ATTACHMENT E.3

EMISSIONS TO SEWER

LOCATION OF EMISSION TO SEWER (IE0310818-22-DR-0003)
Attachment E.3 Emissions to Sewer

It is proposed that trade and foul effluent from the facility will be sent for treatment to the Waterford City Council WWTP at Belview, which is situated adjacent to the site. The location of the sewer emission point (SE1) is shown on Drawing No. IE0310818-22-DR-0003 included in this application. Detail of the sewer emission point is outlined in Table E.3(i) and Table E.3(ii) of this application.

There will be no List I or List II substances, as listed in the Annex to EU Directive 2006/11/EC (as amended), contained in any emission from the site.

Sources of Effluent at the Site

Process (Trade) effluent

The following streams will be collected by the effluent collection system and sent to the effluent balancing tank and oils / fats / grease removal on site.

<table>
<thead>
<tr>
<th>Source</th>
<th>Composition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Line washings from raw materials intake</td>
<td>Water with residues of milk, cream, vegetable oil</td>
</tr>
<tr>
<td>CIP solutions</td>
<td>Very dilute solutions of caustic (sodium hydroxide), nitric acid, other cleaning agents to be decided, in water, with trace amounts of milk and other raw materials</td>
</tr>
<tr>
<td>Condensate from evaporators</td>
<td>Mainly water: trace milk components</td>
</tr>
<tr>
<td>Condensate post-reverse osmosis (RO)</td>
<td>Mainly water: trace milk components with a slightly higher concentration of ammonia and phosphate compared to condensate pre-RO</td>
</tr>
<tr>
<td>Concentrate from reverse osmosis</td>
<td>Mainly water: trace milk components with a higher concentration of ammonia and phosphate compared to condensate.</td>
</tr>
<tr>
<td>Run-off from raw milk intake area</td>
<td>Rainwater, trace milk/cream/vegetable oil; road grease/residues from tankers.</td>
</tr>
<tr>
<td>Contaminated or out of specification stormwater runoff or firewater diverted from the firewater retention pond.</td>
<td>Mainly rainwater with possible contamination from any of the materials used or stored on site – see Table G.1(i) for a complete list.</td>
</tr>
</tbody>
</table>

Foul (sanitary) effluent

Foul (sanitary) effluent will arise from the toilets, washrooms and canteen. The canteen will be provided with a grease trap to remove oils, fats and greases. Foul effluent will be discharged without monitoring to the connection to the WCC WWTP. In terms of foul effluent, the facility will employ approximately 51 people with up to 30 visitors and contractors per day, with a resulting generation of to 140L of sanitary effluent per head.
Effluent Collection System on Site

Refer to drawings IE0310818-30-DR-0021 and IE0310818-30-DR-0022 for the site services layout. This shows the foul and process (trade) effluent lines and connection to the onsite effluent pre-treatment/balancing system and the connection to the existing foul effluent manhole at SE1. The effluent stream, both foul (sanitary) and process (trade) will discharge to the existing connection to the Waterford City Council WWTP at Belview.

Effluent Pre-Treatment on Site

Process effluent streams will be collected and sent to the balancing tanks (2 x 2,000m$^3$ in parallel) at the western end of the site – see IE0310818-30-DR-0022. A pH neutralisation system will be provided to mix and dose caustic (sodium hydroxide) or acidic (nitric acid) solution as required bringing the effluent to the pH range 6-9 as agreed for acceptance with Waterford City Council at its WWTP.

The process effluent will also be pre-treated to remove oils, fats and greases. It is proposed at this stage in the design to employ the use of a dissolved air flotation (DAF) unit for this purpose.

Composition of Effluent as Discharged to Sewer

Table E.3(ii) in the IPPC Licence application outlines the expected characteristics of the emission to sewer from the proposed facility.

The effluent composition is estimated on the basis of loss of 1% of milk after intake due to process losses held up in lines, rejection on quality grounds, spillages and leaks. This milk loss will be diluted by:

- Water supplied to the site for process;
- Cleaning and sanitary water;
- Condensate from the dryers;
- Contaminated storm or firewater runoff diverted from the storm or firewater retention ponds;
- Storage and loading/unloading bay run-off.

BAT for Effluent Emissions from the Facility

The BAT Guidance Note for the Dairy Processing Sector (EPA, 2008) and the BAT Reference Note (BREF) for the Food, Dairy and Milk Industry (EU, 2006) do not make any specification as regards emission limit values for discharges to sewer, only for discharges of treated effluent from onsite wastewater treatment plants to surface waters. Hence there is no set of BAT emission limit values applicable for the discharges to sewer from the proposed facility.

BAT is given for a number of preventative measures to reduce effluent generation: the measures below will be applied at the facility where practicable:

- For all facilities, BAT is to minimise the quantity and load of wastewater generated. For new facilities, BAT is to segregate wastewater streams, i.e.
trade effluents, sanitary waters, cooling water, storm-water, according to their contaminant type and load, to maximise re-use.

- **Water management**
  - Implement adequate process control and maintenance systems to eliminate leaks, overflows, and other associated losses to wastewater and to maximise solids recovery
  - Treat spills as solid waste rather than washing down drains, where feasible
  - Fit drains with screens and/or traps to prevent solid material from entering effluent drains
  - Utilise a CIP system to minimise chemical usage and water consumption
  - Re-use cooling water, condensates from drying and evaporation operations, permeates from membrane separation processes and final rinse water with and without treatment, where feasible.

- **Cleaning**
  - Use dry cleaning
  - Apply good housekeeping practices
  - Use high-pressure (low volume) water for cleaning floors and open equipment
  - Use low-foam cleaning
  - Install trigger nozzles on hoses to reduce flow rates, where feasible
  - Utilise spray guns instead of open-ended hoses for cleaning, where feasible.
  - Optimise CIP sequences
  - Recover CIP solutions
  - Reuse reverse osmosis water
  - Apply recycling processes on the basis of conductivity, rather than time
  - Re-use final water rinse for pre-rinsing
  - Apply automatic dosing of chemicals at the correct concentration
  - Apply automated CIP instead of manual cleaning, where possible
  - Modify process lines and operations to eliminate spillage onto floors
  - Remove as much residual material as possible from vessels and equipment before they are washed
  - Ensure that drains are fitted with catchpots

- **Steam systems**
  - Maximise condensate return
  - Avoid losses of flash steam from condensate return
  - Improve steam trapping
  - Repair steam leaks.

- Consider the use of anaerobic digestion for removal of BOD from effluent.
Consideration of Viability of Anaerobic Digestion for Pre-treatment of Effluent

The effluent produced by milk powder processing plants has a high BOD and COD loading due to the high nutritional content of milk. BAT is to consider the use of anaerobic digestion for removal of BOD from effluent. Anaerobic digestion is a series of processes in which microorganisms break down biodegradable material in the absence of oxygen. The resulting methane gas is used as fuel to provide energy.

As Anaerobic Digestion (AD) is a biological process, a consistent feedstock is required, so the influent liquor (untreated site effluent) would require balancing as regards pH, temperature and nutrient levels before entrance to the biological part of the process. Based on the typical effluent organic mass load anticipated for the facility (BOD of 2,940 Kg/day and COD of 4,388 Kg/day), provision of anaerobic digestion would be possible for the facility, and the gas produced could provide 400 KW/day of energy, which is small in comparison to the total site energy requirement of up to 40 MW per day. The payback time for the capital expenditure on provision of an anaerobic digestion package would be in the order of 15-20 years.

Given that the WCC WWTP is readily accessible on the adjacent property, and has great unused capacity for effluent treatment, there is little merit to the provision of anaerobic digestion at the proposed facility.

Should the proposed facility expand in the future such that BOD/COD loads increase significantly, an anaerobic digestion skid could be considered as the payback time would be shorter.

Waterford City Council WWTP

Waterford City Council’s WWTP at Springfield House, Gorteens, Co. Kilkenny, is licensed by the EPA under licence number W0244-01. It became operational in 2010 and treats effluent from Waterford City and the environs of South Kilkenny, discharging the final treated effluent to the Suir Estuary.

Monitoring of Discharge to Sewer

It is proposed that the process effluent discharged to the sewer be monitored for the following parameters and at the following frequency:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Frequency of Monitoring</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flow</td>
<td>Continuous</td>
</tr>
<tr>
<td>BOD</td>
<td>Monthly, on a composite sample</td>
</tr>
<tr>
<td>COD</td>
<td>Monthly, on a composite sample</td>
</tr>
<tr>
<td>pH</td>
<td>Continuous</td>
</tr>
<tr>
<td>Temperature</td>
<td>Continuous</td>
</tr>
<tr>
<td>Fats, oils, greases</td>
<td>Monthly, on a composite sample</td>
</tr>
</tbody>
</table>