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Engineering Manager, CopRice
Gate 6, Calrose Street
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CC: Environment Manager

18 August 2020

by email: Engineering Manager

COPRICE WANGARATTA – PROPOSED ODOUR EMISSIONS MITIGATION STRATEGY

Dear Engineering Manager,

As requested, The Odour Unit (**TOU**) is pleased to provide technical advice regarding a suitable odour emissions mitigation strategy for the proposed CopRice pet food manufacturing facility at 2 Barry Court, Wangaratta, Victoria (**the Wangaratta Facility**). This proposed strategy is based on the implementation of a wet scrubber-based odour control system that will be designed to capture and adequately treat process and ventilation air from all key activities and equipment at the Wangaratta Facility prior to atmospheric discharge. The expected design performance of the wet scrubber system is 1,000 odour units (**ou**) or less, with the treated emissions discharged via a dedicated stack that will enhance plume dispersion. Based on this proposed strategy, off-site odour impact risks from the Wangaratta Facility operations are examined to be unlikely and adequately mitigated to an appropriate level. This outcome will be authenticated, monitored and maintained through the incorporation of a site-specific odour management plan and validation process, a feature of which will be integrated as part of the proposed odour emissions mitigation strategy at the Wangaratta Facility.

The following letter provides details on the process activities, odour control system rationale and design, and expected performance outcome for the proposed odour emissions strategy at the Wangaratta Facility.

1. Brief Process Overview

The plan for the Wangaratta Facility is to enable the operational capability to include pet food processing. Amongst other ancillary equipment, the key process equipment required to achieve this operational capability will include:

- An extruder, to facilitate in the continuous formation of a uniform particle size distribution of product;
- A conveying system;
- A coater, to infuse nutrients and tallow to increase protein and fat content;
- A dryer, to reduce moisture content of the product; and
- A cooler, to thermodynamically stabilise the product prior to packaging.

This is a typical process configuration to produce dry pet food. A drawing highlighting the site layout of the Wangaratta Facility is provided in **Figure 1**. A process flow diagram (**PFD**) reflecting the various activities at the Wangaratta Facility is provided in **Figure 2**.

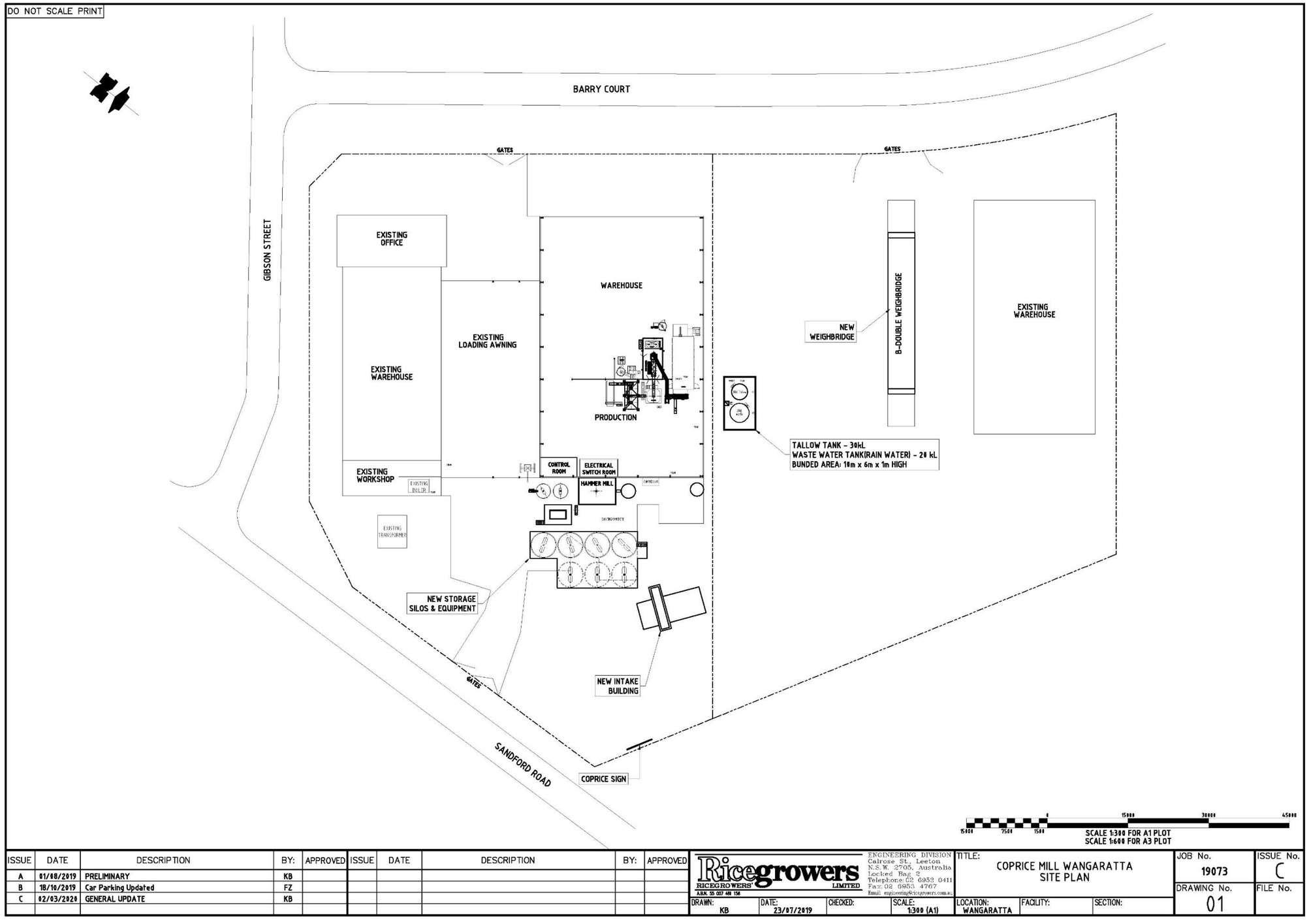

Figure 1 – A master site plan of the Wangaratta Facility

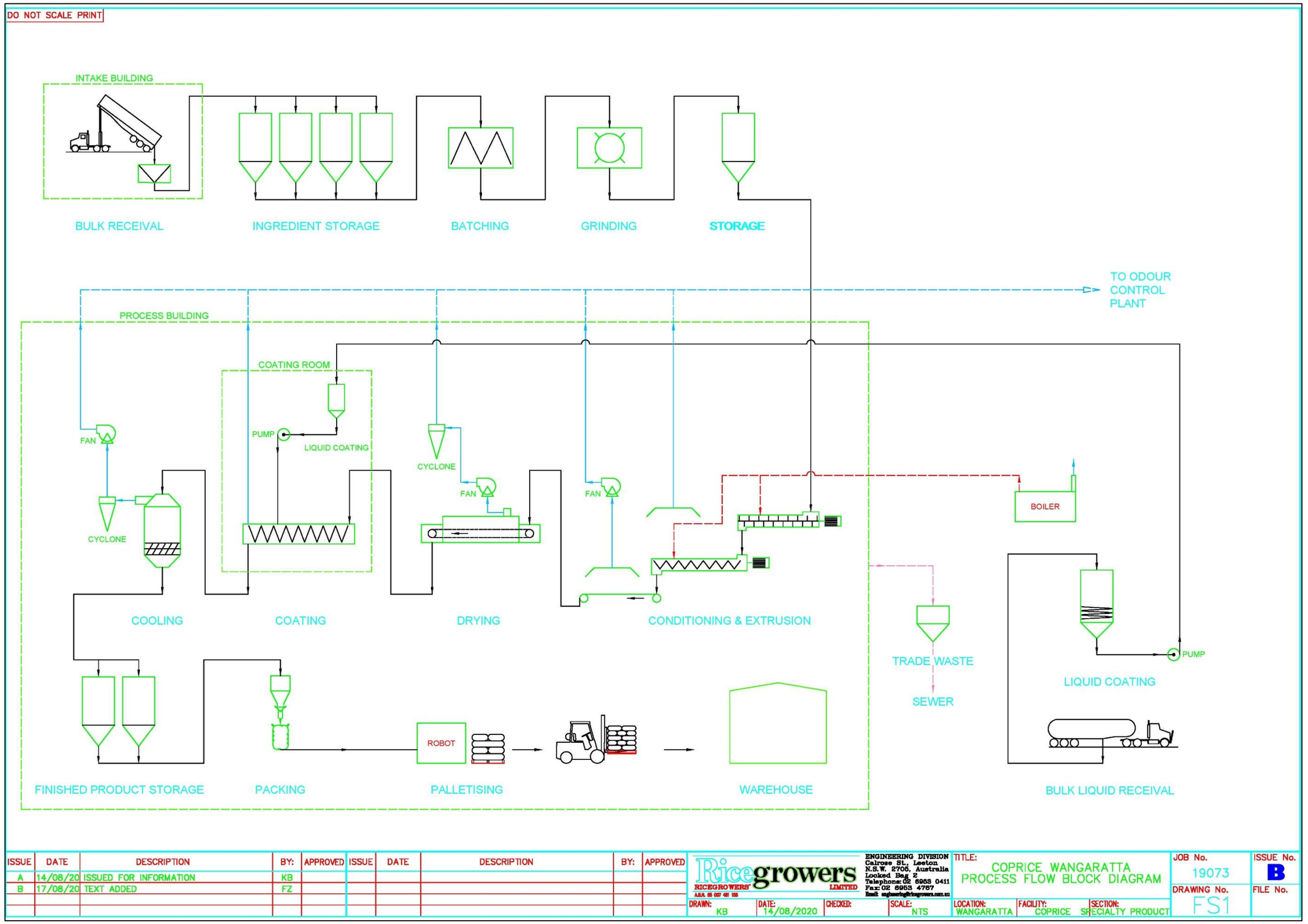

Figure 2 – A process flow diagram reflecting the various activities at the Wangaratta Facility

2. Selection of Mitigation Strategy and Best Practice

In the pet food manufacturing industry, there is a range of odour control technologies that can be adopted, depending on whether it is a dry or wet pet food manufacturing operation. In Australia, a well-proven and effective odour control technology is the use of the biofiltration, which is a typical odour control technology adopted for the pet food manufacturing industry, particularly in wet manufacturing operations. The success of biofiltration (and other conventional odour control technologies) is attributed to the characteristics of the exhaust air emissions from pet food manufacturing, where the vast bulk of the odorous compounds are readily soluble and biodegradable, such as aldehydes, ketones and volatile fatty acids. These attributes also enable wet scrubbing-based odour control technology to be utilised, taking advantage of the solubility properties of the odorous compounds typically generated during pet food manufacturing operations. This effect is more prevalent in dry pet food manufacturing given the nature of the feedstocks, which are generally ready to use dry meal products and tallow, and the nature of operations (mixing, extrusion, drying, cooling, screening and packaging). As such, the use of either biofiltration or wet scrubbing is considered suitable for the Wangaratta Facility. Based on this first-principles and odour operational analysis, the proposed odour control strategy for the Wangaratta Facility is provided in **Section 2.1**.

2.1 Proposed Odour Control Strategy

Given the adoption of only dry pet food manufacturing operations at the Wangaratta Facility, there is a technical case to support the use of a wet scrubber-based solution for the management of odour emissions from key process equipment prior to atmospheric discharge via a dedicated stack (as outlined in **Section 3.1**). Wet scrubbing odour control technology typically involves passing the process exhaust air through a water scrubbing process, often through a packed bed column, venturi channel or hollow vessel, resulting in the removal of contaminants by adsorption/diffusion gradients and mass transfer phenomena. The scrubbing liquor can be water or chemical-based (such as an acid, caustic and/or oxidising agent). It can also involve several scrubbing stages, typically in series, to target different air containments. The use of a wet scrubber solution at the Wangaratta will result in the removal of fine particulate matter, grease, and odorous compounds, from the process exhaust air emissions prior to atmospheric discharge.

2.2 Odour Control System Overview

For the Wangaratta Facility, the adaption of a wet scrubber-based odour control system will consist of the following elements:

- An internal process odour collection ducting system, extracting odorous air from the key pet food processing units including (noting that these airflow extraction rates are preliminary in nature and may vary to the final design airflow for the Wangaratta Facility):
    - The extruder, 1,000 cubic metres per hour (**m^3/hr**) and the extruder conveying system, 110 m^3/hr;
    - Coater, 640 m^3/hr;
    - Dryer, 17,000 m^3/hr; and
    - Cooler, 28,100 m^3/hr.

- To facilitate in the cooling of the process airstream from the above units of operation, a portion of internal building ventilation air will be extracted and utilised as dilution air, for enhancing adiabatic cooling;

- An internal ventilation ducting system, extracting room air from the upper levels of the building. This system will include strategically designed air inlet louvre units at ground level, designed to direct cooler inlet air towards key operation areas;

- An external collection duct network for the process and ventilation duct systems;

- A fan system to drive the process and ventilation components of the air collection and management system, discharging into a main duct and then into a dedicated foul air wet scrubber vessel; and

- A process monitoring system, consisting of the logging of key operational parameters (such as airflow, pressure, temperature, redox potential).

3. Wet Scrubber Preliminary Specification and Performance

Based on the airflow requirements of the process equipment selected to provide the dry pet food manufacturing capability at the Wangaratta Facility, the total design airflow is expected to be 47,000 m^3/hr. At this airflow loading, a wet scrubber vessel of approximately 2.8-3.3 metres (**m**) diameter and a height of approximately 5-7 metres will be required as a minimum. The treated airstream exiting the scrubber vessel will discharge via a stack mounted at ground level, with a design exit velocity of at least 15 metres per second (**m/s**) and discharge height of 14 metres.

3.1 Expected Outcome of the Proposed Odour Emission Mitigation Strategy

The proposed wet scrubber system for the Wangaratta Facility will be designed to remove most, if not all, the original odour character in the foul air stream. With good operation and maintenance of the wet scrubber system, the treated odour level is expected to be 1,000 ou or less. At this level, coupled with a discharge stack height of 14 metres and an exit velocity of 15 m/s, off-site odour impact risks will be unlikely and adequately mitigated to an appropriate level at the Wangaratta Facility.

4. Concluding Remarks

The proposed odour emissions mitigation strategy for the Wangaratta Facility is considered to represent a sustainable and effective solution for the proposed operations Wangaratta Facility. The detailed design for the wet scrubber-based odour control system at the Wangaratta Facility will be competed by TOU in due course.

4.1 Recommendations

In addition to the proposed technical solution outlined in this letter, TOU recommends that the Wangaratta Facility also commits to the following as part of the odour emissions mitigation strategy:

- Development of a site-specific odour management plan that documents the process operations, standard operating procedures to minimise odour generation, odour emission risks and control, odour control system design, operation, maintenance and performance monitoring, and a description of the responsibilities of key staff; and

- The undertaking of a validation assessment within sixty days of operations to confirm the expected performance outcomes for the implemented odour control system.

Regards,

The Odour Unit Pty Ltd

Signed by:

Terry Schulz B. E. (Chem Eng), CAQP
Principal & Managing Director

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Senior Engineer & Consultant