm also signals to the operator that the tanks are full. Filling of tanks 1 and operates similarly in that once full the pump shuts down preventing over flows.

Tanks 1 and 2 contain the effluent for final discharge. This effluent is tested in accordance with the requirements of Schedule 2 (ii) of the IPC license (see attachment J). When the effluent is ready for discharge the valve is opened via the SCADA. The operator can set the volume (dependent on COD) to be discharged over one day and the system then automatically controls the flow rates to achieve this in line with the permitted discharge rates. Once the total volume has reached the quantity set for the batch release this shuts the valve and no more effluent is released. A flow proportional sampler operates on the effluent discharge line.

Atlas is currently carryout trials on effluent treatment to improve the quality of discharges particularly in respect of metal levels. Due to the nature of the effluent this is not as straightforward process but work is progressing to find an efficient solution. Currently the trials involve both laboratory scale pilot trials and scaled up trials.

All waste oil accepted by Atlas is classed as Hazardous with a large number of EWC codes applicable (see section D2). Typically there are no seasonal variations in the intake of liquid oily wastes, though the volumes do vary sometimes depending on the economic climate.

D3.2 USED FILTER PROCESSING

D.3.2 (i) Acceptance

Used oil filters are accepted in accordance with the acceptance procedure for the collection and handling of oily wastes. Wheelie bins are distributed to customer sites and collected when full of used filters from the customer's sites.

D.3.2 (ii) Processing

- Filters are collected by the Industrial and Automotive supplies and services division of Atlas. The quantity of filter bins collected is recorded on the despatch note and signed of by the customer and the collector.
- Collected filters are placed in the filter crusher hopper by the collection operator.
- Filters are visually checked by the operator (in the hopper) for any other wastes such as shock absorbers, starter motor, plastic bags, wraps etc. prior to crushing. Any of these materials or other incompatible wastes present are removed prior to processing.
- Filters are crushed by means of a hydraulic and baled. The oil extruded from the filters drains to a collection tank which is pumped out as required and returned to the main oil processing plant. The baled filters are conveyed into an awaiting bin.
- The conveyor also drains any residual oil into the collection tank and any extra residue of oil is drained off the bale while on the conveyor.

D.3.2 (iii) End use

- Metal bales are collected in a sealed skip until removal off site to an approved waste contractor for recovery.

D3.3 SOIL REMEDIATION

D.3.3 (i) Introduction

Atlas have been operating a soil remediation facility since 2000. The

The treatment is being carried out in purpose built remediation bays which are fully contained reinforced concrete structures (200mm thick) with a plastic (PE) membrane beneath the concrete surface. Drainage from these areas is collected and passed through an interceptor, all underground pipework is of UPP construction with bonded and welded joints and has been pressure tested on commission.

Bioremediation is a naturally occurring process that involves the metabolism of petroleum hydrocarbons (or other biodegradable contaminants) producing less toxic compounds. The microorganisms used by Atlas are naturally occurring (as distinct from genetically modified) and are organisms present in normal soils though at much lower numbers. By controlling a number of parameters within the soils to be treated (nutrients, moisture and oxygen) the process can be greatly accelerated and the timeframe involved reduced from years to months thereby producing a viable and clean technology to reduce pollution.

Incoming soils to the facility (other than the soil used for this experiment) derived from a range of sources including domestic home heating oil spills, petrol station redevelopments and other incidents leading to oil spillages (tanker roll-overs, tank leaks, tank over fills etc.). Prior to acceptance the soils are subjected to our Soil Acceptance procedure (see section E3) which requests relevant analysis of the soils dependent on the source of contamination and history of the site. All soils received into the facility for treatment were subjected to a routine process, this routine process commenced with nutrient addition during the initial set-up of the windrows on the treatment pads. This set up involved the addition of nutrients in the form of commercially available fertiliser and an organic bulking agent to condition the soils.

Then over a period of months the soils have a liquid bacterial broth applied regularly and are also aerated routinely. The addition of oxygenating agents (hydrogen peroxide) is sometimes used to aid the remediation, in addition the warming of soils (using warm air/steam) is sometimes used during periods of weather when the ambient temperature drops to below 10°C. Low temperatures reduce the metabolic rate of the microorganisms and hence delay the remediation process. Typically, for commercially treated soils, the remediation process can take 2 months to achieve the desired levels prior to disposal (though this would vary with the nature of the soils and contamination present). The soils are samples by independent consultants One composite sample made up of 3-4 discreet spot samples is taken per 50m^3

of soil (~4 samples per windrow). This is thoroughly mixed prior to obtain a homogenous composite sample. analyse the soils for Mineral Oil, Gasoline Range Organics and Polycyclic Aromatic Hydrocarbons (USEPA 16 PAHs). In addition a leachate sample is generated for each of the samples and also analysed for the same parameters.

The results of independent testing are forwarded to the EPA for approval prior to the soils being removed off site. Currently the majority of soils are used in landfill with some soils being suitable for use in Golf courses or other landscaping uses as agreed with the Agency.

It is envisaged that thermal desorbtion of contaminated soils be investigated and developed in the future as a soil treatment operation. This would involve the heating of soils to desorb the hydrocarbon contaminants and a secondary stage to thermally oxidise the off gases. Further details would be supplied to the agency prior to the commencement of this process.

D.3.3 (iii) The Remediation Process

Stage 1. The site is investigated to determine the history of the site and identify possible contaminants. Subsequent to this a sampling programme is undertaken and laboratory analysis carried out to assess the levels of contamination in line with our acceptance procedure.

Stage 2. If the material is acceptable for treatment it is transported (using C1 forms) to the facility at Portlaoise where the soil is segregated on the basis of the level and type of contamination. Interim storage at Atlas may be required depending on the processing capacity at the time.

Stage 2a. If the soil is heavily contaminated it may be washed to remove the excess oil and reduce the oil content to a suitable level. Oil recovered at this stage is pumped to our reprocessing plant where it can be reprocessed into a fuel.

Stage 2b. The soil is then prepared for the biological stage of the process. This involves the addition of the relevant micro-organisms, nutrients and soil conditioning agents which create the optimum growing conditions for the micro-organisms.

Stage 3. The prepared soil is processed over a number of weeks using an aerobic system. The soils are monitored to assess the progress of bioremediation.

Stage 4. Once the levels of contamination have reduced to acceptable levels (based on Dutch "Target" levels as agreed with the EPA – see below) and certified by laboratory analysis the soils will be offered for return to the originator, if this is not possible then an alternative use or disposal route will be used.

Table D3.3. Target Clean up Levels for Use as Landfill Cover/Capping Material

	Mineral Oil	GRO	Total BTEX	Total PAHs
Leachate (µg/l)	500	100	100	100
Soil (mg/kg)	1,000	50	5	40

Fig 1. Process Flow Diagram
Bio-remediation of Petroleum Contaminated Soils

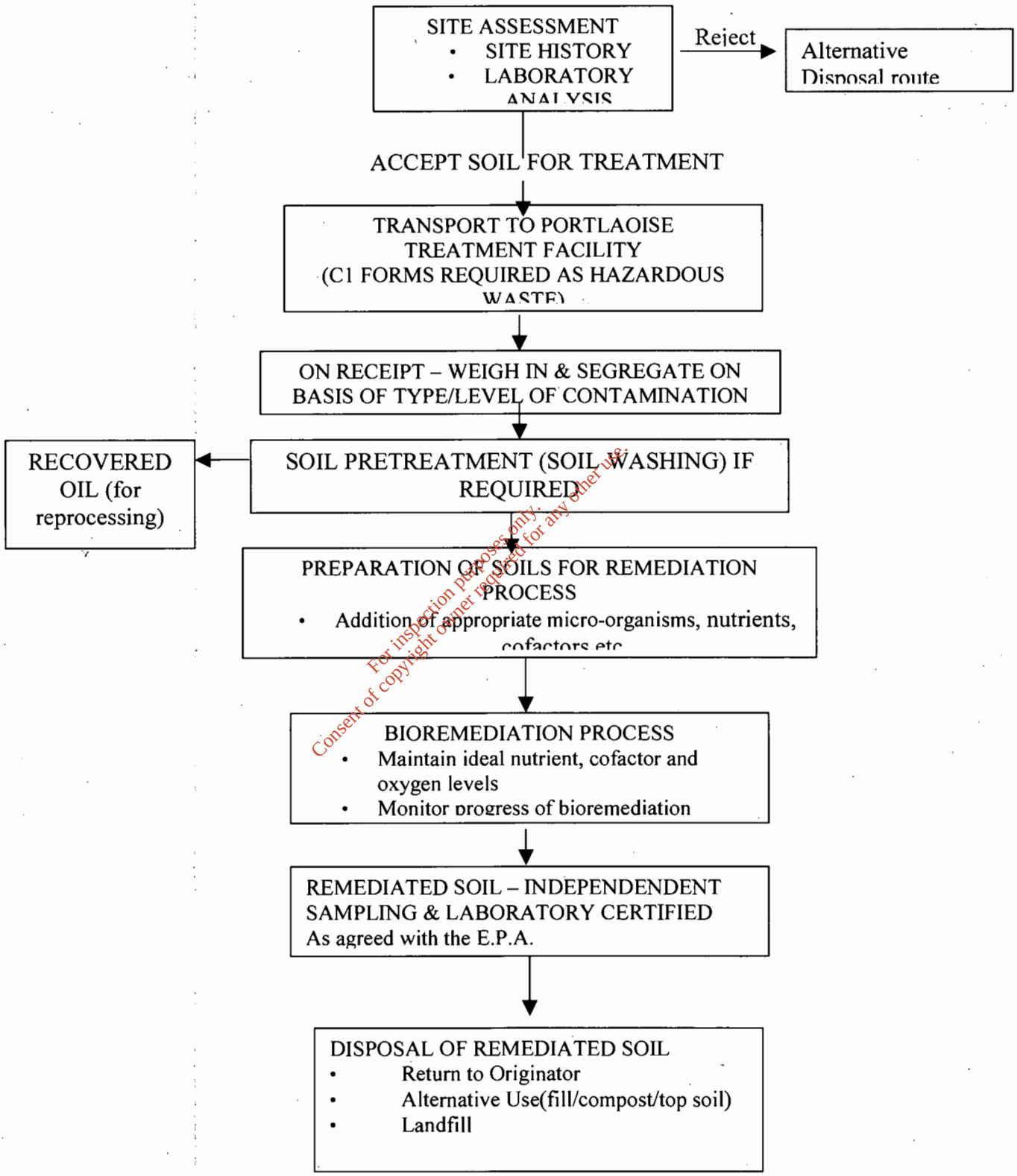

Table 1. Levels of contamination acceptable for bioremediation at our facility in Portlaoise are as follows:

Category	Parameter	Level (mg/kg)
Petrol Range	Gasoline Range Organics	<80,000
	Benzene	<2,500
	Ethylbenzene	<5,000
	Xylene	<5,000
	Toluene	<10,000
	Cresoles	<1,000
	Phenol	<5,000
Mineral Oils	TPH / mineral oil by GC	75,000
PAH's	PAH Screen (US EPA 16)	1,000
Metals	Arsenic	45
	Zinc	1,200
	Nickel	300
	Cadmium	12
	Copper	190
	Mercury	5.2
	Lead	750
Other Compounds	Poly Chlorinated Biphenyls	200 (see Note 1)
Other compounds	Chlorinated Hydrocarbons	100-2500 (see note 2)

Note 1: Where soils contain >50ppm of PCBs; these soils will be segregated from all other soils and no oil recovered to the process from soil washing. Instead leachate or runoff will be recirculated in a closed loop type system until the PCB and/or other levels are reduced to the permitted levels

Note 2: Where soils exceeds dutch intervention for Chlorinated solvents these will be segregated as with PCB's and an anaerobic/aerobic biodegredation system employed to reduce levels to below permitted levels.

D.3.4 Remaining Activities.

The remaining waste activities currently carried out on site are:

- Non-liquid wastes, (Hazardous);
- Washing of wastes with oily residue;
- Storage of mixed fuels (petrol/diesel) for treatment/export;

Non-liquid wastes (oils/solvent contaminated etc) are repackaged on site prior to export. The wastes are usually packaged into drums, FIBC's or other approved container for export to a licensed facility. This process involves the use of a conveyor system which consists of a hopper which is belt powered to feed a feed conveyor discharging into the appropriate container. The containers are appropriately labelled and pallets of drums are wrapped using an automated pallet wrapper.

Some wastes are only surface contaminated with oil/solvent or other residue and can be washed to remove the contaminant prior to being reused or disposed of as non-hazardous wastes. These wastes would typically include plastic spill containment booms, drums and containers or equipment used in dealing with a spillage. All washings are pumped to the effluent handling system and discharged under license. Solid washings or residues removed from the materials are drummed for export under TFS.

Mixed fuels arise from customers typically when diesel and petrol are mixed in a vehicle fuel tank. The mixed fuels are stored in underground storage tanks or in appropriate IBCs prior to being blended into 11LS or sent off site for recovery at a licensed facility. In addition petrol removed from tanks prior to foam filling is stored in the underground tank (separate from mixed fuels) for reuse (forklift, petrol powered equipment etc). Petrols removed from storage tanks are not considered wastes.

D.3.5 Proposed Additional Activities

One of the reasons for moving into the Waste Management licensing sector is to allow Atlas Ireland to expand their current range of waste services in line with customer and legislative demands. As part of this Atlas proposes to collect the following wastes from our customers and bring them back to our facility in Portlaoise for onward shipment to licensed routes:

- Batteries (Hazardous)
- Glass (Non-Hazardous)
- Windscreen washer (Non-Hazardous)
- End of Life Vehicles (ELVs) (Hazardous)
- Brakefluids (Hazardous)

- Antifreeze (Hazardous)
- Solvents (Hazardous)
- Fluorescent tubes (Hazardous)
- Aerosols (Hazardous and Non-Hazardous)
- Waste electrical and Electronic equipment (Hazardous)
- Tyres (Non-Hazardous)
- Acids & Bases (Hazardous)

It also planned to process a number of these wastes on site once the critical mass has been generated within the market. The wastes to be processed are:

D.3.5 (i) Batteries/Acid/Bases
Draining of acid from Batteries prior to shipment of drained batteries for recovery. In addition both acids from batteries and acids collected direct from the customer may be neutralised prior to discharge under the existing discharge license or regenerated for reuse. Alkalis/bases collected from customers would also be neutralised or regenerated for reuse. Reuse would involve recertification of the acid/base and reuse in the wastewater treatment sector for pH adjustment.

D.3.5 (ii) Fluorescent tubes
Processing into the various components prior to onward shipment for recovery or disposal;

D.3.5 (iii) Aerosols
Depressurisation followed by baling and onward shipment for recovery of the metal component;

D.3.5 (iv) Tyres
Shredding of tyres for disposal or recovery (will be carried out as soon as a recovery outlets develop)

D.3.5 (v)Sludge
It is planned to construct and operate a sludge drying plant at the facility. This would involve the use of heat to evaporate liquids from the sludge and thereby significantly reduce the volume of the sludge. The sludge to be dried would originate from wastewater treatment plants and other non-hazardous sources. The heat supplied for the drying process would originate from oil (11LS) or natural gas powered engines. It is also planned to use any excess heat to generate electricity, which would be used on site directly or placed onto the National Grid for resale. See attached Schematic Diagram D3-Process Block diagram, Innoplanna Sludge drying plant.

The sludge would be accepted on site into a 50,000 litre in ground holding tank which would be enclosed within the sludge drying building. The sludge will be conveyed through a screw conveyor/sludge pump into a thin film

evaporator and heated to 188°C. This concentrates the sludge to approximately 45% dry solids. This material is formed into a granulate and is dried further using a belt dryer to generate a finished dry sludge with a solids content of ~90%. This is then cooled to 40°C. The ambient air from the belt drier is circulated using fans that cause the residual moisture to condense out. In the condenser the circulating air is reheated using condensation heat off the vapours from the thin film evaporator (integral process heat recovery). The temperature is then increased further in the re-heater until it reaches the desired entry temperature for the belt dryer. Similarly the re-heater is heated by circulating heat transfer oil. For this purpose the heat transfer plant is equipped with a primary circuit and two secondary circuits. The entire processing operation is controlled automatically and operates on a continuous basis. The dried sludge will be metered into an awaiting skip for removal off site.

The throughput of each waste stream and relevant EWC Codes assigned to each waste stream are detailed in Attachment D2. Waste accepted by Atlas Ireland is not subject to any significant seasonal variation and therefore it is not anticipated that there will be any particular highs or lows due to seasonal market changes.

Average con
Dehydr. slud
189 kg/h
20% DS

Legend

DV	Thin Film evaporator
CH	Chopper
BT	Beltdryer
E1	Aircooler
E2	Condenser
E3	Airheater
P 504	Circulation Fan
P 505	Warmair fan
P 508	Coldair Fan
HT	Hotoil

183 °C

HT

188 °C

Water evap. = kg/h 737

kWh/kg H2O 787

Operating h/year = 5280

5300 m3/h

P 214

55.0 °C

Granulate cooling

DIAGRAM D3(i) Pr

Attachment D3(A).

Document:	**Work Instruction Manual**	**Version No. 3**
Title:	**Prohibited Substances**	**Issued: May '02**
Section:	**W.I No 2**	
Approved by		**Page 1of 2**

PURPOSE:

To outline the products that may not be accepted as waste oil into the plant.

RESPONSIBILITY:

It is the responsibilities of the Operations Manager/Yard Staff/Truck Drivers and Laboratory to ensure prohibited substances are not accepted.

PROCEDURES:

1. It is the policy of Atlas Ireland and Capital to ensure that the substances listed in point No 6 may not be accepted as waste oil for processing.
2. If collectors, representatives or other company personnel are unsure or concerned prior to collection and before loading on customer site about the content of waste oil, they must sample the waste oil and deliver a sample to the laboratory. Results are recorded in the laboratory diary. (A potential unsafe collection sheet must be filled out where it is deemed unsafe to collect, as per W.I. No.1.)
3. It is important that all information concerning the origin and circumstances of the waste oil be communicated to the lab technician upon delivery of the sample, which is recorded in the laboratory diary.
4. Transformer oils cannot be collected with out permission of the laboratory technician after analysis or proper certification. Results are stored in the analysis results file.
   The lab technician must either (i) test and confirm that the oil is not contaminated above 10 ppm PCB before collection or (ii) be satisfied that a certificate from a responsible body is issued for the oil indicating that it is not contaminated with PCBs.

5. The products that cannot be accepted into the plant are as follows:

a) Oils containing PCB greater than 10 ppm.

b) Oils with flash point less than 35°C.

c) Greases animal or vegetable fats to include fish oil.

d) White spirit or turpentine.

e) Chemical solvents or thinners.

f) Benzene, Toluene, Xylene or any mixtures known to contain chlorinated derivatives of these.

g) Naphtha or petrol or derivatives.

h) Coal tars

i) Diluted soluble cutting oils or cooling agents (suds) i.e. other than undiluted form.

j) Monoethylene-glycol or alcohol compounds to include print ink.

k) Rope oil

l) Other substances deemed by the laboratory not to be compatible with the Atlas process. (The lab will have regard to particular risks that may be presented by contaminants such as flammability, corrosivity, explosive mixes etc.)

RELATED RECORDS

Waste Rejection Register
Laboratory Diary
Analysis Results Files
Potential Unsafe collection sheet