APPENDIX 2 TNG WASTE FUEL QUALITY ASSURANCE PROCEDURES



Residual Waste Fuel Quality Assurance Procedures



Bronte Walker

Genesis Recycling Facility Honeycomb Drive Eastern Creek

Issue Date: 1 July 2017



TNG Residual Waste Fuel Quality Assurance

This guideline is for the use of Managers and Employees of the Genesis Waste Recycling and Resource Recovery Facility located at Eastern Creek.

The aim of this guideline is to adapt relevant aspects of the current operational guidelines which operate in respect of quality control for recovered timber and wood-waste products at Genesis.

The purpose of this guideline is to ensure that the residual waste stream which is currently landfilled is subjected to appropriate measures to ensure that in order for it to be used as a fuel the residual waste stream only contains appropriate and approved materials and those standards must be achieved on a consistent and continuous basis.

This guideline is designed for the Genesis Construction and Demolition waste materials processing facility operating as at the date of this publication.

Separate and specific guidelines will be published in respect of:

- (a) Commercial and Industrial waste [packaging] when that waste stream becomes operational; and
- (b) Third party bona fide resource recovery facilities pre-processed waste streams subjected to Genesis QA procedures.



1. Types of Waste to Expect

Genesis Recycling and Landfill Facilities are licensed to accept General Solid Waste [non putrescible]. This type of waste is defined in the Protection of the Environment Operations Act.

The waste predominantly consists of dry mixed waste from building developments, demolition sites or infrastructure works.

This waste **USUAlly** contains

- 1 Timber, garden-waste, green-waste tree loppings and wood-waste.
- 2 Plastics PVC pipes, polystyrene and packaging.
- 3 Brick, concrete, tiles, sand, soil, gyprock, compressed fibre cement sheeting.
- 4 Plumbing, pipes and electrical cables, fixtures and fittings.
- 5 Gas cylinders, fire extinguishers, colorbond sheets, engine parts, empty paint cans, aluminium, steel copper.
- 6 Paper, cardboard.

The waste may contain very small amounts of

1 Residue food wastes, wrappers and containers, nappies, sharps, plastic bottles and glass.

Hazardous waste

1 The main hazardous waste which can be found in mixed loads of building and demolition waste is asbestos sheeting also known as "fibro".

This is known as Special Waste. It presents a hazard and a deadly health risk and must NOT under any circumstances be crushed.

It must NOT be permitted into any product output stream and must by law be landfilled.

It can often be difficult to distinguish between compressed fibre cement and the more dangerous asbestos. For this reason both are to be excluded from the processing streams.



2. Graduated Response

Mixed waste comprising many different materials delivered to Genesis arrives in a multitude of different sizes and no single method is perfect at separating these.

That is why we use the **size and general type** of different materials to carry out the first stage sort.

Materials identified as being mostly wood, or mostly metal or mostly brick can either be directed to specific areas within the site designated for those particular materials or the contents of bins can be tipped on the floor within the MPC in order to fully view the contents.

This process is known as the pre-sort extraction.



3. Pre-sort Extraction

Pre-sort extraction of recyclables takes place prior to the waste being fed into the plant.

This is where the larger items of steel, timber, concrete, plastic, cardboard etc. are separated and extracted prior to the waste being loaded into the plant.





Figure 1: Material drop off

Figure 2: Pre-sort extraction in the MPC



Figure 3: Bulldozer completing pre-sort extraction

It is during this pre-sort extraction process that the physically larger items from the following categories can more easily be separated using the "grabs".

- 1 Timber, garden-waste, green-waste, tree loppings and wood-waste.
- 2 Plastics, polystyrene and packaging.
- 3 Brick, concrete, ceramics, tiles, sand, soil, gyprock, compressed fibre cement sheeting.
- 4 Plumbing, pipes and electrical cables, fixtures and fittings.
- 5 Gas cylinders, fire extinguishers, colorbond sheets, engine parts, empty paint cans, aluminium, steel copper PVC pipes car batteries.
- 6 Paper, cardboard.



- **Concrete** Greater than 500mm in size is to be delivered to the segregated Materials area [SMA]
- **Clean Paper** & To be set aside for bailing and removal.

Cardboard

- **Polystyrene** To be set aside for bailing and removal.
- **Gyprock Sheet** To be set aside for removal.

Metal ObjectsGas cylindersFire extinguishersColorbond sheetsColorbond sheetsEngine partsAluminium, steel copper electrical/ plumbing accessoriesCar batteriesElectrical components

METALS

The metal objects listed are valuable resources to be removed from site for reprocessing by others.

These objects inflict unnecessary wear and damage on the Plant. It is therefore the highest priority to remove these objects at the earliest stage possible.





4. Asbestos & Fibre Cement Sheeting

It is during this phase that special vigilance is required for the presence of asbestos.

Asbestos is not permitted to be received within the recycling facility and will normally be viewed or declared at the weighbridge. It is at that point where the waste classification is given and the vehicle is directed to the landfill. This applies both to bonded asbestos sheeting and to asbestos or fibre based insulation.

Sometimes small quantities of bonded asbestos may be contained or concealed within a mixed load or may be confused by its appearance with compressed fibre cement sheeting. The presence of this material may only be discovered when the load has been tipped onto the floor for inspection.

In such a case the MPC Manager will determine from the circumstances and by using the electronic scanner whether the load is in fact contaminated, or may be easily and safely remediated.

FIBRE SHEETING

As a general rule, any material within the MPC which may be thought could possibly be asbestos is to be removed for landfilling at the earliest stage possible.

5. PVC Materials

PVC pipes and plumbing fittings are common components of building and demolition waste streams.

In NSW these are not considered hazardous wastes and are usually landfilled.

PVC

PVC pipes and fittings are not a desirable component of the residue waste fuel stream and are excluded at the earliest stage possible.





6. Waste Loaded into the Shredder

After pre-sorting of the material, the residual waste is then loaded into the shredder for resizing before it passes through the plant.

The plant separates the waste materials into commodities such as:

- Timber
- Soil
- Rubble
- Aggregates
- Steel
- Non-ferrous materials.

From the shredder the combined waste stream goes up the conveyor to the "Long Object Separator", here as it name states, the material is separated into larger and smaller objects.



Figure 4: Shredder



Figure 5: Long object separator



7. Waste passes through Electro Magnet and Waste Screen

All the material coming off the Long Object Separator passes under an Electro Magnet, which extracts the small steel fragments which had escaped the pre-sort process and drops the steel items onto another sorting line.

After passing under the Electro Magnet, the material then passes over a waste screen which separates the fractions by size into over 65mm and under 65mm.



Figure 6: Electro Magnet



Figure 7: Waste screen which separates material into over 65cm and under 65cm



8. Waste goes onto Flip Flop Screen

After the Waste Screen the 60mm minus material goes onto a Flip Flop Screen which drops out the fines and also separates the remaining material into fraction sizes of 5mm, 10mm, 25mm and 30mm to 60mm+.

From here the materials pass through a series of blowers to remove any light waste [cardboard, paper, plastic] and then pass through an Eddie-Current to remove the non-ferrous metals.

The material is then stockpiled outside.

The 60mm – 450mm material then passes through the Air Separation unit which sorts out the heavy material from the light material. Heavy material is made up of primarily brick, concrete, asphalt etc. which returns to the Quality Control Station (QC2) for final inspection before going into storage outside.



Figure 8: Flip flop screen



Figure 9: Blowers used to remove any light waste



9. Aggregates and Hardfill Materials

Sorting and separation by weight and by size is a particularly efficient aspect of the Genesis Plant .

It is still necessary to ensure that heavier timber pieces are not cross contaminated with hardfill materials which may be sent for crushing.

At QC 2 pickers inspect the waste flow and ensure that hardfill materials separated from the mixed incoming waste are able to be deposited outside of the western wall of the MPC for where they will be integrated with larger quantities of source separated materials of the same kind.



Figure 10: QC 2 Pickers sorting out the heavy material, made up of primarily brick, concrete and asphalt



10. Ballistic Screen

The Ballistic screen also sorts out the 3 dimensional products such as timber, which then goes through Quality Control Station (QC3).



Figure 11: Ballistic Screen



Figure 12: Pickers at the Quality Picking Station



11. QUALITY CONTROL – Timber and Wood-waste

QC3 picking line is a 6 person picking station, 3 people on each side of the conveyor belt.



Figure 14: Overview of QC3 picking line

In the Timber Room there are currently FOUR waste chutes and ONE metal chute.

At QC3 the predominantly wood waste which has been separated by the plant from the mixed and shredded waste is then handpicked, separating out and excluding from the flow any material which is not wood.



Items typically removed at QC 3 include:

Plastics



Rubble (brick, tiles, rocks)



Fibreboard



CCA treated timber, painted timber, MDF, formwork fragments are also removed from the recovered wood-waste production line.



Figure 15: The above materials are extracted from the timber line as the material passes through the Quality Picking Stations and placed on the landfill line.

All of the contaminants removed at Quality Control stations by pickers are dropped via the individually designated chutes thereby ensuring that only eligible materials form part of the residue waste fuel stream and materials which are not eligible to be used as fuel are landfilled.



12. After QC3 Timber and Wood-waste Materials pass via Conveyor outside of the Building to QC5

At QC 5 further inspection and picking takes place to ensure integrity of product.





Figure 16: Conveyor from MPC (QC3) to QC5

Figure 17: Conveyor from QC5 to Timber Yard

Acceptable timber is left on the belt. This includes hardwood and pine timber.





Figure 18 Pine timber



13. Timber Processing, Chipping and Shredding

This process takes place outside in the designated area and from where the product is tested, certified, sold and transported.











TNG Fuel

Materials of concern to the public on the basis of a potential toxicity to the TNG fuel waste stream are already removed from the incoming Genesis mixed waste stream, by the processes described in this manual.

This is carried out at an early stage because

- (a) It is convenient and cost effective to do so, and
- (b) Because it is financially rewarding to the recycler to remove and sell the materials which have a commercial value, and
- (c) Because materials which are submitted to the shredding and separation processes of the Genesis require pre-sorting in order to ensure optimum outcomes.

Pre-sort removal [in particular] of metal objects, car batteries, engine parts, fire extinguishers, gas cylinders, containers, etc. prior to the initial shredding avoids or minimises unnecessary wear and tear on the plant and produces the optimum separation process.

Materials which are identified and removed by hand as contaminants from the recovered resource streams at QC2, QC3 and QC5 are currently then transported to landfill via the downhill conveyor and chute.

These residue fractions comprise the same materials as identified in section 1 but in sizes which are too small to recover and re-use commercially or which are too mixed and soiled that they cannot [using current technology] be recycled.

The same methodology described earlier in this manual to exclude unacceptable materials from recovered wood-waste products also allows Genesis to exclude certain of those same materials from the TNG Fuel stream.

Simple re-designation of excluded material chutes as shown in the following figure means that treated timber, PVC, fibro board and non-combustible fractions can be safely and easily removed from the TNG fuel waste stream. These are then sent to landfill and the balance forms the TNG Fuel waste stream.

The installation of an additional dedicated Quality Control position [as QC6] will provide an additional level of confidence that fuel feedstocks will meet the required standards by minimising or excluding CCA treated or lead painted timbers, asbestos, and PVC.

