C3.1.3 DPS P3 08 WASTE DISPOSAL - RECOVERY

Disposal Routes of Operational Waste

Solid Waste

Some 30 tonnes per day of solid waste will be produced by the DeSOx units when the proposed 144MW plant is operating on HFO on a *Base Load Condition* cycle. There are no local waste treatment facilities able to deal with either the nature or quantity of this material. This hazardous waste material therefore needs to be exported to a hazardous waste treatment facility abroad. There exists a possibility to recycle this waste material back for use as a raw feed stock by producing new sodium bicarbonate reagent.

The proposed development provides adequate waste handling equipment and storage facilities for handling this waste. The waste handling system and storage is incorporated in the Flue Gas Desulphurization (FGD) handling plant. It is the intention of the developer that the same containers used for the importation of the desulphurization reagents will be used to export the ashes.

The sodium bicarbonate reagent and the waste will be transported in specialised 20ft containers. Typical containers for this purpose are shown in the Figures 1 and 2.

Figure 1 showing typical containers for the transportation of chemicals/waste

The design and construction of these containers make it also possible to stack them one on top of each other and provide storage capacity as required. Figure 2 shows an arrangement of these containers stacked together.

Waste from the FGD plant will be held in an Ash Silo located in Area 17 and able to retain a 3-day storage capacity before the material is transferred into the 20ft containers. Figure 3 shows possible arrangements and different configurations for the containers and site plan shows where these containers will be located on site.

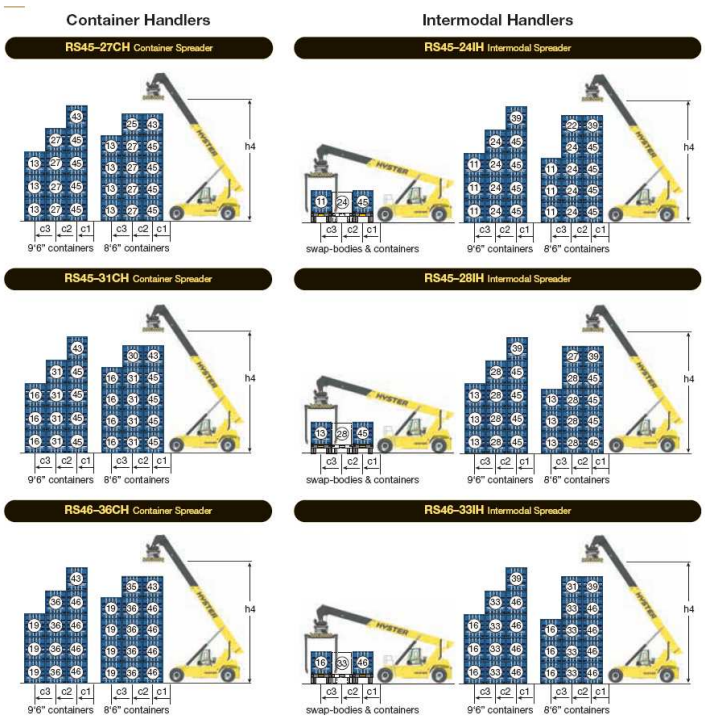
Some 80 x 20ft containers will be held at any one time on site and which equates to about 60 days of storage. Another 30 containers will be transit whilst another 15 containers will be either at the material supplier or the waste treatment facility.

Figure 2: Chemical/waste containers stacked together

It is expected that a weekly delivery of sodium bicarbonate and pickup of hazardous waste will be in place with an estimated exchange of 15 containers either way per week.

The 20ft containers will be shipped to waste treatment facilities abroad. The containers will be loaded on a ship berthed at the Delimara Power Station or will be loaded aboard from the Malta Freeport Terminal located opposite DPS in the Marsaxlokk Harbour.

Figure 3: Chemical/waste containers handling arrangements



Other Waste - Disposal of Spent DeNOx Catalyst

The proposed 144MW plant, apart from the DeSox units (desulphurization), also incorporates a DeNox (de-nitrification) process to purify the air emissions. The DeNox

process uses urea as a catalyst and the resulting chemical reaction breaks down any NO_x compounds into carbon dioxide (CO_2) and nitrogen (N_2). The typical reaction being

$$CO(NH_2)_2 + 2NO+1/2\ O_2 = 2N_2+ CO_2 + 2H_2O.$$

Therefore no solid wastes will be generated as a result of this process. However, following a number of cycles, the catalyst becomes ineffective and needs to be replaced after approximately 3 years, based on an operational period of 8,000hrs/year.

As there are no treatment facilities in Malta for the regeneration of the catalyst, the developer intends exporting the spent catalyst back to the original manufacturer for extraction and re-use.

Liquid Waste

As part of the proposed 144MW extension to the DPS an Oily Water Treatment System will be installed to purify the oily water produced from the plant. Some 30 m^3 of oily water and 3m^3 of oil sludge are expected to be generated daily. The purpose of this unit is to retain the bulk of the oil fraction and purify the remaining water to a level that can be discharged at sea. The oil sludge is retained in two holding tanks each having a capacity of 40m^3.

A coalescing oily water separator separates the water and oil by the principle of gravity and with the support of a coalescing insert. Clean treated water from the separator is discharged to sea via the existing pump interceptors. The oil from the separator is discharged to the sludge holding tank under fresh water pressure.

It is proposed that the sludge will be transported to be incinerated at the local waste incineration plant. This sludge will have calorific value of about 28,000kJ/kg and is seen as a good fuel substitute for the incinerator at Marsa. Wasteserv Malta Limited have been contacted and a reply awaited whether they can use this material as a fuel substitute.

The Oily Water Treatment plant will reduce any petroleum hydrocarbons present down to a concentration of 5ppm and the treated water will be discharged to the sea in accordance with the requirements of Council Directive 76/464/EEC on water pollution by discharges of certain dangerous substances.

Ancillary Equipment

Boiler Wash Effluent System

The installation of an energy recovery system is being proposed whereby heat from the exhaust gases is utilized in order to improve the efficiency of the plant. Steam is generated in exhaust heat recovery boilers with economizer, evaporator section, and super heater section. Any excess steam is used to provide heating requirements for fuel storage and fuel treatment.

The exhaust gas steam boiler unit needs periodic washing (2-3 times a year). For this purpose a boiler wash effluent treatment system is being proposed for washing the boilers and to treat this wash water. Washing is done manually with hoses through

inspection holes and the wash water is captured and treated for up to 10 times reuse. A GRP storage tank having a capacity of 25m^3 collects the wash water.

It is expected that some 50m^3 of wash water will be used when cleaning all 8 boilers. After the collected wash water is neutralized, it is estimated that a total of some 8m^3 of sludge per year ends in the sedimentation tanks. This sludge will be sent to the hazardous landfill at Ghallis.

Sewage, Drainage, and Water Systems

For the buildings and covered areas, a sewage and drainage system is being proposed. The following areas and facilities will be connected to adequate drainage systems:

- Interior areas prone to floods
- Areas with equipment where spillage may occur as a consequence of failure
- Equipment requiring connection to drainage system

Three separate drainage systems are being proposed. These are:

- Drainage system for surface run-off water
- Drainage system for sanitary water (sewage)
- Drainage system for oily water

Surface Run-off Water System

This drainage system will collect storm water from roofs, concrete slabs, and roads. Surface water will be gravity discharged into 3 existing reservoirs.

System for Sanitary Water (sewage)

A sanitary water system from the toilets in the proposed extension electrical annex will be led to the existing sanitary water drainage system.

Oily Effluent System

Floor gully and drain pit will collect oily effluent water in the powerhouse and the fuel oil treatment building via underground pipes. From the pump pit, the oily effluent water is discharged to the Oily Water System oily water separator treatment system. Underground pipes will be oil resistant PVC pipes.

Wastes arising from accidental breakdowns, spillages and leakages

Areas containing fuel tanks, lubricating oil tanks and urea mixing tanks are surrounded by suitably sized bund walls so that any spillage from any tank will be contained inside these containment areas. Adequate drainage facilities connected to drainage and oily water collection pits are also provided. Separation is carried out at this point prior to discharge in interceptor. Similar collection pits are found around collection areas in engine room and auxiliary equipment.