Attachment F.1

Description of the Wastewater Treatment Plant

1. Waste water sources:

1.1. Millipore's wastewater treatment plant receives wastewater from Durapore casting, hydrophilisation, Aircasting, J2, J1,Solvent Recovery Unit, MW2, IC2 as well as rainwater/spills from the tanker unloading area and the tank farm bunds can also be pumped to the treatment plant. Process Wastewater from the OS process also be directed to the Wastewater Treatment plant. Storm water from the new acid/ causic bunded area will be directed to the Wastewater Treatment Plant.

1.2. The operation of the plant depends on production demand but generally runs seven days / week.

2. Process pipeline:

2.1. The pipeline from the process plant to the effluent plant consists of a 6" double contained stainless steel pipe.

3. Inlet Section

3.1. Submersible Pump Station

The waste water flows from the plant to the Submersible pumping station. This is a small tank designed to provide house two duty/ standby submersible feed forward pumpsPU15 & PU 16. These pumps pump the waste water forward to the Equalisation Basin

3.2. Equalisation Basin

Wastewater is pumped into the flows to the equalisation Basin, capacity 1200m^3, in the region of 4-6m^3/hr, depending on process operations. This flow rate will increase to 15 -20 m^3/ hr when the IC2 and J1 facilities commence production. The flow to the equalisation tank is measured and this measurement is relayed back to the SCADA system in the control room at the effluent plant. There are low and high level detectors in both the pump station and the equalisation basin and these will display alarm conditions if the level of effluent within the tanks exceeds the set point. These detectors are also linked to the SCADA system. Two mixers in the equalisation basin facilitate mixing of the effluent prior to pumping to the

aeration tank thus ensuring a constant feed to the activated sludge. Two forward feed pumps transfer effluent to the aeration tank. These pumps can be set in automatic or manual mode at the required rate.

3.3. Sanitisation Tank and Emergency Tank

On the inlet section there are three actuated valves. Under normal operating conditions process flow is directed to the equalisation basin through the pump station. In times of abnormal production when concentrated process flows may need to be diverted to the wastewater treatment plant, the valve to the submersible pumping station can be closed and the valve to the emergency basin (capacity 500m3) opened. This concentrated waste stream can then be held in the emergency basin and fed slowly to the equalisation basin via two duty/ standby pumps when normal operating conditions resume. These valves can be controlled from the SCADA system in the effluent control room. During times of sanitisation in the production areas, both the valves to the submersible pumping station and to the emergency tank can be closed and the valve to the sanitisation tank opened. The sanitisation tank has a capacity of ca. 60m3. The sanitisation material is treated with Anti-Chlor prior to transfer to the Emergency Tank and onwards to the Equalisation Basin. The transfer pumps PP1,2,3,4 are controlled from the SCADA system.

4. Aeration basin,

4.1. The effluent is pumped via two duty/standby pumps to the aeration basin, which has a capacity of 1200m^3. A flow meter on this line signals the rate of feed to the aeration basin on the SCADA system. The aeration basin is an activated sludge system where a population of micro-organisms breaks down the organic load in the effluent stream. Air is supplied to the microbes by two blowers, which operate on a duty standby system and pass air through a series of diffusers on the floor of the aeration basin. The dissolved oxygen concentration is controlled by two dissolved oxygen probes located in the aeration basin which signals the control panel when oxygen is required. The system is set up to operate between two set points and these can be increased or decreased as required. In general it

operates between 1mg O_2/L and 2 mg O_2/L. Two mixers located in the aeration basin aid in agitation and to promote the uptake of oxygen from the air.

4.2. Caustic Soda and Nutrients (N and P as required) are pumped from a covered chemical store to the aeration basin when necessary to adjust either pH or nutrient levels. The pH of the plant is maintained between 6.5 and 8.5 with optimum pH being 7.5.

4.3. Level detectors in the Aeration basin indicate low or high levels in the system. Abnormalities in the levels in the aeration basin signal an alarm on the SCADA system.

4.4. The aeration basin is provided with a temperature control loop to ensure stable temperatures are maintained in the system. This operates by cooling a circulating stream of aeration tank contents using a heat exchanger fed with cooling water.

5. Clarifier:

5.1. From the aeration basin the effluent overflows to the final clarifier, capacity 74 m^3. In the clarifier, solids are allowed to settle and this settled sludge is returned to the aeration basin. Two sludge recycle pumps, which operate on a duty/standby basis return sludge to the aeration basin at a controlled rate. Excess sludge is wasted on a regular basis from the clarifier to the sludge holding tank (capacity 60m3). From here the sludge is dewatered using a Westfalia decanter – Dried sludge is disposed of via a suitable waste disposal contractor.

5.2. Data Trending: Data which is fed to the SCADA system from pH & D.O. probes, flow meters, level detectors, TOC analyser can be viewed and this data can also be trended using the computer software. The trend of individual parameters such as DO, flow, pH, temperature, tank levels can be viewed separately over the previous 1 hour or 24 hour period. There is also a facility to print these trends if required..

6. Outflow Weir

6.1. The final effluent flows over the weir of the clarifier and towards the outflow weir. The pH of the final effluent is continuously monitored and the information is fed to the SCADA system. A composite sampler takes a sample from the outflow on a flow proportionatal basis. An ultrasonic flow meter in the outflow continuously measures flows leaving the plant. The quality of the final effluent is also monitored by a suspended solids probe & a total Nitrogen / TOC analyser. The typical outflow volume presently is 130 to 160 m^3/day. We expect this to increase to 400 to 600 m^3/day (max) when the IC2 process ramps up to full production. From the outflow weir the treated effluent flows to the Carrigtwohill Municipal Treatment plant, where it undergoes further primary and secondary treatment before discharge to Cork Harbour.

7. Sampling and Testing

7.1. A composite sample from the sampler at the outflow weir, a grab sample from the Aeration basin and a grab sample from the balance tank are analysed daily for Chemical Oxygen Demand (using the HACH method) pH and Total Nitrogen. Suspended solids levels at the outflow as well as the MLSS in the aeration tank are also tested daily. Phosphorous testing is carried out on the final effluent 3 times weekly to ensure control of nutrient additions to the plant. Each day, solids settleability in the Aeration basin is measured using an Imhoff cone.

7.2. Each week, three 24 hr flow proportionate composite samples taken from the outflow are sent to an independent laboratory for BOD analysis. An outflow composite sample is analysed for sulphates and acrylates monthly. GC analysis and an oil,fats and greases test of the final effluent is carried out on a quarterly basis.

8. Calibration and Maintenance

8.1. The DO probe, which controls oxygen in the aeration tank, is maintained by an external contractor and calibrated on a quarterly basis. The on-line pH probes are washed and checked weekly. The maintenance group carries out general maintenance support and Preventive Maintenance.

8.2. The TOC / Total Nitrogen analyser, DO probe in the Aeration tank, the pH probes in the Aeration tank, balance tank and the outflow, the Ultrasonic flow meters, the suspended solids probe in the outflow, the COD heating blocks, the WTW bench-top pH meter are all calibrated on a quarterly basis by an external contractor. During a yearly two week manufacturing shutdown in July any major maintenance work is carried out. Analytical balances, ovens, spectrophotometer are all calibrated by an external contractor on an annual basis.

9. Odour

All tanks at the Wastewater Treatment plant are covered and sealed. Air from the head space on the Sanitisation, Emergency , Equalisation and Aeration tanks is piped to the thermal oxidiser for destruction. The clarifier is also covered and the air from its headspace is also piped to the thermal oxidiser for destruction.

10. Chemical Treatment

Chemical dosing systems are provided for the following chemicals:

- Anti-Chlor for neutralisation of sanitising agents
- AL 3 – Aluminium Sulphate to promote flocculation of the clarifier feed
- Nutrient Dosing to the Aeration tank.
- Sodium Hydroxide Dosing to the Aeration Tank for pH control
- Antifoam Agent to control excess foaming in the aeration system.
- Polyelectrolyte addition to promote sludge coagulation at the Sludge Dewatering station