ANNEX 20

BREF for *"Slaughterhouses and Animal By-Products Industries"*

(Sections 5.1 and 5.3)

	REQUIREMENT	WASTESERV RESPONSE
5.1	**SLAUGHTERHOUSES AND ANIMAL BY-PRODUCTS INSTALLATIONS**	
5.1.1	**General processes and operations**	
1.	use an environmental management system (see Section 4.1.1 and 5.1.1.1)	Section 4.1.1 – Environmental Management Tools and Section 5.1.1.1 - BAT for environmental Management – The current TTF operations has been awarded both ISO 9001 and ISO14000 certification. This means that an EMS has been successfully implemented. The scope of the current EMS shall be revised in the future to cover any additional processes that will be implemented in the near future within the TTF.
2.	provide training (see Section 4.1.2)	The process with which the training is planned, implemented and verified for effectiveness is highlighted in section 6.2.2 of the Quality Manual for the TTF.
3.	use a planned maintenance programme (see Section 4.1.3)	The maintenance program covering the TTF Plant, laboratory, weighbridges and servers are covered under section 6.3 of the Quality Manual for the TTF. Controlled document 27 encompasses a yearly planner of the preventive and planned maintenance of critical TTF equipment.
4.	apply dedicated metering of water consumption (see Section 4.1.4)	Currently the TTF has the Water Services water meter to monitor the overall water consumption by the TTF as well as a meter following the exit of the 3 water reservoirs to monitor the water pumped from each reservoir. Water monitoring meters will be installed to monitor the water consumed by the Autoclave plant.
5.	separate process and non-process waste water (see Section 4.1.5)	Rain water and reject water from the RO which is considered as non-process water which is not contaminated are collected separately into a dedicated reservoir for re-use.
6.	remove all running water hoses and repair dripping taps and toilets (see Section 4.1.7)	The EMS encourages energy and water savings due to targets imposed. Running water hoses are prohibited and maintenance of

		leaking pipework is carried out immediately.
7.	fit and use drains with screens and/or traps to prevent solid material from entering the waste water (see Section 4.1.11)	All drain outlets are equipped with stainless steel screens to prevent any solid particles from entering the sewer system.
8.	dry clean installations and transport by-products dry (see Section 4.1.12), followed by pressure cleaning (see Section 4.1.10) using hoses fitted with hand-operated triggers (see Section 4.1.9) and where necessary hot water supplied from thermostatically controlled steam and water valves (see Section 4.1.23)	N/A since the TTF is a facility receiving waste. Once waste is delivered to site there is no further transport. Having said this, cleaning of the TTF is done using hot water pressure cleaning.
9.	apply overfilling protection on bulk storage tanks (see Section 4.1.13)	Currently there are two storage tanks dedicated for blood. Once the storage tanks have reached their maximum capacity, the blood pumping mechanism are disabled automatically.
10.	provide and use bunds for bulk storage tanks (see Section 4.1.14)	The blood storage tank has been designed without a bunding system. However, any leaks from this blood tank are deviated to a waste water treatment sump for pre-treatment prior to disposal.
11.	implement energy management systems (see Sections 4.1.16 and 4.1.17)	Section 4.1.16 – implement energy management system – As part of the ISO 9001 energy consumption is monitored on a daily basis including electricity, water and fuel and targets have been set to improve the energy consumption on a yearly basis. Section 4.1.17 – energy management at a red meat plant (Not applicable)
12.	implement refrigeration management systems (see Section 4.1.18)	All cooling equipment at the TTF are covered with a maintenance agreement. Technicians authorized to carry out maintenance on refrigeration equipment have been requested to possess a MEPA license. Furthermore, considering that refrigeration is a process that is considered as high energy demanding, the Autoclave plant has been planned with the ultimate intention to reduce the dependency of freezing waste at very low temperature during maintenance period of the TTF. The Autoclave plant has been designed in a way to be self-sufficient so that all waste can be treated within the same day.
13.	operate controls over refrigeration plant running times (see Section 4.1.19)	The refrigerated cold rooms are all equipped with temperature controls and temperature sensors. When not in use, refrigerated equipment is switched off to save on energy.
14.	fit and operate chill room door closing switches (see Section 4.1.21)	All chill rooms are equipped with micro-switches so that after a pre-set timing they close automatically and they can be reopened

		from the inside.
15.	recuperate heat from refrigeration plants (see Section 4.1.22)	Recuperation of heat from refrigeration plants does not exist due to investment costs and economies of scale.
16.	use thermostatically controlled steam and water blending valves (see Section 4.1.23)	Steam flows and water temperatures are all controlled via a PLC. Modifying set parameters can only be done by authorized technical personnel.
17.	rationalise and insulate steam and water pipework (see Section 4.1.24)	Steam and hot water pipes are all insulated for safety reasons and to save on energy.
18.	isolate steam and water services (see Section 4.1.25)	The TTF is not a very large plant to justify the expenditure for a BMS for water and steam.
19.	implement light management systems (see Section 4.1.26)	Lighting at the TTF is all being replaced to LED type due to longer lifetime and low energy consumption. Furthermore motion detection systems are installed to ensure lights are switched off when no one is in the room or working place.
20.	store animal by-products for short periods and possibly to refrigerate them (see Section 4.1.27)	Slaughtering wastes will be kept in refrigerated areas until they are processed to avoid odour generation.
21.	audit odour (see Section 4.1.28)	All waste treatment will be carried out in enclosed structures with an air recirculation system incorporated in them. Air will be recirculated through activated carbon filters to neutrilise an odours generated. A contractor is also engaged to monitor odours and to carry out olfactometry monitoring within the site and adjacent to the perimeter.
22.	design and construct vehicles, equipment and premises to ensure that they are easy to clean (see Section 4.1.30)	Storage containers will be made from stainless steel where applicable for ease of cleaning and sterilization. The floor will be covered with special tiling material to facilitate cleaning. Bins used will be sealed to avoid leakages.
23.	clean materials storage areas frequently (see Section 4.1.31)	Cleaning of the site will be carried out on a daily basis to ensure a clean working environment.
24.	implement a noise management system (see Section 4.1.36)	Noise will be maintained to a safe working environment. Noise monitoring will be carried out to ensure compliance with all applicable regulations.
25.	reduce noise at, e.g. roof extract fans, balance lagoon blowers and refrigeration plants (see Sections 4.1.3, 4.1.36, 4.1.37, 4.1.38 and 4.1.39)	Equipment with low noise emissions will be selected. Noise equipment which cannot be avoided will be enclosed in sound proof areas. Alternative solutions will be investigated to avoid noisy equipment.

26.	replace the use of fuel oil with natural gas, where a natural gas supply is available (see Section 4.1.40)	Natural gas in bulk is currently not available in Malta.
27.	enclose animal by-products during transport, loading/unloading and storage (see Section 4.1.29)	Animal by-products will be delivered to the TTF in closed bins which are leak-proof.
28.	where it is not possible to treat blood before its decomposition starts to cause odour problems and/or quality problems, refrigerate it as quickly as possible and for as short a time as possible, to minimise decomposition (see Section 4.2.1.8) and	Blood that cannot be treated immediately will be stored in 1000ltrs IBCs in a cold room.
29.	export any heat and/or power produced which cannot be used on-site.	Waste heat energy generated at the TTF will be used in the Autoclave Plant. Heat energy recovered from the autoclave plant will be used to heat water for washing of the facility and bins.

5.1.1.1	**BAT for environmental management**	
	definition of an environmental policy for the installation by top management (commitment of the top management is regarded as a precondition for a successful application of other features of the EMS)	The current Environmental Policy for the Thermal Treatment Facility at Marsa states that the following: The Marsa Thermal Treatment Facility Management and Staff recognise that our activities impact the environment. We are committed to continually improve our operations in order to minimise our environmental impact and prevent pollution. We aim to instil an awareness drive that seeks to promote environmental benefits within the Thermal Treatment Facility. To meet this commitment, we will: • Comply with IPPC permit IP 0004/07 and all applicable environmental laws and regulations that relate to our environmental aspects and impacts; • Reduce the risk of underground water pollution by collecting and treating surface run off and liquid waste; • Monitor and control the waste received at the plant, its storage and incineration process; • Monitor and control the air pollution generated as a result of the storage and

		incineration of waste; • Implement emergency preparedness measures to minimise and control the risk of fire and spills in high risk area. • Motivate and educate employees through regular training (formal and on-the-job); To implement this policy we have adopted an Environment Management System, based on the requirements of ISO 4001:2004. The management and staff of the Marsa Thermal Treatment Facility are aware of this policy and commit ourselves to adopt it. We will also communicate this policy to the public, and all visitors and contractors at the plant.
	planning and establishing the necessary procedures	
	implementation of the procedures, paying particular attention to – structure and responsibility – training, awareness and competence – communication – employee involvement – documentation – efficient process control – maintenance programme – emergency preparedness and response – safeguarding compliance with environmental legislation.	Included in the facility's Quality Manual rev_03 and Environmental Manual rev_063
	checking performance and taking corrective action, paying particular attention to – monitoring & measurement *(see also Reference document Monitoring of Emissions)* – corrective and preventive action – maintenance of records – independent (where practicable) internal auditing in order to determine whether or not the environmental management system conforms to planned arrangements and has been properly implemented and maintained.	Included in the facility's Quality Manual rev_03 and environmental Manual rev_063
	review by top management	Management Review Meetings are minuted and records kept.
Three	having the management system and audit procedure examined and validated by an	The EMS was audited and certified by MCCAA

further features	accredited certification body or an external EMS verifier	
	preparation and publication (and possibly external validation) of a regular environmental statement describing all the significant environmental aspects of the installation, allowing for year-by-year comparison against environmental objectives and targets as well as with sector benchmarks as appropriate	This is a vital part of the ISO 9001 and ISO 14000.
	implementation and adherence to an internationally accepted voluntary system such as EMAS and EN ISO 14001:1996. This voluntary step could give higher credibility to the EMS. In particular EMAS, which embodies all the above-mentioned features, gives higher credibility. However, non-standardised systems can in principle be equally effective provided that they are properly designed and implemented.	The TTF is accredited to ISO 14000 and ISO9001.
Further potential features	giving consideration to the environmental impact from the eventual decommissioning of the unit at the stage of designing a new plant	Both the TTF and the autoclave Plant will be mainly made of steel items. These can be easily sent for recycling.
	giving consideration to the development of cleaner technologies	The facility is being upgraded to improve its performance with newer technologies in line with environmental requirements and also with economical sustainability. The Plant has to operate with all BAT which is also a requirement in the IPPC.
	where practicable, sectoral benchmarking on a regular basis, including energy efficiency and energy conservation activities, choice of input materials, emissions to air, discharges to water, consumption of water and generation of waste.	This is part of the ISO 9001 and ISO14000 to continuously improve.

5.1.2	**Integration of same site activity**	
1.	re-use heat and/or power produced in one activity in other activities (see Sections 4.4.1,	**Section 4.4.1 – Integrated slaughterhouse and rendering plant.** **Section 4.4.2 – Integrated slaughterhouse and carcass**

	4.4.2 and 4.4.3) and	**incinerator.** Sections 4.4.1 and 4.4.2 are not applicable. These apply to when a rendering plant is operated on a slaughterhouse site. In our case the rendering Plant will be a totally separate entity and at a different location from the slaughtering house. **Section 4.4.1 –Rendering Plant and Animal Meal Incinerator.** Waste heat recovered from the Incinerator will be used to pre-treat the animal waste in the rendering plant. Animal fat and MBM will be fed into the incinerator. Heat energy recovered from the condensation of the steam produced from the autoclave process will be used to heat water that will be used to clean the site and wash the bins,
2.	share abatement techniques, where these are required, e.g. WWTPs.	The waste water treatment plant that will be installed to treat the waste water generated both from the Incineration and also from the Autoclave facility. The active carbon filters will be neutralizing odours generated both from the Autoclave Plant as well as from the other facilities related with the incinerator.

For rendering and incineration on the same site, BAT is to do the following:

1.	burn non-condensable gases produced during rendering in a same site incinerator (see Sections 4.4.2 and 4.4.3).	The Incinerator is too small to treat the gases that will be generated in the Autoclave Plant. Active carbon filters will be used.

5.1.3	**Collaboration with upstream and downstream activities**	
1.	BAT is to seek collaboration with upstream and downstream partners, to create a chain of environmental responsibility, to minimise pollution and to protect the environment as a whole, (see, e.g. Sections 4.2.2.1.1, 4.2.2.1.2, 4.1.27, 4.3.1.4, 4.3.4.1, 4.3.8.7 and 4.2.2.9.10).	**Sections 4.2.2.1.1 – Cessation of feeding of animals 12 hours prior to slaughter.** Not applicable **Section 4.2.2.1.2 – Minimise animals time in the slaughterhouse to reduce manure production.** Not applicable **Section 4.1.27 – short and possibly cold storage of animal by-products**

		Material pending treatment will be kept in a Cold Room at a temperature between 3°C-5°C **4.3.1.4 – Use of fresh refrigerated raw materials** The scope behind having an autoclave Facility to render the slaughtering waste is to treat the raw waste as fresh as possible within the same day and in the shortest possible time. **Section 4.3.4.1 – Use of fresh low total volatile nitrogen (TVN) feedstock** Fish can deteriorate under the anaerobic conditions present during storage. The deterioration causes the formation of a large number of strong-smelling compounds. Besides NH3, TMA and other volatile basic compounds, various volatile sulphur compounds, such as marcaptans and the highly toxic and strong-smelling H2S gas are formed. To reduce or mitigate this problem, fish waste received will be kept separate in the cold storage and will be given priority during treatment. **Section 4.3.8.7 – Agreeing a specification with the renderer, regarding receipt of material manufactured to the optimal physical characteristics for incineration and associated handling and storage.** Since the by-product will be incinerated within the same site of the rendering plant, the dry product will be stored in bins and transported to the Incinerator for final Incineration. **Section 4.2.2.9.10 – Trimming of all hide/skin material not destined for tanning immediately after removal from the animal** Not applicable

5.1.4	**Installation and equipment cleaning**	
1.	manage and minimise the quantities of water and detergents consumed (see Section 4.1.42.1)	Water and detergent consumed by the Autoclave (rendering) facility will be monitored to notice immediately any drastic fluctuations in the water consumption.

2.	select those detergents which cause minimum impact on the environment (see Section 4.1.42.2), without compromising the efficacy of cleaning	Since all waste water will be treated on site, detergents will be selected cautiously to ensure the proper operation of the waste water treatment plant. Waste water released needs to be within the Sewer Discharge Control regulations L.N. 139of 2002
3.	avoid, where possible, the use of cleaning and disinfectant agents containing active chlorine (see Section 4.1.42.3) and	Since all waste water will be treated on site, detergents will be selected cautiously to ensure the safe operation of the waste water treatment plant. Waste water released needs to be within the Sewer Discharge Control regulations L.N. 139 of 2002
4.	where the equipment is suitable, operate a cleaning-in-place system (see Section 4.2.4.3).	Cleaning in place technique will be considered during the technical design and procurement phase for the Autoclave facility.

5.1.5	**Treatment of waste water**	
1.	prevent waste water stagnation (see Section 4.1.43.3)	All pipes associated with the drainage and with the Waste Water Treatment Plant will be laid as far as possible to have sufficient gradient to avoid stagnation of waste water. This will be forseen during the tender design and also during the installation phase.
2.	apply an initial screening of solids using sieves (see Section 4.1.43.4) at the slaughterhouse or animal by-products installation	Wherever solids may be generated that could end up to the sewer network, sieves will be installed having aperture widths of 0.25 – 4mm.
3.	remove fat from waste water, using a fat trap (see Section 4.1.43.9)	Fats will be recovered from the waste water in the waste water treatment plant before the waste water is released in the sewer system. This is in line with L.N. 139 of 2002.
4.	use a flotation plant, possibly combined with the use of flocculants, to remove additional solids (see Section 4.1.43.10)	This technology will be included in the tender design for the selection of the Waste Water Treatment plant.
5.	use a waste water equalisation tank (see Section 4.1.43.11)	This technology will be a requirement that will be included in the tender design for the selection of the Waste Water Treatment plant.
6.	provide a waste water holding capacity in excess of routine requirements (see Section 4.1.43.1)	This will be included in the tender design for the waste water plant to ensure full compliance with L.N. 139 of 2002.
7.	prevent liquid seepage and odour emissions from waste water treatment tanks, by	This will be a requirement for the waste water treatment plant and these requirements will be included in the technical specifications

	sealing their sides and bases and either covering them or aerating them (see Sections 4.1.43.12 and 4.1.43.13)	of the tender document.
8.	subject the effluent to a biological treatment process. Aerobic and anaerobic treatments which are applied to waste water from slaughterhouses and animal by-products installations are described in Sections 2.3.1.2, 2.3.2.1.3, 4.1.43.14, 4.1.43.15, 4.2.6.2, 4.2.6.3 and 4.3.3.15	The ultimate technology that will be used for the waste water treatment plant can be determined at the end of the procurement/tendering phase. The starting emissions limits and the limits to be achieved in line with L.N. 139 of 2002 will be specified and will be a requirement in the tendering technical specifications.
9.	remove nitrogen and phosphorus. Some information is given in Section 2.3.1.2	The waste water treatment plant will only treat the waste water from the Autoclave plant and TTF and the quantities will be relatively small.
10.	remove the sludges produced and subject them to further animal by-product uses. These routes and their conditions of application are regulated by ABP Regulation 1774/2002/EC	Sludge generate from the waste water treatment plant will be incinerated at the Incinerator located within the same site.
11.	use CH_4 gas produced during anaerobic treatment for the production of heat and/or power	There is currently no intention to produce CH4 from the waste water treatment plant.
12.	subject the resulting effluent to tertiary treatment and	
13.	regularly conduct laboratory analyses of the effluent composition and maintain records (see Section 4.1.43.2). Further information on monitoring techniques is available in the current “Common Waste Water and Waste Gas Treatment/Management Systems in the Chemical Sector” BREF [341, EC, 2002].	Waste water will be monitored at the on-site laboratory including BOD, COD, suspendable solids, dissolved solids, Nitrogen, Kiedahl Nitrogen and Ph.

5.3	**Additional BAT for animal by-products installations**	

1.	operate continuous, dry and segregated collection of animal by-products throughout animal by-products treatment (see Section 4.3.1.1)	Waste will be treated in continuous batches. The treatment plant will be enclosed in closed structured with an integrated air recirculation system. Air will be recirculated through activated carbon filters to neutrelise odours that may be generated. Waste originating from the civil Abattoir will be transferred (pumped) to the rendering plant through airtight stainless steel pipes. Waste will be stored in cooled containers/silos. Waste received in bins from private slaughter houses will be stored in cold rooms. Following the shredding process, waste will be pumped to the batch cooker through airtight stainless steel pipes. Following the treatment process, the dry material will be stored in bins while the animal fat will be stored in heated silos.
2.	use sealed, storage, handling and charging facilities for animal by-products (see Section 4.3.1.3)	See section 5.3.7
3.	where it is not possible to treat animal by-products before their decomposition starts to cause odour problems and/or quality problems, refrigerate them as quickly as possible and for as short a time as possible (see Section 4.3.1.4) and	Since the rendering process is a batch process and each batch may require approximately 2.5 hours to treat depending on the quantity of water inside the waste, all incoming waste will be kept at a cooled temperature until treatment. However, all waste will be treated within the same day.
4.	where inherently malodorous substances are used or are produced during the treatment of animal by-products, pass the low intensity/high volume gases through a biofilter (see Section 4.1.33).	See section 5.3.7

5.3.1	**Additional BAT for fat melting**	
	For fat melting no additional BAT have been identified in addition to those in Sections 5.1 and 5.3.	Not applicable

5.3.2	**Additional BAT for rendering**	
1.	totally enclose the rendering line (see Section 4.3.3.1)	See section 5.3.7

2.	reduce the size of carcasses and parts of animal carcasses before rendering (see Section 4.3.3.2)	See section 5.3.7 All waste will be shredded pror to being rendered in the batch cooker.
3.	remove water from blood, by steam coagulation, prior to rendering (see Section 4.3.3.4)	A blood coagulator is already installed at the TTF and fully commissioned and operational using steam from the TTF.
4.	for raw material throughputs less than 50000 t/yr, to use a single effect evaporator to remove water from liquid mixtures (see Section 4.3.3.5) and	Water will be evaporated from the waste leaving a mix of bone meal and meat meal and animal fat. Waste heat from the TTF will be used to evaporate the water. The steam from the waste will be condensed back to water through a heat exchanger and sent to the waste water treatment plant.
5.	for raw material throughputs greater than, or equal to 50000 t/yr, to use a multiple-effect evaporator to remove water from liquid mixtures (see Section 4.3.1.5).	N/A

When it has been impossible to use fresh raw materials and thereby to minimise the production of malodorous substances, BAT is to do either of the following:

1.	burn the non-condensable gases in an existing boiler (see Section 4.3.3.11) and to pass the low intensity/high volume odours through a biofilter (see Section 4.1.33) or	See section 5.3.7
2.	to burn the whole vapour gases in a thermal oxidiser (see Section 4.3.3.10) and to pass the low intensity/high volume odours through a biofilter (see Section 4.1.33).	
5.3.3	**Additional BAT for fish-meat and fish-oil production**	N/A – the by-products from the autoclave will all be incinerated.
1.	use fresh, (low total volatile nitrogen) feedstock (see Section 4.3.4.1)	N/A
2.	use heat from the vapour evaporated during the drying of fish-meal in a falling film evaporator to concentrate stickwater (see Section 4.3.4.2)	N/A
3.	incinerate malodorous air, with heat recovery (see Section 4.3.4.3) and	N/A
4.	wash air using condensate liquid instead of using clean seawater (see Section 4.3.4.4).	N/A

5.3.4	Additional BAT for blood processing	
1.	concentrate plasma, prior to spray drying, using reverse osmosis (see Section 4.3.5.1)	N/A
2.	concentrate plasma, prior to spray drying, using vacuum evaporation (see Section 4.3.5.2) or	N/A
3.	remove water from blood, by steam coagulation, prior to spray drying (see Section 4.3.3.4).	See section 5.3.2.3

5.3.5	Additional BAT for bone processing	
	For bone processing, no additional BAT have been identified in addition to those in Sections 5.1 and 5.3.	N/A

5.3.6	Additional BAT for gelatin manufacture	N/A – the by-products from the autoclave will all be incinerated.
	insulate bone de-fatting equipment (see Section 4.3.7.1).	

5.3.7	Additional BAT for incineration of animal by-products	
1.	enclose buildings used for delivery storage, handling and processing of animal byproducts (see Section 4.3.8.1)	All storage and treatment of waste will be in enclosed areas with incorporated air recirculation system.
2.	clean and disinfect delivery vehicles and equipment, after each delivery/use (see Section 4.3.8.2)	A wheel washer facility will be installed to ensure that all vehicles accessing the site will be washed and disinfected.
3.	carry carcasses (not drag them) (see Section 4.3.8.3)	Carcasses will be carried using a forklifter. Individual small carcasses may be transported in wheeled bins with hinged lids.
4.	reduce in size animal carcasses and parts of animal carcasses, before incineration (see Section 4.3.8.4)	All animal waste will pass through the rendering process prior to incineration. In case of a breakdown, the waste can be shredded and bypass the rendering process and is incinerated in the rotary kiln incinerator within the same site.
5.	restrict feedstock to exactly that tested during trials (see Section 4.3.8.5)	All bone meal and meat meal can be incinerated in the TTF since it has even be designed for hazardous waste.

6.	agree the fat:moisture:ash content of animal meal, with the renderer (see Section 4.3.8.6)	The incineration process will take place within the same facility.
7.	avoid receipt of material for incineration in PVC packaging (see Section 4.3.8.10)	No PVC packaging will be used.
8.	either auger feed (see Section 4.3.8.11), or pump (see Section 4.3.8.12) parts of carcasses or animal meal to the incinerator	The material will be pumped to the Incinerator due to the long distance. It is not practicable to have a long auger distance.
9.	incinerate incineration waste water (see Section 4.3.8.13), if there is no suitable WWTP on the site	N/A since there will be a waste water treatment Plant.
10.	seal the storage, handling and charging of animal by-products to incinerators (see Section 4.3.8.14)	Storing of waste and charging of waste to the incinerator will be through airtight ducts.
11.	duct air from the installation and the pre-combustion equipment to combustion chambers (see Section 4.3.8.15)	Activated carbon filters will be used. The quantity of air for incineration is too small because the incinerator plant is very small.
12.	alarm and interlock combustion temperatures to charging mechanisms (see Section 4.3.8.16).	This is already included as a safety feature in the TTF. When the temperature increases waste loading automatically stops.
13.	operate continuous incineration (see Section 4.3.8.20)	The TTF is a continuous process on a 24/7.
14.	operate an ash burnout chamber (see Section 4.3.8.21), where adequate combustion is not otherwise achievable, e.g. immediately downstream from rotary kilns	N/A
15.	operate automated continuous de-ashing (see Section 4.3.8.22)	This is included in the TTF.
16.	operate a monitoring regime for emissions, including a protocol for monitoring burnout, including biohazard from TSE prions, in ash (see Section 4.3.8.25)	All emissions are continuously monitored. Bottom ash and filter ash and boiler ash is sampled and analysed on a monthly basis by an independent laboratory.
17.	to achieve emission levels as low as reasonably practicable below those shown in Table 5.2 (see Section 4.3.8.17)	N/A – this applies to a fluidized bed incinerator
18.	regularly clean and disinfect installations and equipment (see Section 4.3.8.26)	Cleaning of the site is carried out on a daily basis.
19.	operate odour arrestment techniques, when the incinerator is not working (see	See section 5.3.7

	Section 4.3.8.27), when odour prevention is not reasonably practicable and	
20.	use a carbon filter for odour abatement, when incinerators are not operating (see Section 4.3.8.29) and where odour prevention is not reasonably practicable	See section 5.3.7

In addition to the general measures in Sections 5.1, 5.3 and those listed above, for the incineration of animal by-products, BAT is to do to do one of the following:

1.	incinerate animal carcasses, parts of carcasses and animal meal in bubbling fluidised bed incinerators (see Section 4.3.8.17), with suitable flue gas treatment equipment or	N/A – No fluidized bed incinerator is installed
2.	incinerate animal carcasses, parts of carcasses and animal meal in circulating fluidised bed incinerators (see Section 4.3.8.18), with suitable flue gas treatment equipment or	N/A – No fluidized bed incinerator is installed
3.	incinerate animal carcasses, parts of carcasses and animal meal in rotary kiln incinerators (see Section 4.3.8.19), with suitable flue gas treatment equipment	The rotary kiln incinerator will be the backup facility for the rendering plant and can cope with the demand because to date all waste being generated in Malta is all being treated at the rotary Kiln.

5.3.8	**Additional BAT for biogas production**	
1.	re-use heat during biogas production (see Section 4.3.10.3).	N/A - No biogas will be produced.

5.3.9	**Additional BAT for composting**	
1.	provide sufficient drainage capacity for a windrow on a hard standing (see Section 4.3.11.1) constructed from concrete (see Section 4.3.11.2).	N/A – no composting will take place

ANNEX 21

Min Easting 54578.56, Min Northing 70428.36, Max Easting 54978.56, Max Northing 70928.36

0m 400m

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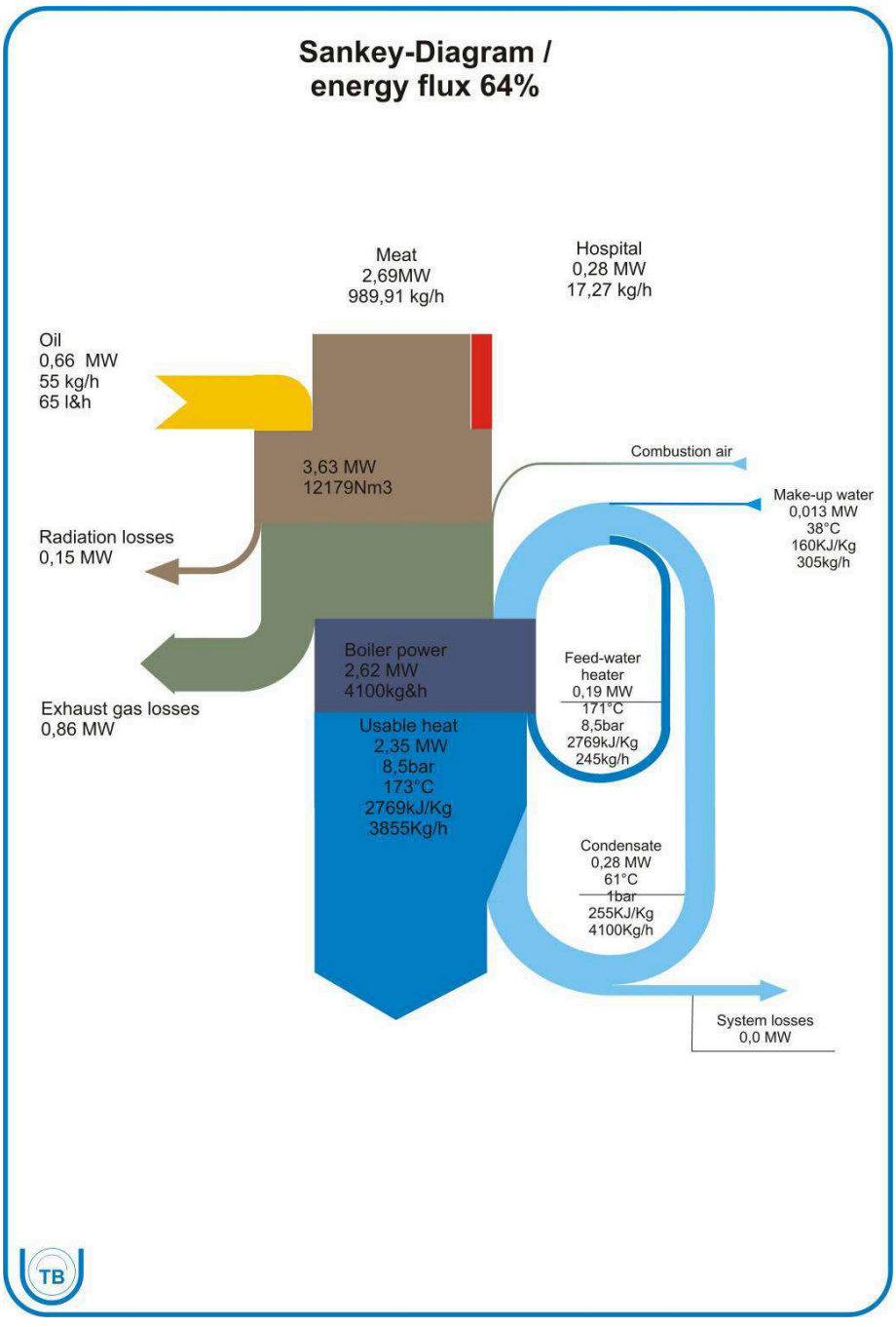
Site Plan, Scale 1:2500
Printed on: Wednesday, August 08, 2012

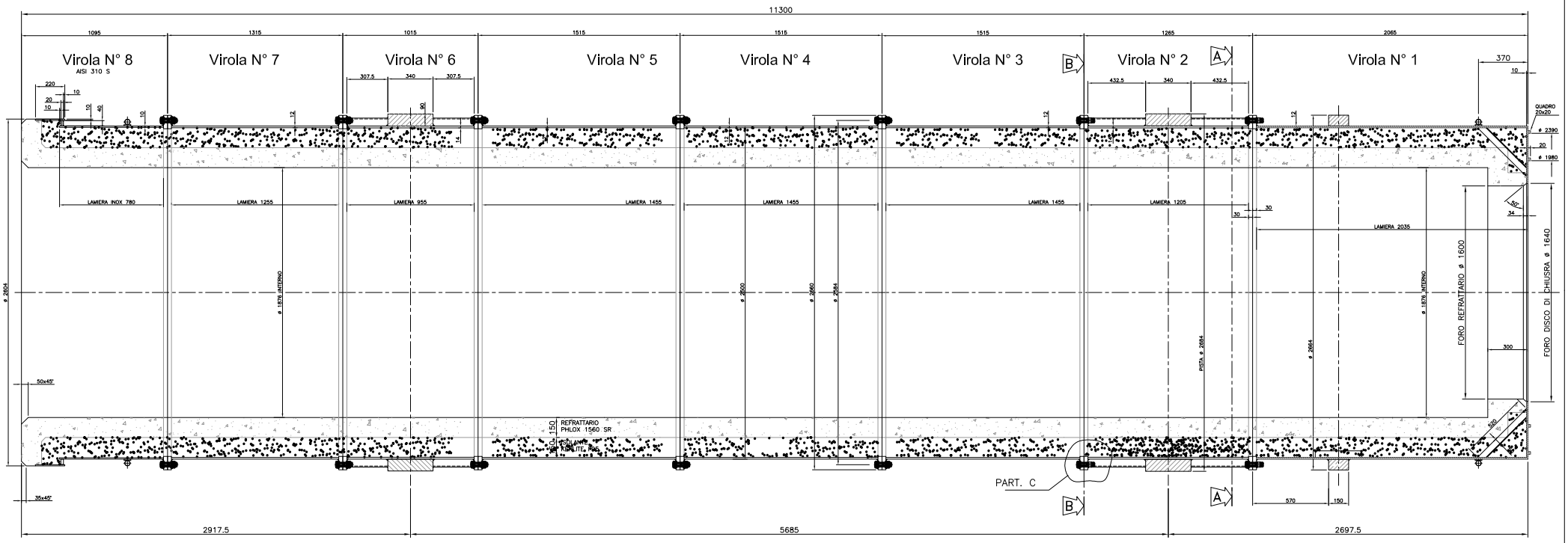
Perit Robert Grech
Executive Architect & Civil Engineer
WasteServ Malta Ltd.

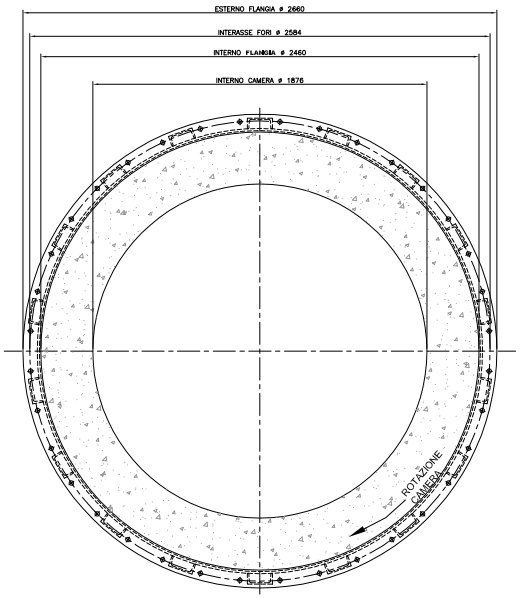
ANNEX 22

3 Mass and Energy Balance

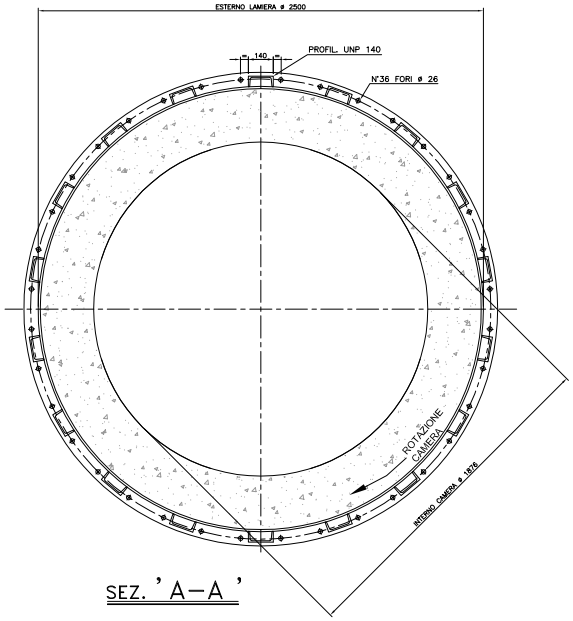


ANNEX 23

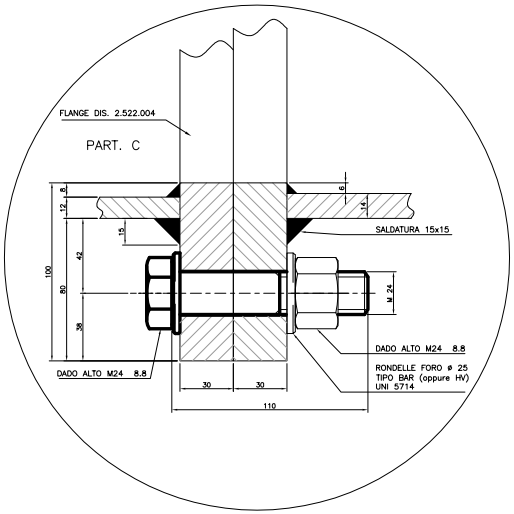




SEZ. 'B–B'



SEZ. 'A–A'

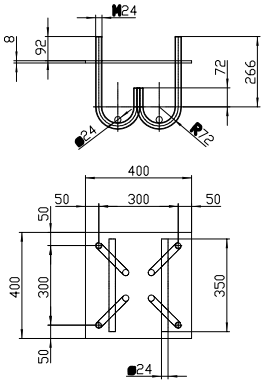


Officine Meccaniche cirioldi S.p.A.	FINITURA	MATERIALE	PEZZI N° 1	MACCHINA N°
MACCHINA – MACHINE ROTOMAX 2000	GRUPPO – GROUP	IMPIANTO – PLANT MARSA–MALTA B.&T.	COMMESSA N° 2.522	
			DISEGNATO – DRN L.Silletta	DATA – DATE 18.03.2009
			VISTO – CHK'D	SCALA – SCALE
DENOMINAZIONE PARTICOLARE – TITLE CAMERA ROTANTE (modificata per avanforno nuovo con caricatore) senza setti di rimescolamento e gradini di contenimento			DS. N°/DRG. N° 2.522.002.001A	

ANNEX 24

PIASTRA DI FONDAZIONE
CON TIRAFONDI

SCALA 1:10



VERIFICARE LE DIMENSIONI CON LE COPERTURE COMMERCIALI

TO VERIFY THE DIMENSIONS WITH THE COVERS IT TRADES THEM

BARRE ø16

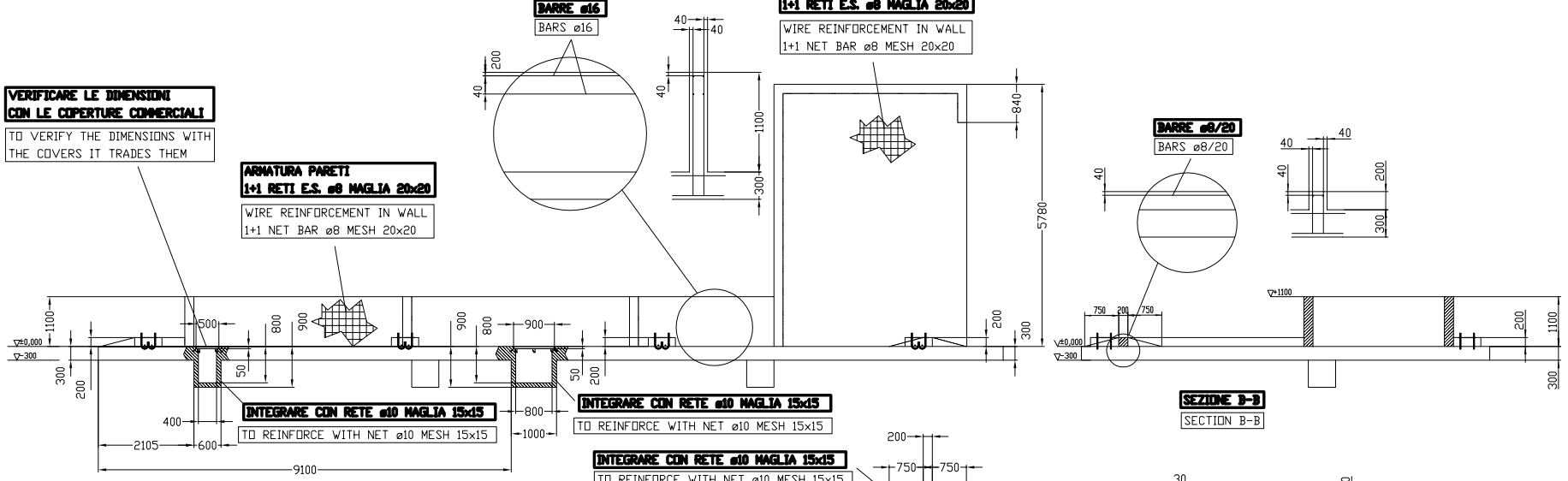
BARS ø16

ARMATURA PARETI 1+1 RETI E.S. ø8 MAGLIA 20x20

WIRE REINFORCEMENT IN WALL
1+1 NET BAR ø8 MESH 20x20

BARRE ø8/20

BARS ø8/20

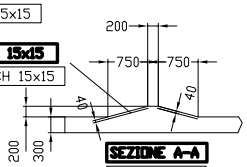


SEZIONE B-B

SECTION B-B

INTEGRARE CON RETE ø10 MAGLIA 15x15

TO REINFORCE WITH NET ø10 MESH 15x15

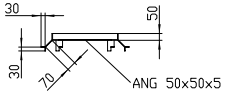


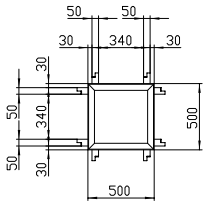
SEZIONE A-A

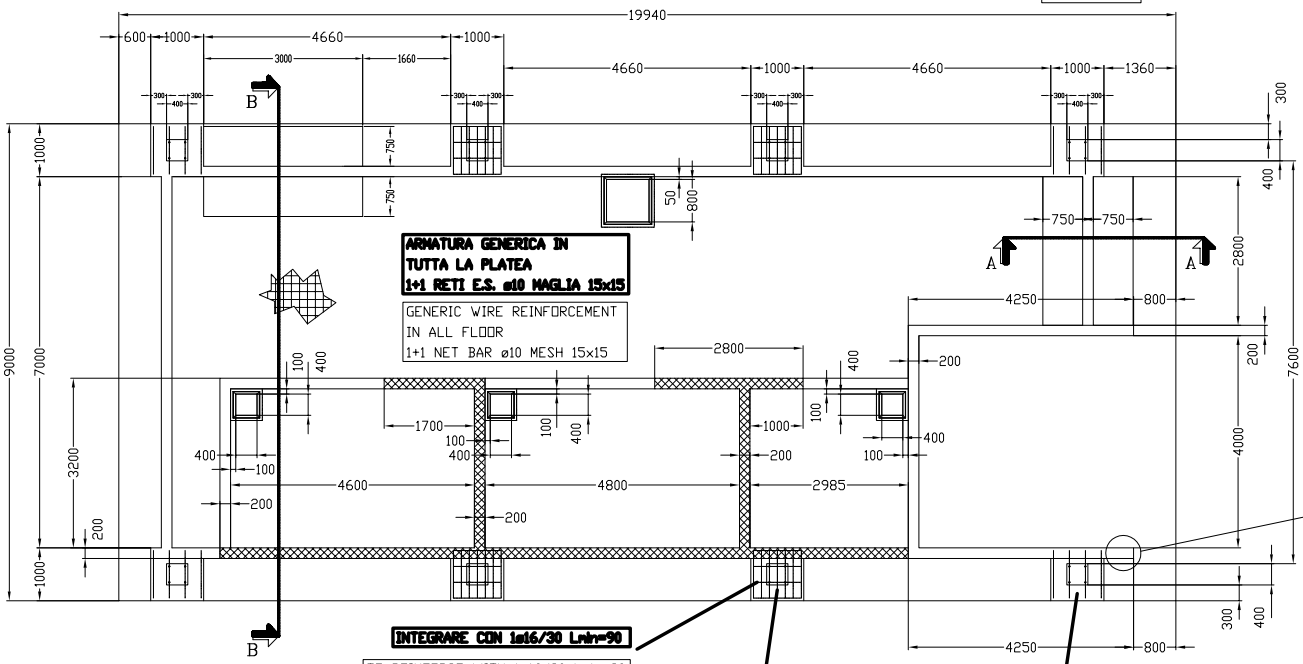
SECTION A-A

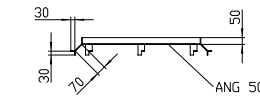
TELAIO PER TOMBINO L=500

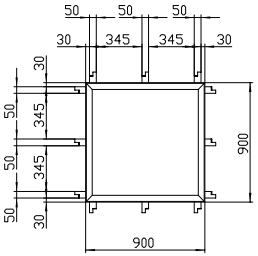
SCALA 1:20











TELAIO PER TOMBINO L=800

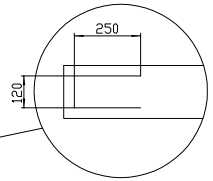
SCALA 1:20

ZONA DA RINFORZARE CON 2ø16

ZONE TO REINFORCE WITH 2ø16

FERRI DI CHIUSURA ø8/20

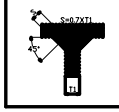
CLOSING BARS ø8/20



LEGATURA TRA ARMATURE SU FACCE PARALLELE N°6 SPILLI/m2 ø6

FASTENING BETWEEN ARMORS ON PARALLELS FACES N°6 PINS/m2

PARTICOLARE SALDATURE - WELDINGS DETAIL



-LE SALDATURE DEVONO ESSERE DIMENSIONATE COME SPECIFICA IL PARTICOLARE "K"
-THE FILLET WELDS , WHERE DIMENSIONS ARE NOT SPECIFIED DETAIL.

PLATEA
SPESSORE 30cm
COPRIFERRO 4cm
ACCIAIO FeB44K
CLC RCK350

FLOOR
THICKNESS 30cm
COVER TO REINFORCEMENT 4cm
STEEL FeB44K
CONCRETE CLASS RCK350

It will be your care,according to the dispersion characteristic of the ground,to locate the points where to place the dispersion elements. (earthed) (1 for each tank; total 3)

REVISION R-2
THE SHED IS "MIRRORIZED" REGARDING PREVIOUS VERSION

REV.	DATE	REVISIONS	BY
-	-	-	-
-	-	-	-

CLIENTE / CUSTOMER : -	IMPIANTO/PLANT : MALTA
NAZIONE/NATION : -	DESCRIZIONE/DESCRIPTION : SOLVENTS STORAGE SHED FOUNDATIONS
COMMESSA / ORDER : V070395	
DISEGNATORE/DRAFTSMAN : T.D.	MATERIALE/MATERIAL : -
SOSTITUISCE IL N°/SUBSTITUTES N°: -	
DATA/DATE : 13-08-07	SCALA/SCALE : 1:50
PESO/WEIGHT (Kg) : -	N.DISEGNO/N°of PLAN : 64-1093-B| REVISIONE/REVISION R 2

Gruppo barbieri & tarozzi spa
Via Prampolini 18-41043 Formigine (Mo) Italy
TEL. +39-059-446111 - FAX +39-059-446555

AUDIT REPORT

Audit report

WasteServ Malta (WSM)
Marsa Thermal Treatment Facility
(Albertown, Marsa)

06 – 07 May 2013

Contents

1 Dates of audit

06 to 07 May 2013.

2 Organisation subject to the audit

WasteServ Malta (WSM).

3 Installation

Marsa Thermal Treatment Facility (MTTF), Albertown, Marsa.

4 Audit objective

To assess compliance with the IPPC permit issued for the MTTF.

5 Audit planning and summary

In accordance with the audit plan, the audit at the MTTF started with an opening meeting on May 6th, during which Wasteserv staff and the plant were introduced to the audit team and the audit plan and audit objectives were discussed and confirmed.

During the morning of May 6th, a site visit was carried out to obtain an overview of the site infrastructure/equipment, waste management procedures, effluent discharge and odour control. A documentation review was then performed covering environmental monitoring, procedures, and documentation produced as part of the obligations of the IPPC permit. Wasteserv personnel were interviewed throughout the audit. Additional on-site visits and reviews of documentation were carried out on May 7th.

Audit conclusions were presented to Wasteserv officials and management during the closing meeting.

WSM personnel cooperated fully with the audit team during the audit.

During the audit, the plant was found to be shut down for emergency repairs. Despite this, the audit was effective: site housekeeping, operational procedures, etc., could be verified. Because the Primary Combustion Chamber (PCC) and Secondary Combustion Chamber (SCC) were cold, it was possible to enter the kilns, observe the plant sections and better understand their functioning.

6 Audit team

Camillo Franco, Sogesca, external auditor
Nicholas Bellizzi, Sogesca, external auditor
Rachel Decelis, Senior Environment Protection Officer, MEPA
Pauline Farrugia, Senior Environment Protection Officer, MEPA
Thomas Paris, Environment Protection Officer, MEPA (on May 6th)
Malcolm Vella Haber, Senior Principal Environmental Health Officer, Environmental Health Directorate

7 WSM staff present during the audit

Mary Grace Micallef, Facility Manager, WSM
Daniela Grech, EMS Manager, WSM
Henriette Putzulu Caruana, Chief Officer Compliance and Communications, WSM

8 Persons who attended the closing meeting

Michael J. Sant, Unit Manager, MEPA
Paul Demanuele, Chief Operations Officer, WSM

9 Site overview and activities

The MTTF Marsa was inaugurated on 12th December 2007. The original plant was designed to burn abattoir waste. Wasteserv Malta Ltd has upgraded the facility with an additional investment of €2 million to co-incinerate other EWC codes.

Waste currently being accepted includes:

- Animal by-products such as slaughtering / abattoir waste, fallen animals, expired food stuffs, blood, etc.
- Clinical waste.
- Pharmaceutical wastes excluding cytotoxic and cytostatic waste.
- RDF (Refuse Derived Fuel) such as shredded wood, paper, textiles.
- Paints.
- Oily contaminated material (rags, sand, etc.)

The solvent line has not yet been commissioned, therefore solvents are not generally accepted for incineration. All the above wastes (EWC codes) are listed in the IPPC permit application.

Waste is accepted by appointment, according to the company's applicable procedures. Before accepting hazardous materials from a client, the calorific value and the moisture content are determined by the MTTF scientist; moreover a combustion test is carried out to determine if a sample incinerated adversely affect the emissions (TTF EP 09 "Testing and monitoring of samples" procedure).

The TTF QP01 "Waste enquiry procedure" establishes the information to be collected and the controls necessary both for waste streams already accepted before and for those never accepted before (list of products to be incinerated, quantity, packaging type, MSDS, physical properties, type of contamination, chemical content). In case of pharmaceutical waste only, a signed declaration is requested of the waste producer confirming that the material does not contain cytotoxic waste.

The quotation sent to the waste producer establishes the conditions for delivery (e.g. packaging, documentation, etc.) and shall be accepted by the producer before accepting the waste at the plant.

The TTF QP02 "Waste receipt procedure" regulates the procedure and records to be kept when the waste is received at the plant.

Data to be controlled and registered in the appropriate software include:

- Vehicle registration numbers and permit
- EWC code
- Consignment permit and note

The procedure also establishes radioactive checks to be carried out on hazardous waste, responsibilities to supervise offloading of waste, to check bins, IBCs, etc., bin content and handling.

Animal by-products, mainly abattoir waste, are managed according to a thawing procedure aimed at preventing odours.

Wastes which cannot be incinerated immediately, in particular animal by-products, are frozen in refrigerated closed containers (T <0 °C). According to the incineration plant plan, animal by-products are brought – using a lift – to a refrigerated storage area (T >0 °C) to unfreeze in a closed area. When thawed, animal by-products are fed into the shredder.

Animal by-products which can be incinerated immediately are taken from dedicated refrigerated storage and fed into the shredder.

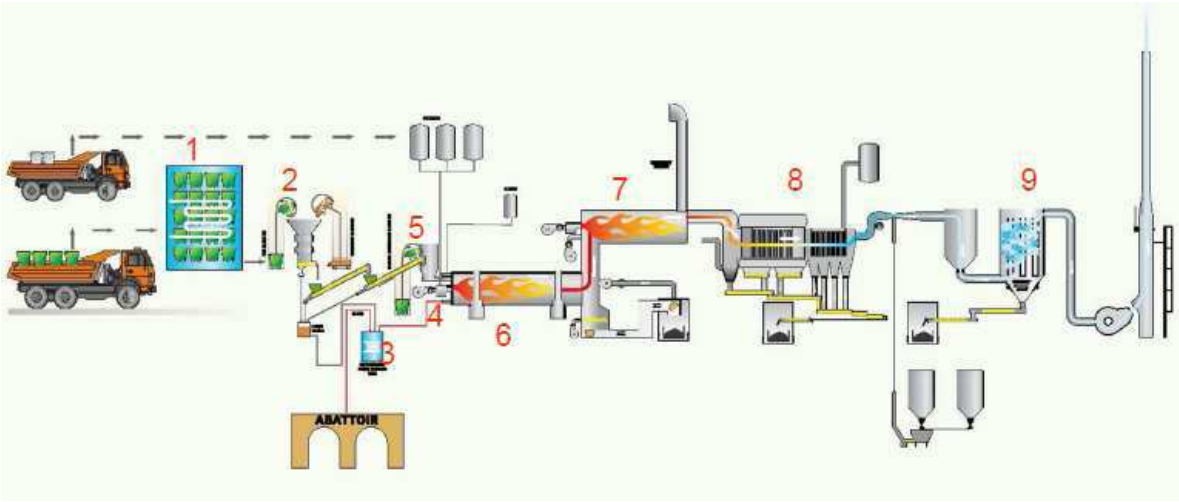
The feeding of combustion chambers is planned according to the calorific value of the different kind of waste to ensure the correct combustion temperature. In case of low calorific value wastes, more fuel is injected. In case of high temperatures, fuel injection is reduced or stopped.

Refrigerated closed containers: Abattoir waste being removed for incineration

Lift used to take abattoir waste to the refrigerated storage area

Refrigerated storage area

The incineration process is presented in the following scheme.



1. Refrigerated Storage Areas
2. Shredder
3. Blood Storage Vessel
4. Fuel injection lances
5. Feed Hopper
6. Primary Combustion Chamber (PCC)
7. Secondary Combustion Chamber (SCC)
8. Boiler
9. Flue Gas Treatment Plant

Blood arising from animal by-products is stored in a vessel; a coagulator has been installed to sterilize the blood and separate the water. The weight is reduced by approximately 50%.

Coagulated blood to be fed into the hopper

The feed hopper is installed directly in front of the Primary Combustion Chamber (PCC). It receives all the waste prior to discharge into the PCC.

The feed hopper system includes a compacting lid, a hydraulic ram, a double firedoor, and a water cooling system.

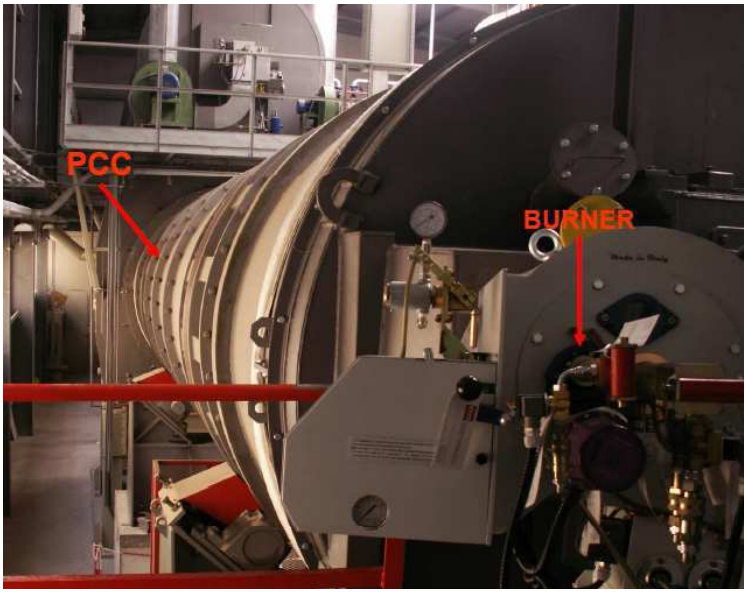
Feed hopper

The PCC is the first chamber to receive waste to be burnt. It consists of a rotating drum: temperature is maintained above 850 °C by means of a burner. It is designed to function only with diesel, or diesel and solvents mixed together.

Fuel used at the Thermal Treatment Facility is Heating Gas Oil. The MTTF has a storage capacity of 90,000 litres. Diesel is pumped to the modulating burners of the plant.

The solid products and gases resulting from the combustion of waste are separated in the post-furnace chamber.

Fumes pass on to the Secondary Combustion Chamber. Ashes are collected in a hopper.



Primary Combustion Chamber and diesel burner

Fumes coming from the PCC are completely combusted in the SCC.

The chamber is sized so as to guarantee a stay time of at least two seconds at a temperature above 850 °C and in the presence of free oxygen content of more than 6%. It has a useful volume of 35 m^3. It is placed horizontally and in line with the primary combustion chamber. Urea is injected into the SCC to reduce NO_x emissions.

The fumes from the Secondary Combustion Chamber then pass through a boiler and economiser that reduce the temperature to approximately 180 °C.

The elevated temperature of the fumes cause the water running through the boiler to convert to steam. Currently some of the steam is used for the blood coagulator and the remainder is condensed back to water and re-circulated.

The flue gas treatment system is designed with the aim of ensuring that emitted gases are within the limits laid down in the IPPC permit. Fumes are mixed with activated carbon and sodium bicarbonate. Activated carbon is used to remove toxic products in the flue gas emitted, particularly heavy metals, dioxins and furans. Sodium bicarbonate is used to neutralise acid emissions such as SO_2 and HCl.

The fumes then pass into the bag house filter whereby the dust and spent reagents are collected.

The maximum thermal capacity of the plant is 4.5 MW. Plant operates 24 hours for 7 day in a week for approximately 310 days a year. The remaining days are used for maintenance. Shutdown for maintenance occurs normally every 4 weeks; each maintenance period has a duration of 5 days in order to cool down and warm up the PCC and SCC.

In case of emergency situations, such as:

- Activation of the emergency stop button

- Very high operating temperatures
- Very high boiler pressure, etc.

the emergency chimney is opened and the waste load process is disabled so as not to allow any waste into the chamber other than that already present, which must be completely burned.

Waste produced by the plant operations include:

- Bottom ash: this is treated as non-hazardous (confirmed through analysis) and sent to Għallis non-hazardous landfill.
- Filter (fly) ash and boiler ash: these are hazardous and are being exported for final disposal.
- Wastewater: this is partially treated in the blood coagulator (sterilised) and then disposed to drains.
- Waste from maintenance, operations and office: these are separated at source and recycled or incinerated.

The Plant is equipped with two continuous emissions monitoring instruments working in parallel. The instantaneous, half-hourly average and daily average results are shown on the monitor. Parameters being monitored continuously include nitrogen dioxide, sulphur dioxide, hydrogen chloride, hydrogen fluoride, dust, ammonia (NH_3) and TOC. Flue gas is also monitored by an independent laboratory every month. Every quarter flue gas is also tested for heavy metals, dioxins, and furans.

10 Audit findings

In the following table, audit findings are reported. Each finding is related to the corresponding clause of the IPPC permit IP004/07 and is classified according to the following Compliance Classification (CC) Scheme:

CC	Description
1	A non compliance which has a potentially **major** environmental effect
2	A non compliance which has a potentially **significant** environmental effect
3	A non compliance which has a potentially **minor** environmental effect
4	A non compliance which has **no** potential environmental effect

	Aspect	Detailed observations	IPPC permit ref.	CC	Action to be taken	WasteServ Reply (June 2013)
1	Waste management. Waste acceptance criteria, control and treatment procedures	<u>Labelling of incoming waste</u>: Generally jumbo-bags, IBCs and other incoming waste containers are not labelled. This practice might be acceptable in the current situation given that few EWC waste codes are currently accepted at the installation, all having different containers (yellow bins, blue and green bins, IBCs, boxes, etc.), therefore it is unlikely that the different wastes would be confused.	§2.3.6	4	In the future, given that a larger number of EWC codes are proposed to be accepted at the installation, the implementation of a procedure for properly labelling waste storages and hazardous wastes containers is recommended.	Wastes in storage are currently being labelled. Hazardous waste consignments are labelled to include the consignment note number, delivery date, waste producer, etc. Animal by-products are not labelled. However, once the Autoclave Plant set-up is in place, waste from the Civil Abattoir will be pumped directly to the Plant through dedicated pipelines. Hence the pipes will be labelled. The proposed set-up will reduce the demand for bins. Most of the waste from private slaughterhouses is Category 2 material. Fallen animals can be Category 1 or 2 material but will not be delivered in bins. Such consignments will be guided by weighbridge personnel to deliver the material to the correct Plant, Plant for Category 1 or Plant for Category 2&3 depending on the type of waste delivered and permit code. Yellow bins for clinical waste (as per local standard) are labelled with the biohazard sign.
	 *IBCs for abattoir wastes*	 *Pharmaceutical wastes in boxes*	 *On the left, a blue bin containing abattoir waste; on the right, a yellow bin containing clinical waste.*			

	Aspect	Detailed observations	IPPC permit ref.	CC	Action to be taken	WasteServ Reply (June 2013)
2	Waste management. Waste acceptance criteria, control and treatment procedures	Receipt procedure: The following operational procedures were discussed with representatives of WSM: - Waste receipt procedure rev.3, 29.01.2013 The waste receipt procedures at the weighbridge were investigated by interviewing involved personnel. Waste carriers and consignor permits, consignment permits and consignment notes appeared to be under control. Proper visual controls, according to the applicable procedures, are carried out on incoming wastes.	2.1.1.1, 2.2.1, 2.2.5, 2.4.4 – 2.4.9.	-	None (no non-conformances identified).	-
3	Waste management. Waste acceptance criteria, control and treatment procedures	Waste enquiry procedure: The following operational procedures have been discussed with representatives of WSM: - Waste enquiry procedure issued rev.5, 29.01.2013 - Testing and monitoring of samples rev.2, 20.02.2012 Chemical and physical analysis of same waste (e.g.: EWC 07 05 13*) and other information available to describe the characteristics of the waste have been discussed according to the above listed procedures. WSM involved personnel demonstrated a good knowledge of the relevant characteristics of the incoming wastes and of the related risks, however there is not in place a procedure that enables the company to keep sound and organized data and information on waste characteristics in order to allow the best plant management.	§2.5	4	It is recommended to establish a procedure and database that enables, for each incoming waste (EWC code / client), the keeping of sound and organized data and information on waste characteristics and associated risks. It may also contain information on any past problems encountered during acceptance/storage/incineration of the individual waste stream, for better guidance to all staff dealing with the waste This should address both the improvement of the plant operations (e.g. calorific value and temperature control) and to prevent high emissions from the stack (content of pollutants)	A procedure and database to record this information is in the process of being established.
4	Incineration plant and related infrastructures	The plant operations were discussed with the facility manager. Criteria for mixing wastes to be fed, feeding the kiln, regulating the PCC and SCC temperature through diesel burning and air inflating, controlling the correct operating of the boiler and of the bag house filter, etc. have been discussed. The following operational records have been observed and discussed with WSM staff: - TTF Daily report (TTF010 Rev.02) - Incinerator Supervision Check-list (TTF007A Rev.02) - Bin loading sheet (TTF008 Rev.01) Operational records can be related to the emissions at the stack.	-	4	It is recommended to improve the analysis of all collected data regarding plant operations and emissions in order to eventually identify opportunities to improve the plant efficiency with special regard to the stack emissions.	WasteServ is currently considering a number of options for the best way forward to analyse available data and whether additional information needs to be collated for statistical evaluation.

	Aspect	Detailed observations	IPPC permit ref.	CC	Action to be taken	WasteServ Reply (June 2013)
5	Management of residues from waste incineration	Waste separation and storage appears good. Disposal procedures for EWC codes 190105* and 190115* (boiler ashes and fly ashes) were checked with positive results indicating compliance: the case of the disposal of 22.76 tons of waste which occurred on 15.01.2013 (carrier MJK Transports, delivered to Alquimia Solutiones Ambientale – Ciudad Real – Spain on 07.02.2013) was investigated. Chemical analysis performed in 2012 by an Italian accredited laboratory of the mentioned wastes of the plant have been checked; tests show the polluting potential of the wastes and confirm they are hazardous waste.	2.2.4-2.2.8, 2.2.10, 2.2.11.	-	None (no non-conformances identified).	-
6	Effluent discharge from installation	WSM internal laboratory reports n.100-2013R (02.05.2013), n.077-2013R (01.04.2013) and 046-2013R (01.03.2013) show values of concentrations exceeding the limits as per LN 139/2002 or Water Services Corporation limits for several pollutants (COD, BOD, Suspended Solids, Kjeldahl-Nitrogen, Free Chlorine, Phosphate). Other reports also showed non-compliance with the limit value for copper. Limit values for temperature and pH were complied with. Analysis is carried out daily (every day from Monday to Friday, and Saturday and Sunday where possible). Water from washing of bins and other washing are treated, only when possible, at the blood coagulator pit; moreover, the blood coagulator pit is not a dedicated plant for water treatment and the results indicate that on its own it is not sufficient to reach the limit values identified by LN 139/2002. Rainwater falling on the external working areas, where wastes are handled and stored, should be considered contaminated unless specific chemical analysis demonstrates the contrary. All these waters are discharged to the sewer. WSM has applied for a sewer discharge permit from the Water Services Corporation.	§3.2.8-3.2.9 §3.2.12-3.2.13 §3.2.15	2	a) Identify and install a suitable treatment plant for contaminated waters in order to comply with legal limits. The treatment plant should treat all contaminated waste waters from the installation. b) Draw a plan of the sewage system of the plant and submit to MEPA. c) Clean the coagulator pit and dispose of the sludge; check the integrity of the pit to prevent leakages. Plan periodical cleaning and checking of the pit. d) Take all necessary action to obtain the sewer discharge permit from the Water Services Corporation.	a) The proposed master plan includes the installation of a waste water treatment plant through which second class water can be produced. Hence the quality of the effluent is expected to improve drastically. b) The requested plan is being drawn up and will be submitted as soon as possible. c) Noted. d) An application for a discharge permit has been submitted and feedback from the Water Services Corporation is awaited.

	Aspect	Detailed observations	IPPC permit ref.	CC	Action to be taken	WasteServ Reply (June 2013)
		During the audit, the pit was cleaned and wastewaters analysed again. Results for 07 to 09 May 2013 (report reference n. 103-2013R, 104-2013R, 105-2013R) show an overall reduction in concentration of pollutants, however full compliance was still not achieved for COD, suspended solids, total Kjeldahl-Nitrogen, phosphate and copper during these days. The most critical situation is related to total BOD, Kjeldahl-Nitrogen and phosphate.				
		 *Blood coagulator pit*				
7	Emissions from incineration of waste	There are two continuous monitoring systems in place. Data collected by the new system are analysed, sent to MEPA and published on the WSM website. Calibration procedures have been verified and results are reliable. According to the "Annual Environmental Report – 2012" and to the latest monitoring results observed at monitor located into the control room, there are exceedances of the IPPC Permit emission limits (half-hour 100% limit, half-hour 97% limit, daily limit), mostly for NO_x, NH_3, CO, HCl and SO_2. Exceedances of the limit values occur frequently. In some rare cases, significant high values for several parameters are registered simultaneously over a period of some hours before the concentrations go back to normal values.	§3.1.2	2	Actions shall be taken to improve the emissions. Among others, the following can be considered: a) Change urea spraying nozzle to improve the effectiveness of the reduction of NO_x caused by sprayed urea. b) Investigate relationships between plant operations and emissions data (PCC and SCC temperature, expected calorific value of the fed waste, rate of sprayed urea, NO_x emissions, Head of Shift in charge, etc.) c) Improve the planning of the feeding of the kiln using more reliable information of the waste characteristics relevant for combustion. d) Obtain more information about reliability of thermocouples (expected duration at the actual working	a) New lances have been installed. They are proving to be more reliable. b) Such analysis is not possible due to lack of data. c) Most of the waste currently being incinerated is abattoir waste. Not much information that can be collected on this waste stream. Clinical waste is also difficult to predict since it cannot be analysed. As regards to pharmaceutical waste, the main constituents are known prior to

	Aspect	Detailed observations	IPPC permit ref.	CC	Action to be taken	WasteServ Reply (June 2013)
		 *Urea spraying nozzles* The two systems for continuous emissions monitoring are appropriate, providing data suited to demonstrate the compliance with the limits. The detailed data provided automatically by the system (half-hourly means) may be elaborated and compared with other information regarding the plant operations (see action to be taken "b)"). The "Emergency stack report", included into the AER 2012, shows that in 2012 the emergency stack has been used 11 times. In most cases (9), this was only used for a few minutes.			conditions, expected errors, etc.); thermocouples are not calibrated or maintained; they are changed at prefixed intervals. In case the temperature is not correctly measured, combustion and emissions problems may occur. e) Consider low-NO_x nozzles to burn diesel into the kiln. f) Investigate the feasibility of plant improvements, such as a wet scrubber for acid gases abatement or a selective catalytic reduction system for No_x abatement to be installed at the proper temperatures after the injection of activated carbon and sodium bicarbonate in the flue gas. g) In case of major problems with emissions (exceeding limits for some hours and for several parameters with high values of concentrations), WSM is requested to prepare a specific report including the analysis of the causes and the corrective actions.	incineration. However, during the combustion process it is difficult to predict how the waste is being combusted since the mix varies continuously. d) Discussions with the current supplier are on-going. e) The burner installed is a low-NO_x burner. f) Refer to Appendix 1 to this reply. g) Noted. In parallel, WasteServ is working towards having the Emissions Instrument certified to EN15267.
8	Emissions from incineration of waste	The "Annual Environmental Report" for 2012 was discussed. The report provides data to assess the compliance with the limits provided in table 3.1.2.2 of the IPPC permit. Data required by §12 of Schedule 2 are not provided.	Schedule 2, §12	3	Provide, within the annual report, the monthly mean value of the concentrations at the stack for continuously monitored pollutants.	This requirement will be included in the next annual report covering 2013.
9	Odour control	Odour control practices were assessed during the site visit. The thawing procedure was discussed in detail (see §9 "Site overview and activities"). Operations were also discussed during the site visit. A document "Odour monitoring programme" was submitted by WSM on 11th April 2012 (reference: point 1, table 1.5.1 of the IPPC permit). The evidence of the monitoring results has not been provided.	§3.4.1-3.4.2	3	A suitable system is required to ensure that the doors of the warehouse beside the shredder (Refrigerated Storage Areas) are kept closed (e.g.: fast-acting roller shutter doors). Further improvements of the procedure and/or of the equipment adopted to take waste from the containers to the shredder are expected. Among others, the following can be considered: a) Keep IBCs closed when transported to	The situation is expected to improve drastically when the fridge is in operation. Further improvements are expected when the misting system and eventually the autoclave plant are in place. The installation of fast roller shutter doors can be installed subject to budget availability.

	Aspect	Detailed observations	IPPC permit ref.	CC	Action to be taken	WasteServ Reply (June 2013)
					the shredder. b) Move IBCs when still frozen. c) Install the deodorizer misting system close to the shredder; test it with and without a deodorising agent. d) Assess the opportunity to keep IBCs waiting for shredding in a space with negative pressure and to burn the extracted air into the incinerator. e) Implement the odour monitoring programme.	
10	Emergency response procedures	The MTTF Emergency Response Plan and Procedures delivered by Shield Security Consultant LTD has been approved on 01.12.2011 but is not fully implemented. A more suitable TTF Emergency Response Plan is under development by WSM staff.	§1.5, point 8	2	Decide the contents of the most suited emergency response plan and send it to MEPA when approved.	The updated emergency response plan will be completed shortly and will be sent to the CPD for approval. Once approved, training can proceed.
11	Emergency response procedures	Fire fighting systems were observed during the on-site visit. A tender for supply and installation of a Fire Detection System at the MTTF – WSM20/2013 – has recently been issued. Fire extinguishers are correctly maintained once a year. An evacuation drill was carried out on 25.02.2013. Reporting is good. Training of personnel on emergency issues (first aid, fire-fighting) is in place. In case of spill of diesel from bowsers, the spilled fuel goes to the blood coagulation pit and – in case of large quantities spilled – to the sewer.	§1.5, point 8	3	a) Install hydrants for cooling of diesel tanks in case of fire. b) Set up a procedure to keep under control the diesel unloading operations and to identify proper installations and/or devices to prevent the fuel goes to the drains and to the coagulation pit. c) Plan and carry out all required emergency drills. d) Identify at least one nominated person and one deputy for each shift as responsible for emergency management; plan proper training and qualify them. e) Include into the general maintenance plan requirements for fire fighting system checks and maintenance (hydrants, pumps, foam system, etc.)	a) The current set up is in line with CPD required and is also approved by the CPD. To this effect WasteServ is of the opinion that additional resources are not required. b) Diesel truck bunding is in the process of being procured. c) These are conducted as necessary. d) The revised emergency response plan will cater for this requirement. e) Maintenance schedule will be updated accordingly.
12	Ozone-depleting substances (ODS) and Green House Gases (GHG)	At the plant there are about 20 refrigerated containers for storing abattoir wastes, freezers/fridges, air conditioners, compressors, etc. containing quantities of GHG (e.g.: R134a, R407, etc.). It is possible that some of the equipment also contains ODS (e.g.: R22).	§4.2	3	Identify equipments containing GHG and ODS (type of gas and quantity) to plan correct maintenance and recording according to the EU Regulations 842/2006 (GHG) and 1005/2009 (ODS). Equipment should be duly registered with MEPA (template will be provided on	All air conditioners at the facility are covered with a maintenance agreement with a local company which has technicians in possession of the relevant MEPA registration. Future tenders for the hiring of

	Aspect	Detailed observations	IPPC permit ref.	CC	Action to be taken	WasteServ Reply (June 2013)
					request). In case the equipment is property of the supplier, the contract shall be checked to clarify responsibilities to keep maintenance records.	reefers will include a requirement for technician/s registered with MEPA in order to comply with this directive.
13	Maintenance	Maintenance planning and maintenance records were observed with MTTF staff during on site visit.	§4.2	-	None (no non-conformances identified).	-
14	Training	The "Training plan per Department TTF – Year 2013" has been provided by WSM. Training records related to personnel are correctly kept.	§4.1	-	None (no non-conformances identified).	-

11 Improvement programme obligations in the IPPC permit

WSM agreed to provide an updated "Improvement programme" as requested by the IPPC permit IP0004/07, §1.5. Outdated and old documents are to be resubmitted.

Following the audit observations and findings it is noted that the IPPC application should be updated to the present situation since it is the main document to be referred to for plant and operation description.

12 Summary of positive aspects

According to the audit findings (see §10), the following have been evaluated as positive aspects of the management of the installation by WSM:

- Reduction of the use of the emergency stack operations over previous years.
- Good fly ash storage.
- Good incoming wastes administrative acceptance procedure.
- Good calibration practices (based on "Calibration of the emissions instruments" issued on 22.05.2012).
- Substantial data recorded on plant operation.
- Good maintenance planning, traceability and recording.

Based on the judgment of the external auditors, additional aspects have been perceived as positive:

- Management commitment to improve the plant performance.
- ISO 14001 certification.

Appendix 1

WasteServ's Feedback to Audit Report (Thermal Treatment Facility, Marsa)

Aspect 7(f): Emissions from incineration of waste

Action to be taken: Investigate the feasibility of plant improvements, such as a wet scrubber for acid gases abatement or a selective catalytic reduction system for NO_x abatement to be installed at the proper temperatures after the injection of activated carbon and sodium bicarbonate in the flue gas.

WasteServ's Reply:

The Thermal Treatment Facility is currently equipped with a Dry Flue Gas Scrubbing Unit. UREA is injected into the Second Combustion Chamber at a temperature between 850°C and 1000°C to reduce NO_x levels. When the flue gas is cooled down to 170°C following the Waste Heat Boiler and Economiser, Sodium Bicarbonate ad Activated Carbon are injected simultaneously into the flue gas to reduce the acidic component gases such as SO_2 and HCl and to absorb heavy metals like mercury, dioxins and furans.

The system was originally designed to clean the flue gas using $Ca(OH)_2$ with the design parameters below:

- Maximum total fume flow rate: 14,700 Nm_3/hr at 180°C
- Total suction head: 550 mm H_2O
- Maximum concentration of pollutants at entrance
    - Particulates : 1000
    - HCl: 60
    - HF: 1.5
    - SO_x: 140
    - NO_x: 200
    - CO: 50

The bag house filter has a filtering surface of 475m^2.

During the upgrading of the Plant, the reagent was replaced to Sodium Bicarbonate and Activated Carbon. With an incineration waste mix of approximately 90% by weight of the waste incinerated being organic waste which is not hazardous while the remaining 10% being hazardous waste consisting of clinical waste and pharmaceutical waste or RDF the current scrubbing system can cope in achieving the IPPC emission thresholds.

With the introduction of the autoclave plant, all slaughtering waste will be diverted to the Autoclave Facility, resulting in the Incinerator being used to treat mainly RDF (shredded wood) and hazardous waste including pharmaceutical waste. The emissions produced from this new waste mix will vary from the current mix whereby 90% is organic slaughtering waste. If the quantity of hazardous waste is to

increase from the current quantities being treated, the current scrubbing system may not cope in maintaining the emissions below the IPPC limits. If the quantity of hazardous waste is to increase, then the scrubbing system may need to be upgraded.

WasteServ has the following options to consider:

1. Increase the size of the bag house filter and hence increase the dosing rate of sodium bicarbonate and activated carbon. The only possible way is to increase the height due to space limitations. Increasing the surface area will improve emissions cleaning. However, the more Sodium Bicarbonate is injected, the higher the quantity of hazardous waste produced (fly ash) which needs to be exported for disposal. Higher consumption of dosing chemicals will also be experienced.
2. The second option is to install a wet scrubbing system, consisting of an initial dust filter, following by two wet scrubbers for the HCl and SO_2 gases and a police filter prior to the chimney. This system is more effective and reliable as compared to the dry scrubber but requires a higher investment cost especially since it needs a waste water treatment plant to treat the effluents produced from the wet scrubbers. Another concern is space since it requires a footprint area of approximately 20m x 16m and a height of 16m. Having a wet scrubbing system will not increase the quantity of hazardous waste produced.

Considering the above, WasteServ shall be seeking technical expertise in this very specialized field to investigate further the available options as well as the investment costs, operational costs and space requirements as well as reliability (guarantee) of emissions within the permit thresholds that each option offers. Once the expert's report is available, a clear decision on the way forward can be pursued.