

Elf Farm Supplies Pty Ltd

PROPOSED MODIFICATIONS TO MULGRAVE SUBSTRATE PLANT

1. Background

On 11 January 2012 Elf Farm Supplies received approval from the Minister for Planning to further develop the company's mushroom substrate plant at Mulgrave; and subject to meeting performance requirements, for staged increases in production. Consistent with the approval, the company subsequently submitted environmental plans and strategies, receiving approval to commence construction work and to increase production to 1,600 tonnes of substrate per week.

The company is now ready to proceed with further elements of the approved development, specifically to expand the pre-wet processing facility and augment the odour control system. The currently approved development permits construction of a second larger shed for pre-wet processing. The approval provides for air exhausted from the pre-wet processing area and other parts of the site to be passed through a second bioscrubber and discharged via a second 40 metre chimney on the site.

Figure 1 is a layout plan of the site showing the outline of existing structures and approved structures yet to be constructed.

2. Proposed Modifications

Elf Farm Supplies seeks the Minister's approval for following alterations to the approved project:

- a move to tunnel processing for the pre-wet phase of composting instead of processing in a large pre-wet building and,
- the installation of an emissions treatment plant comprising ammonia scrubbers and a biofilter instead of constructing a second bioscrubber and chimney stack.

3. Purpose of the Modifications

There are several reasons for proposing modifications to the approved pre-wet and odour control process:

1. As foreshadowed in the environmental assessment (Perram & Partners 2010), Elf Farm Supplies has continued to monitor worldwide technological improvements in mushroom substrate production and odour management. Recent developments, particularly in Western Europe, have demonstrated:
 - pre-wet processing in tunnels allows for more effective odour management than using windrows in a large shed;
 - ammonia scrubbers and biofilter beds are now shown to be more effective at odour removal than a bioscrubber;

2. The Mulgrave substrate plant operates under an environment protection licence issued by the EPA. Elf Farm Supplies routinely monitors odour in the substrate plant chimney consistent with the licence. Air samples taken from the chimney have shown that the plant continues to operate within the specified limits.

However, there has been community unrest since January 2013 with regard to odour in the Mulgrave area. Both the EPA and Elf Farm Supplies have responded to the concerns. The company has undertaken a number of repair and modification projects to the existing plant in conjunction with some operational procedure changes, now completed. A July 2014 odour survey undertaken by the EPA has resulted in further improvements being required to prevent fugitive emissions from the plant, being air that escapes from non-treated sources, rather than through the chimney.

3. The approved Odour Management Plan (Todoroski Air Sciences 2012) requires that consideration be given to enclosing the bale wetting area to contain possible fugitive odours from bale wetting (section 4.2.1).

Elf Farm Supplies now needs to embrace the recent technological improvements as part of its action to control fugitive emissions. Fugitive emissions are controlled by sealing air escape paths and maintaining operating areas under negative pressure. In the case of pre-wet processing, the requirement to effectively exhaust the significant volume of air from a large pre-wet shed so as to maintain the building negative pressure is challenging for both engineering design and operational management.

It is therefore proposed to move to tunnel processing for the pre-wet stage of substrate production. This enables a smaller volume of air to be treated from each batch of material with a more efficient odour removal system. Elf Farm Supplies has experience with tunnel processing as this method has been successfully used at Mulgrave for Phase 1 composting for more than a decade. Ammonia scrubbers and a biofilter will replace the previously proposed bioscrubber and chimney.

The proposed changes will mean in the longer term that all process operations, including the transfer of compost material throughout the plant, will be undertaken in enclosed buildings and covered conveyors. This will result in Elf Farm Supplies being able to remove a substantial source of fugitive emissions.

With the construction of new pre-wet tunnels, the existing pre-wet shed will become redundant for this purpose and would allow the bale wetting and stable bedding operations to be carried out indoors, further reducing the potential for fugitive emissions.

4. Technology

Pre-wet tunnels would use similar technology to the existing Phase 1 tunnels, including:

- an “air under” system to introduce air to the mix through the tunnel floor;
- conveyor loading of tunnels to ensure even distribution

- computer controlled fans regulating air flow to and from the tunnels

The biofilter is essentially a concrete structure similar in form to an above-ground swimming pool. A duct network carries exhaust air from the plant to the base of the biofilter. Air exhausted from the existing Phase 1 and pre-wet shed, new pre-wet tunnels and other plant processing areas will be passed through ammonia scrubbers prior to the biofilter. This apparatus uses acid dosing to remove ammonia. The resultant solution is returned to the pre-wet substrate, creating no waste water.

5. Building Alterations

5.1 Existing approval

The new pre-wet building approved in 2012 was designed to share a common wall with the existing pre-wet building. It was to be larger than the existing building being 133 metres long by 45 metres wide. It had a wall height of eight metres with a pitched roof extending to approximately 12.6 metres above ground. The lower two metres of the external walls were to be of concrete with a combination of metal sheeting and clear panel above.

The approved bioscrubber was to be a separate stand-alone structure 22 by 15 metres in plan and nine metres high. The building had concrete walls and a flat concrete roof. A chimney was to be erected on the roof of the bioscrubber with a diameter of 1.8 metres at the base extending to a height of 40 metres above ground.

It is proposed that neither of these structures will be erected. The total plan area of the approved buildings now superseded by this proposal is approximately 6,300 square metres.

5.2 Proposed alterations

Tunnel Structure

It is now proposed to erect a redesigned structure to permit pre-wet processing to take place in concrete tunnels. The structure will have similar characteristics to the existing Phase 1 tunnel structure on the site. *Figure 2* shows the footprint of the proposed tunnel structure overlayed on the outline of the previously approved pre-wet shed and bioscrubber.

There will be 10 pre-wet tunnels, each 50 metres long and eight metres wide. Tunnels will be arranged in a bank of six at the southern end and four at the northern end. A working hall will separate the banks of tunnels. At each end a plant room will enclose machinery including ammonia scrubbers, tanks, fans and pumps. A four metre wide service corridor along the eastern side of the tunnel structure adjoining the existing pre-wet building will house a conveyor and miscellaneous rooms for storage and operations. *Figure 3* shows the internal layout of the new pre-wet structure.

The tunnels will be constructed of reinforced concrete with a concrete roof. The loading area walls and roof will be metal clad. The plant rooms at the ends of the structure will have external walls of concrete blockwork for noise control.

The tunnel structure will have a total floor area of approximately 6,500 square metres, comparable with the area of the superseded buildings. The height of the tunnels will be approximately eight metres to a flat roof, with a section of pitched roof over the work room extending to about 13 metres. A rooftop conveyor will create a linear height extension across the centre of each bank of tunnels. *Figure 4* shows west and south elevations of the proposed new pre-wet structure.

Biofilter

The biofilter will occupy an area of approximately 2,800 square metres. It will have the form of a large open swimming pool type structure with concrete sides extending approximately two metres above ground level. Ductwork, partly above and partly below ground, will convey exhaust air from the pre-wet facility and distribute it across the base of the biofilter structure. The biofilter will be filled with organic material including shredded tree stumps, trunks and bark that have proven effective in removing odour molecules from the exhaust air.

Conveyors

The existing approved development includes installation of several new conveyors. The proposed alterations will require rearrangement of approved conveyors and some new conveyors. New conveyors proposed with the new pre-wet structure will primarily be internal to the building except for the rising connections to the tunnel rooftop.

All external conveyors will be fully enclosed to prevent fugitive emissions.

Minor Modifications

The bale wetting area will be decommissioned as this operation will move into the existing pre-wet shed following commissioning of the new pre-wet structure. The approved second external bale wetting area and associated water recycling pit will not be required. A bale breaking line will be included in the pre-wet shed.

The raw materials storage area will be further enclosed and fitted with air extraction. Deliveries and manure processing will occur within this area. There will be an internal connection from this area to the existing pre-wet shed to alleviate the use of loaders externally transporting chicken manure to the pre-wet shed.

Cooling towers will regulate the exhaust air temperature in the ammonia scrubbers and recycle the heat energy back into the two working halls to improve operator working conditions.

The site drainage system will not require further modification as the new pre-wet structure will be a replacement for the previously approved shed with a similar roof area.

6. Operations

The pre-wet operation will be carried out entirely indoors, with loaders operating in the working hall to collect material from the tunnels and deposit it in walking floor hoppers for transfer either back to tunnels or to the next stage of processing. There is an enclosed vehicular corridor linking the pre-wet building to the Phase 1 building. The proposed modifications will eventually eliminate the need for loaders to pass through the corridor with compost material as part of the normal transfer operation.

Computer-managed controls will automatically regulate all aspects of the composting operation and odour control system including fan speeds, damper positions, air temperature and acid dosing.

5. Assessment of Environmental Impact

Appearance

The proposed change in the manner of producing pre-wet will result in a minor change in building form. Notably the building will have a similar footprint with a similar bulk. The most significant change from a visual perspective is that the second chimney will not be required.

Stormwater

As the modified pre-wet building has a similar footprint to the approved building there will be no significant change to the approved stormwater system.

When bale wetting moves indoors it will continue to use the existing water recycling pit. Rainfall percolating through the biofilter will drain to the existing water recycling pit.

Wastewater

The ammonia scrubber will produce an ammonium sulphate solution. This liquid will be mixed with water and added to the compost as part of the substrate production process.

Hazardous material

Up to 20 kilolitres of sulphuric acid will be stored at the southern plant room in accordance with relevant requirements for storage of this material.

Noise

Noise emissions will be constrained to remain within existing licence limits. A noise assessment demonstrating that this will be achieved has been commissioned.

Odour

The proposed modifications are aimed at improving the odour performance of the pre-wet process and other areas of the plant. Negative air pressure can more readily be maintained with tunnel processing.

A consultant has been engaged to prepare an odour assessment in accordance with guidelines to be advised by the EPA.