



ResourceCo RRF Pty Ltd
Energy from Waste Management Plan
Wetherill Park RRF

February 2018

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Definitions

Term	Definition
Accredited laboratory	a testing laboratory accredited by the National Association of Testing Authorities, Australia (NATA) or a similar accreditation authority, or otherwise granted recognition by NATA, either solely or in conjunction with one or more other persons.
Applicant	ResourceCo RRF Pty Ltd
C&D	Construction and demolition
Construction and Demolition Waste	Waste arising from commercial or industrial premises, refurbishments and demolition and construction work
EfWP	NSW Energy from Waste Policy
EfWMP	Energy from Waste Management Plan
EIS	Environmental Impact Statement titled <i>Waste and Resource Management Facility</i> SSD 15-7256, ResourceCo Pty Ltd, 35-37 Franck Street, Wetherill Park, prepared by Nexus Environmental Planning Pty Ltd dated 8 March 2016
EMS	Environmental Management System
EPA	Environment Protection Authority
EPL	Environment Protection Licence issued by the EPA under the POEO Act
Load	the quantity of waste material delivered to the stockpile by truck, bin or trailer
Minister	Minister for Planning (or delegate)
NATA	National Association of Testing Authorities
OEMP	Operational Environmental Management Plan
Operation	The receipt, removal or processing of waste
PEF	Process Engineered Fuel
Personal Protective Equipment (PPE)	equipment and clothing that is used or worn by an individual person to protect themselves against, or minimise their exposure to, workplace risks. It includes items such as facemasks and respirators, coveralls, goggles, helmets, gloves and footwear
POEO Act	<i>Protection of the Environment Operations Act 1997</i>
PROC	Procedure
Processing	the complete recycling process, including inspection of incoming loads, removal of extraneous material, crushing and blending of different materials to create a recycled product.
QC	Quality control
RTS	Response to Submissions titled <i>Response to Submissions Waste and Resource Management Facility</i> SSD 15-7256, ResourceCo Pty Ltd, 35-37 Frank Street, Wetherill Park, prepared by Nexus Environmental Planning Pty Ltd, dated 28 November 2016
SOP	Standard operating procedure
Waste	As defined in the POEO Act and includes any materials receive or processed on the site

1. Introduction

1.1 Overview

ResourceCo RRF Pty Ltd (ResourceCo) is the operator of the Wetherill Park Resource Recovery Facility (the facility) located at 35-37 Frank Street, Wetherill Park.

The facility comprises a waste and resource management operation which processes relevant waste materials to recover products including aggregates, metal, timber and to manufacture solid recovered fuel (Processed Engineered Fuel or PEF).

This Energy from Waste Management Plan (EfWMP) is one of a suite of plans that governs the operation of the facility.

1.2 Purpose

This EfWMP has been developed to address and manage the compliance with the NSW 'Energy from Waste Policy'. The key principles of the EfWMP are to provide:

- Details of how the receipt of incoming waste (feedstock) from waste processing facilities or collection systems complies with the resource recovery criteria specified in Table 1 of the EPA's 'Energy from Waste Policy Statement' for each waste stream
- Details of how ResourceCo will compile and calculate percentages of incoming waste streams every three months and retain this information for submission to the EPA on request
- A procedure for providing evidence to the EPA that incoming material was previously going to landfill
- A procedure for the management of out of specification PEF
- A requirement that out of specification PEF materials would not be reprocessed until further analysis demonstrates that it meets the relevant criteria
- Define calibration procedures and operating thresholds for the online analyser that will be used to measure real-time chlorine, calorific value and moisture content of the PEF

The EfWMP provides an overall framework for adherence the NSW 'Energy from Waste Policy' during operation. It has been developed to satisfy the requirements of:

- Condition B8 of the Development Consent for SSD 7256 dated 10 April 2017
- the commitments made in the Environmental Impact Statement titled 'Waste and Resource Management Facility' SSD 15-7256, ResourceCo Pty Ltd, 35-37 Frank Street, Wetherill Park, prepared by Nexus Environmental Planning Pty Ltd dated 8 March 2016 (EIS)
- the commitments made in the Response to Submissions titled 'Response to Submissions Waste and Resource Management Facility' SSD 15-7256, ResourceCo Pty Ltd, 35-37 Frank Street, Wetherill Park, prepared by Nexus Environmental Planning Pty Ltd, dated 28 November 2016 (RTS)
- ResourceCo's Environmental Management System (EMS), including ISO14001
- applicable legislation and regulatory requirements
- requirements of relevant government agencies

In the event of any inconsistency in the above documents, the Development Consent prevails.

1.3 Project description

The Waste and Resource Management Facility Project, as defined in the EIS includes the following key built elements:

- Industrial sheds for housing the facility operations
- Processing equipment capable of converting up to 250,000 tonnes of relevant waste materials per year into approximately 150,000 tonnes of PEF and over 75,000 tonnes of reusable commodities such as metal, aggregates and timber.
- Workshop, office and staff amenities
- Vehicular access and internal roadways, weighbridge and 42 car parking spaces in two car parking areas
- Stormwater management system for collection of water for reuse in the processing system, and dust suppression or treatment and discharge from the site, including a 300 kL underground stormwater storage tank and two above ground tanks with combined capacity of 27 kL.
- 30 kL diesel fuel tank

1.4 Environmental management system

1.4.1 ResourceCo corporate EMS

This EfWMP has been developed and will be implemented in accordance with ResourceCo's corporate EMS. This EMS has been developed, implemented and certified in accordance with the International Standard for Environmental Management Systems AS/NZS ISO 14001 (Certification No. 2012017).

Throughout the operation of the facility, ResourceCo will undertake periodic reviews and audits of the works to ensure the corporate commitments are fulfilled. ResourceCo's EMS, as implemented at the facility, will be periodically audited as part of the corporate EMS re-certification and ongoing validation process.

1.4.2 Wetherill Park Resource Recovery Facility OEMP

This EfWMP is a sub-plan to the Wetherill Park Resource Recovery Facility Operational Environmental Management Plan (OEMP). The OEMP is based on the ISO14001 Environmental Management System, which provides for continual improvement in environmental performance.

The OEMP is intended as an over-arching environmental management document that forms the basis for development of detailed sub plans (such as this) and procedures for managing specific environmental aspects and impacts. It includes a number of subordinate environmental planning and management instruments (e.g. sub plans, procedures, instructions, forms etc.) that will be implemented during operation of the facility.

The scope and interaction of this document within the OEMP document framework is illustrated in Figure 1.

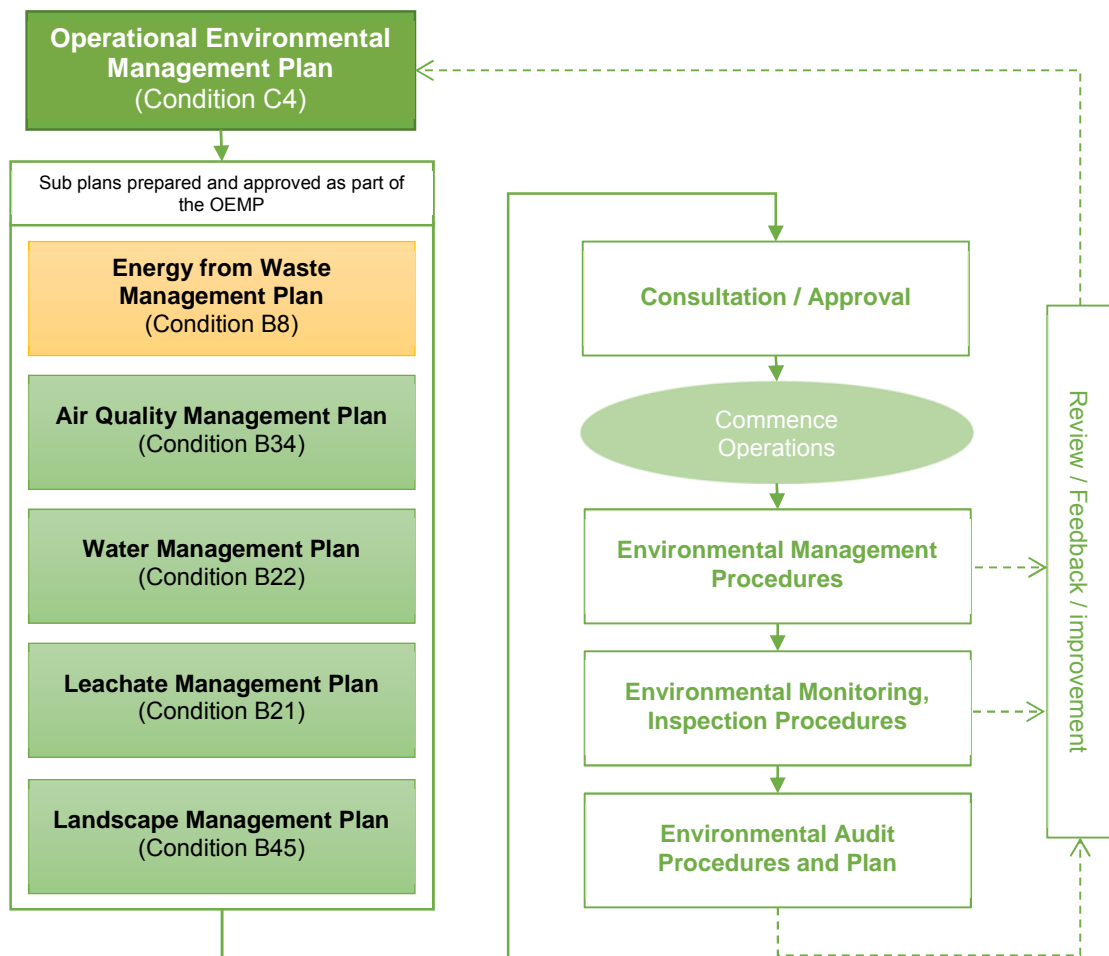


Figure 1 Operational environmental management document structure

1.4.3 Sub plans

In accordance with the Conditions of Approval, a number of sub plans are required to document ResourceCo's management approach to identified risks (e.g. air quality, water and leachate). These sub plans identify potential impacts as they relate to the operation of the facility (as defined in the EIS and RTS) and outline the physical and management safeguards, mitigation measures, responsibilities and monitoring requirements to be implemented to minimise potential impacts on the environment.

The sub plans (including this plan) required according to the Conditions of Approval are shown in Figure 1. Additionally, this shows the sub plans that are to be approved as part of the OEMP and those that are to be approved and/or consulted upon separately.

1.4.4 Procedures and forms

In addition to the environmental management documents nominated above, ResourceCo uses a suite of additional processes and procedures for its EMS. These management tools (described below) are referred to in this EfWMP and/or the individual sub plans:

- Procedures (PROC) and Safe Operating Procedures (SOP) – provide instructions to ResourceCo staff and subcontractors to guide the completion of tasks required during the operation of the facility. The implementation of these PROCs and SOPs will ensure consistency in approach and quality of results. Specific procedures are developed for management issues including Job Safety and Environmental Analysis (JSEA) for reviewing

works to identify hazards and appropriate control measures, and environmental monitoring etc.

- Environment-related forms (FORM) are used to document environmental issues, actions and/or performance against requirements. Typical forms include incident reporting, inspection checklists, audit protocols, complaints/feedback reports etc.

1.5 Consultation and approval process

1.5.1 EfWMP compliance with the Conditions of Approval

Table 1 lists the key requirements of Condition B8 and indicates where these requirements are addressed within this EfWMP or other documents.

Table 1 Conditions of Approval requirements

Condition requirements	Response/reference
Condition B8	
Prior to the commencement of operations, the Applicant must prepare an Energy from waste Management Plan (EfWMP). The EfWMP must:	
(a) be prepared in consultation with the EPA and to the satisfaction of the Secretary	Section 1.5.2
(b) detail the procedures to ensure full and ongoing compliance with the NSW <i>Energy from Waste Policy</i> , including:	
(i) details of how the receipt of incoming waste (feedstock) from waste processing facilities or collection systems complies with the resource recovery criteria specified in Table 1 of the EPA's 'Energy from Waste Policy Statement' for each waste stream	Section 3
(ii) details of how ResourceCo will compile and calculate percentages of incoming waste streams every three months and retain this information for submission to the EPA on request	Section 4
(iii) a procedure for providing evidence to the EPA that incoming material was previously going to landfill	PROC 28 (refer Appendix B)
(iv) a procedure for the management of out of specification PEF	Section 8
(v) a requirement that out of specification PEF materials would not be reprocessed until further analysis demonstrates that it meets the relevant criteria	Section 8.2
(c) define calibration procedures and operating thresholds for the online analyser that will be used to measure real-time chlorine, calorific value and moisture content of the PEF.	PROC 34 (refer Appendix C)

1.5.2 Consultation and approval

In accordance with Condition B8, this EfWMP is required to be prepared in consultation with the EPA and to the satisfaction of the Secretary of the Department of Planning and Environment.

A draft version of this document was sent to the NSW EPA for review and comment. Issues raised by NSW EPA have been addressed in the revised version of this document and documented in correspondence shown in Appendix H.

2. Energy from Waste Policy Statement requirements

Table 2 shows the resource recovery criteria for energy recovery facilities as a direct extract from Table 1 of the *NSW Energy from Waste Policy Statement*. The *NSW Energy from Waste Policy Statement* states that energy recovery facilities may only receive feedstock from waste processing facilities or collection systems that meet the criteria outlined in this table.

Table 2 Resource recovery criteria for energy recovery facilities

Waste stream	Processing facility	% residual waste allowed for energy recovery
Mixed wastes		
Mixed municipal waste (MSW)	Facility processing mixed MSW waste where a council has separate collection systems for dry recyclables and food and garden waste	No limit by weight of the waste stream received at a processing facility
	Facility processing mixed MSW waste where a council has separate collection systems for dry recyclables and garden waste	Up to 40% by weight of the waste stream received at a processing facility
	Facility processing mixed MSW waste where a council has a separate collection system for dry recyclables	Up to 25% by weight of the waste stream received
Mixed commercial and industrial waste (C&I)	Facility processing mixed C&I waste	Up to 50% by weight of the waste stream received at a processing facility
	Facility processing mixed C&I waste where a business has separate collection systems for all relevant waste streams	No limit by weight of the waste stream received at a processing facility
Mixed construction and demolition waste (C&D)	Facility processing mixed C&D waste	Up to 25% by weight of the waste stream received at a processing facility
Residuals from source-separated materials		
Source-separated recyclables from MSW	Facility processing source-separated recyclables from MSW	Up to 10% by weight of the waste stream received at a processing facility
Source-separated garden waste	Facility processing garden waste	Up to 5% by weight of the waste stream received at a processing facility
Source-separated food waste (or food and garden waste)	Facility processing source-separated food or source-separated food and garden waste	Up to 10% by weight of the waste stream received at a processing facility
Separated waste streams		
Waste stream	Feedstock able to be used at an energy recovery facility	
Waste wood	Residual wood waste sourced directly from a waste generator e.g. manufacturing facility	
Textiles	Residual textiles sourced directly from a waste generator	

Waste stream	Processing facility	% residual waste allowed for energy recovery
Waste tyres	End-of-life tyres	
Biosolids	Used only in a process to produce a char for land application	
Source-separated food and garden organics	Used only in a process to produce a char for land application	

Notes

1. The EPA may give consideration to increases to the maximum allowable percentage of residuals from facilities receiving mixed municipal and commercial and industrial waste where a facility intends to use the biomass component from that process for energy recovery, rather than land application and the facility can demonstrate they are using best available technologies for material recovery of that stream.
2. Waste streams proposed for energy recovery should not contain contaminants such as batteries, light bulbs or other electrical or hazardous wastes.
3. Bio-char or char materials produced from facilities using mixed waste streams will not be able to be considered for land application as a soil amendment or improvement agent.
4. The C&I no limit category is likely to apply only to mixed waste collected from single generators of large volumes of waste (e.g. supermarkets) or precinct based businesses (e.g. shopping centres). Proponents will need to demonstrate that each entity generating waste has effective and operating collection systems for all waste streams they generate that have reuse or recycling opportunities (e.g. paper/cardboard collection; organic collection; and residual waste collection). Proponents wishing to use the C&I no limit category will need to contact the EPA to determine the eligibility of each entity.

Note: the “no limit mixed C&I” category cannot be used until approval is granted from the EPA.

3. Receipt of incoming waste (feedstock)

This section provides details of how the receipt of incoming waste (feedstock) from the waste processing facilities or collection systems will be managed to comply with the resource recovery criteria specified in Table 1 of the EPA's *NSW Energy from Waste Policy Statement* for each waste stream (as shown in Table 2).

3.1 Waste control

3.1.1 Permitted wastes

The facility is licensed by the NSW EPA to accept general solid waste (non-putrescible) as defined by Schedule 1 Part 3 of the *Protection of the Environment Operations Act 1997* (POEO Act). Only wastes expressly permitted by the Environment Protection Licence (EPL) are to be accepted for processing.

ResourceCo will target the following landfill-destined waste streams:

- C&D recycling residuals from a facility which recycles mixed C&D waste. This waste stream comprises lighter materials leftover once the C&D recycler has extracted metal, aggregates, soil and some timber from waste stream and typically includes plastics, papers, textiles, timber (clean and unclean) and unrecovered C&D materials
- Mixed C&I Waste from C&I collectors that is free of organics, wet, liquid, hazardous or radioactive wastes
- Mixed C&D wastes from C&D collectors that is free of organics, wet, liquid, hazardous or radioactive wastes

3.1.2 Excluded wastes

Specific waste types not permitted to be accepted into the facility include the following:

- Liquid wastes (paint, chemicals, oils, solvents etc)
- Listed wastes
- Household or kerbside collected green and general waste
- Explosives
- Poisons
- Radioactive materials
- Medical waste (syringes, clinical and related waste)
- Asbestos
- Scheduled pharmaceuticals
- Contaminated soils

In addition, in accordance with Condition B5, any waste generated outside the site must not be received at the site for storage, treatment, processing, reprocessing, or disposal, except as expressly permitted by the EPL.

3.1.3 Waste screening and acceptance

Pre-qualification

As outlined in Section 6.2.3 of the OEMP, all potential customers will be required to be pre-qualified before being allowed to bring waste to the facility in accordance with the Incoming Waste Customer Pre-Qualification Procedure (PROC 28). This pre-qualification process will determine if the potential customer's waste meets the approved acceptance criteria for the site, if it will enable high quality PEF product to be produced and which category it meets for the PEF processing criteria, which are:

- C&D recycling residues
- mixed C&I "no limit PEF"
- mixed C&I "50% PEF" or
- mixed C&D

If the customer's pre-qualification meets the C&D recycling residues category, the customer will be required to complete a declaration stating that their residuals being sent to ResourceCo is no more than 25% of their incoming waste by weight and that ResourceCo is the only energy recover facility to which they are sending their residuals. This declaration will be required to be completed on a quarterly basis to allow ResourceCo to submit this declaration with its quarterly allowable PEF percentage calculation to the NSW EPA.

At the facility

Signs at the entrance clearly indicate the types of wastes that are and are not accepted at the facility.

As outlined in Section 6.2.3 of the OEMP, when a vehicle enters the weighbridge, the Customer Service and Weighbridge Operator will check with the driver if the waste meets the acceptance criteria, and will visually inspect the load for waste types not accepted or to be excluded from the production process (as outlined Section 3.1.2 above). If part or all of the load is identified as not be approved for tipping in the facility the truck will not be unloaded and will be directed to leave the site immediately. The Customer Service and Weighbridge Operator will also ensure that all waste that is controlled under a tracking system has the appropriate documentation prior to acceptance at the site.

If the waste meets the acceptance criteria then the waste delivery truck will be directed to the waste tipping area inside the manufacturing building. Once the load is tipped the Waste Receival Inspection Officer will inspect the load for waste types not accepted or to be excluded from the production process, and to ensure that all waste that is controlled under a tracking system has the appropriate documentation prior to acceptance at the site.

Wastes that are not able to be accepted will either be sent back out of the site on the same waste delivery truck (if it is able to be) or removed from site as soon as possible by a licenced collector at the customers expense (if the incoming waste truck has left the site or if it is not able to be reloaded). Section 3.1.5 below outlines the approach to handling and disposal of hazardous materials such as asbestos, sharps and chemical/biological materials that, despite the waste acceptance procedures, have been delivered to site.

3.1.4 Waste monitoring program

Incoming waste

The following details will be recorded and kept on file for all incoming waste received on the site:

- Quantity, type and source of waste
- Date and time of receipt
- PEF processing criteria category
- Copies of all documentation relating to tracking for controlled waste brought to the site
- Details of any hazardous or other prohibited materials (including asbestos) brought to the site, along with handling and disposal activities undertaken and a record of any related documentation

3.1.5 Hazardous materials

Any materials listed in Section 3.1.2 will be immediately rejected from the site where safe to do so and staff will be trained to ensure that these materials are first quickly identified and secondly safely removed from the waste stream. Specific management techniques for key hazardous waste types are provided below.

Asbestos

The following will be implemented to manage the potential for asbestos in the waste stream:

- Direct education with the customer base to ensure that only materials that are asbestos free will be accepted at the site. This is particularly focussed upon in the pre-qualification process (refer Section 3.1.3) with a potential new customer.
- Well positioned, appropriate signage at the entrance, weighbridge on weight dockets and at the drop off point
- Asbestos identification training for all relevant staff on site. Please see Appendix I of the OEMP for the Asbestos Management Plan
- Safe asbestos management and removal training for all relevant staff on site.
- Safe asbestos management and removal procedures are outlined in the Asbestos Management Plan (PROC 29).

Sharps and medical waste

Sharps and medical waste identification training for all relevant staff on site. Refer to SOP 72 *Hazardous Chemicals – including Dangerous Goods and Sharps Procedure*.

Chemicals and oils

Hazardous Chemicals identification training for all relevant staff on site. Refer to SOP 72 *Hazardous Chemicals – including Dangerous Goods and Sharps Procedure*.

Oil spill kits will be kept on site at all times and staff will be trained in its appropriate use.

Chemicals will be managed on an as needs basis with supervisors with dangerous goods training quickly assessing if the spill can be safely managed internally or if external assistance is required i.e. NSW Fire and Rescue.

4. Calculation of percentages

The following procedure will be implemented to calculate the PEF production target and demonstrate compliance with the *Energy from Waste Policy Statement* Resource Recovery Criteria:

Formula:

$$\text{PEF \%} \leq (100\% \times \text{C\&D recycling residuals}) + (100\% \times \text{"no limit mixed C\&I" waste}) + (50\% \times \text{"50\% mixed C\&I" waste}) + (25\% \times \text{mixed C\&D waste})$$

Formula component details:

- All measures are by weight
- The ResourceCo facility weighbridge is the point of measurement
- Incoming waste stream volumes are measured when they enter the site over the weighbridge over the 3 month period
- PEF volume is measured when it leaves the site over the weighbridge over the 3 month period
- Incoming waste is classified into the following waste streams:
 - C&D recycling residuals
 - “No limit mixed C&I” waste from C&I sources
 - “50% mixed C&I” waste from C&I sources
 - C&D waste from C&D sources
- C&D recycling residuals will be from a facility which recycles mixed C&D waste and can produce a declaration stating that the residuals being sent to ResourceCo are less than 25% of the mixed C&D waste intake for the facility and that ResourceCo is the only offtake for their residuals for energy recovery purposes
- “No limit C&I” will be those C&I waste sources which have been approved by the EPA as meeting the no limit criteria
- “50% mixed C&I” will be those C&I waste sources which do not meet the “no limit” criteria
- Mixed C&D will be raw mixed C&D waste that has not gone through a resource recovery process

The frequency of calculation will be 3 monthly (quarterly).

5. Records and reporting

5.1 Reporting

The weighbridge data including type, PEF category and amount of waste (in tonnes) received on the site and all material produced on site and transported off-site (as product or waste) will be recorded and retained.

5.2 Record keeping

PEF calculations and records generated will be identified, collected and stored in accordance with ResourceCo's quality management system.

Compiled calculations of percentages of incoming waste streams (as per Section 4) as well as Quarterly C&D recycling residuals declarations will be retained on site for the life of the facility and be kept readily available for submission to the EPA on request.

7. Review and improvement

7.1 Review of the Energy from Waste Management Plan

The EfWMP will be reviewed on a regular basis to ensure that it accurately reflects the ResourceCo EMS and conforms to applicable legislative and other requirements. The frequency of review will be at least annually as part of the OEMP review, or more frequently, as a result of a significant non-conformance or as directed by the Secretary of the Department of Planning and Environment or other authority.

At the conclusion of the review process, any recommendations for change, or improvement, to EMS will be reflected through amendments to the relevant system element including the OEMP, other sub plans, procedures or forms.

An assessment will be undertaken of the proposed documentation change against the Conditions of Approval (including development consent, EIS and RTS).

Minor changes to the documentation will be recommended by the appropriate manager. The revised documents will be managed in accordance with ResourceCo's quality management system – including approval, document control and communication of changes to relevant staff.

Major documentation changes to the documentation will be reviewed by senior management and if deemed necessary, approval will be sought from the Department of Planning and Environment. Approved revised documents will be managed in accordance with ResourceCo's quality management system – including document control and communication of changes to relevant staff.

Table 3 lists the types of amendments that would be considered minor and major, and the approval process.

Table 3 EfWMP approval process

Review trigger	Amendment type	DPE approval	Examples
Minor amendments and corrections	-	No	Changes to system processes without change to environmental outcome Minor changes to operational processes without change to environmental outcomes
In response to environmental incidents	Minor	No	Hazardous materials removal
	Major	Yes	Non-compliance with EPL
Audit findings	Minor	No	Change to procedure to improve a process
	Major	Yes	Non-compliance with a Condition of Approval
Request by government agency	Minor or major	Yes	-
Annual review findings	Minor	No	Non-compliance with a target
	Major	Yes	Non-compliance with a Condition of Approval

7.2 Non-conformance, corrective and preventative action

Non-conformances, including those of an environmental nature, shall be identified through verification processes such as monitoring, inspections, audits and reviews as well as through the receipt of complaints and incidents and near misses. Non-conformances shall be identified

through verification processes aimed at ensuring compliance with NSW Energy from Waste Policy Statement, in particular the resource recovery criteria, the OEMP and this EfWMP. All ResourceCo personnel can raise a non-conformance. In summary, the management process is:

- When a non-conformance issue is detected, the corrective and preventative actions are entered on a CAR (Corrective Action Request) form. In addition, the CAR assigns responsibilities for actions to a manager for close-out and the timing for completion.
- The CAR is entered into the CAR register for recording and tracking progress of follow-up and close-out.
- Upon satisfactory completion of all corrective actions and follow-on preventative actions (e.g. revision of documented procedures), the CAR is closed-out by the responsible staff member.
- The environmental CARs will be reviewed monthly and during the regular review meetings.
- During the annual environmental review, CAR statistics will be assessed and trends analysed.

8. PEF quality management

8.1 Quality control

Quality control for PEF will comprise:

- Control of the wastes accepted into the facility, as described in Section 3 (and Section 6.2.3 of the OEMP), to minimise contaminants, and in particular PVC plastics through:
 - Pre-qualification of customers
 - Waste screening and acceptance processes including visual inspection
- Development of PEF sampling and testing procedures in conjunction with customers
- Physical separation of the incoming waste stream to remove materials from the PEF product
- Physical testing in accordance with test procedures
- Online analyser on the low PEF finished product output line

Note: There are two distinct grades of PEF manufactured, namely Low CV PEF and High CV PEF, which have independent finished product output lines. The online analyser is installed on the Low CV PEF finished product output line only.

Customer Service Officer on the weighbridge and the Waste Receival Inspection Officer are responsible for ensuring that the waste delivered meets the pre-approved criteria for acceptance.

PEF specification and test procedures will be determined in conjunction with each specific customer (typically cement kilns). Currently, the required specification and test procedures for PEF are summarised in Appendix A. The facility's PEF will be produced to meet these specifications. This will be achieved by:

- Inspection of the incoming waste by the Waste Receival Inspection Officer to ensure inappropriate items are taken out of the waste stream at the tipping floor and do not enter the production line
- Physical separation of incoming wastes with multiple magnets, screens, air separators and manual QC stations to ensure that the following materials do not go into the PEF product:
 - PVC plastics (separation with a ballistic separator and manned QC PVC picking station)
 - Aggregates such as concrete, rocks, bricks and other heavy inert materials
 - Clean timber (picked out at a manned QC picking station)
 - Metals

The physical testing regime, including specific test methods, is attached in Appendix A. The physical testing regime will be performed by a third party, Australian based NATA accredited laboratory.

The online PEF analyser will be designed to provide real time feedback on the major parameters of chlorine content (Cl), calorific value (CV) and moisture (H₂O). The real time feedback on key elements enables continual refinement of the process to help ensure that the key parameters remain within specification.

The online analyser calibration procedures and operating thresholds are provided in PROC 34 attached as Appendix C.

8.2 Management of out of specification PEF

The online analyser compares the real time measured values of the major parameters of chlorine content (Cl), calorific value (CV) and moisture (H₂O) against those detailed in Specification A in Appendix A, namely:

Chlorine (Cl)	≤ 0.2% m/m
Calorific Value (CV)	≥15%
Moisture (H ₂ O)	≤15% m/m

to determine if the PEF is out of specification.

The operating threshold range of the online analyser is detailed in Appendix C (PROC 34 *On-line Analyser Calibration Procedure*)

Should the online analyser determine an out of specification against any of the above major parameters, then the “swish arm” on the outfeed conveyor will be activated which will divert the out of specification PEF into a quarantine stockpile. The quarantine stockpile has a maximum capacity of 180 tonnes. Once this capacity threshold has been reached then the production line is stopped and cleaned to remove the material causing the issue, typically PVC plastic. This will ensure the in-specification finished PEF is separated from any out of specification PEF.

Out of specification PEF is managed as per Appendix D (PROC 40 *Managing Out of Specification Solid Recovered Fuel*).

The PEF storage location is able to store approximately 1,800 tonnes. 10% of the PEF storage location capacity to be designated quarantine area for out of specification PEF diversion temporary storage.

8.3 Managing out of specification PEF – monthly combined composite sample

Both Boral and ResourceCo have multiple ‘layers of control’ in place around PEF, to ensure there is no risk of harm to the environment or to human health through the use of PEF by Boral. These are detailed in Appendix I.

In the unlikely event that the monthly combined composite sample routine test returned an out of specification result on any of the parameters in the specification approved by the EPA as part of Boral’s Development Consent (DA 410-11-2002-i), then ResourceCo will implement the following procedure:

1. ResourceCo will communicate the results of the monthly composite sample as per the requirements of the supply agreement between Boral and ResourceCo.
2. ResourceCo will send the retained duplicate monthly combined composite routine sample to an independent NATA accredited laboratory for testing to all parameters specified in the specification.

If the test results of the retained duplicate monthly combined composite routine sample conform to specification, then:

1. ResourceCo will communicate the results of the retained duplicate monthly combined composite sample as per the requirements of the supply agreement between Boral and ResourceCo.
2. No further action.

If the test results of the retained duplicate monthly combined composite routine sample verify the out of specification, then:

1. ResourceCo will communicate the results of the retained duplicate monthly combined composite sample as per the requirements of the supply agreement between Boral and ResourceCo.
2. ResourceCo will notify the EPA within seven days of becoming aware that it has not complied with the specification.
3. Resource will conduct a root cause analysis to determine the source of the out of specification, utilizing information from:
 - a. Customer pre-qualification processes;
 - b. Waste Inspection processes;
 - c. Routine testing;
 - d. Trend analysis; and
 - e. Any other relevant sourcesas detailed above.
4. ResourceCo will implement corrective and preventive actions to prevent a reoccurrence.
5. ResourceCo will increase routine testing until it is confirmed that the product is able to satisfactorily meet specification on an on-going basis.

9. References

Nexus Environmental Planning Pty Ltd (2016) Environmental Impact Statement titled 'Waste and Resource Management Facility' SSD 15-7256, ResourceCo Pty Ltd, 35-37 Frank Street, Wetherill Park

Nexus Environmental Planning Pty Ltd (2016) Response to Submissions titled 'Response to Submissions Waste and Resource Management Facility' SSD 15-7256, ResourceCo Pty Ltd, 35-37 Frank Street, Wetherill Park

NSW EPA (2015) 'NSW Energy from Waste Policy Statement'

Appendices

Appendix A – PEF Specification and Test Procedures

PEF Specification (current PEF customers)

The following specifications, information and test methods apply:

Parameter	Specification A	Specification B
Gross Calorific Value (MJ/kg)	≥15.0	>18.0
Ash	≤15.0% m/m	<15.0%
Moisture (as H ₂ O)	≤15.0% m/m	<35.0%
Chlorine (as Cl)	≤0.2% m/m	<0.8% m/m
Total Fluorine, Bromine, Iodine (as F, Br, I)	≤0.2% m/m	Not specified
Sulphur (as S)	≤1.0% m/m	<3.0%
Particle size	≤ 50 mm in any direction	≤ 50 mm in any direction
Bulk density (kg/m ³) bailed	≥ 700	Not specified
K ₂ O (%)	1.0	Not specified
Na ₂ O (%)	0.5	Not specified
Mercury (Hg) (mg/kg)	≤1.2	<1.0
Cadmium (Cd) (mg/kg)	≤20	<100
Thallium (Tl) (mg/kg)	≤20	<100
Total Group II metals (mg/kg) Cadmium (Cd) + Thallium (Tl)	≤30	<100
Copper (mg/kg)	≤500	<3,000
Lead (mg/kg)	≤1000	<10,000
Zinc (mg/kg)		<30,000
Total Group III metals (mg/kg) Antimony (Sb) + Arsenic (As) + Cobalt (Co) + Copper (Cu) + Chromium (Cr) + Lead (Pb) + Manganese (Mn) + Nickel (Ni) + Vanadium (V)	≤3000	<10,000
PCB's (Polychlorinated)	< 10 mg/kg	< 5 mg/kg
PCP's (Phencyclidines)	< 100 mg/kg	
Gross and Net Calorific	EN 15400:2011	ASTM E711-87
Moisture content	EN 15414:2011	ASTM E949-88
Chlorine	EN 15408:2010	ASTM E776-87
Sulphur	EN 15408:2011	ASTM E775-87
Nitrogen	EN 15407:2011	Not specified
Carbon Content	EN 15407:2011	Not specified
Biomass	EN 15440:2011	Not specified
Ash	EN15403:2011	ASTM E830-87
K ₂ O, Na ₂ O	EN 15410:2011	Not specified
Particle Size	EN 15412-1:2011	RCM sizing protocol QC-P03- with latest revision
Metals – Mercury, cadmium, thallium, copper, lead, Total Group II metals, Total Group III metals	EN 15411:2011	Acid digestion followed by ICP- AES
PCB	TBC	USEPA 8082A

Physical Sampling Procedure

The sampling will be carried out as per PROC 35 – SRF Sampling Procedure – Characterization Testing (Appendix D) and PROC 36 *SRF Sampling Procedure – Routine Testing* (Appendix F), which are in accordance with EN15442:2011 “Solid Recovered Fuels – Methods of sampling” and EN15443:2011 “Solid Recovered Fuels – Methods for the preparation of the laboratory sample”.

The samples will be tested for the parameters specified in test methods table with ResourceCo providing a monthly test result produced following guidelines from EN15443:2011 “Solid Recovered Fuels – Methods for the preparation of the laboratory sample” and EN 15413:2011 “Solid Recovered Fuels – Methods for the preparation of the test sample from the laboratory sample”.

All samples will be tested by the approved independent laboratory and a duplicate sample representative of each sample tested will be retained as a reference for a period of three (3) months stored in a correctly labelled and suitably sealed container.

Online Analyser Procedure

An online analyser will be used for real time quality measurement of chlorine content (Cl), calorific value (CV) and moisture content (H₂O). ResourceCo, in conjunction with the manufacturer of the analyser, will define the calibration procedures and the operating thresholds to determine when an out of specification point has been reached. If an out of specification limit is reached then the PEF will be ejected to a quarantine stockpile via a “swish arm” on the outfeed conveyor. This will prevent the out of specification PEF from contaminating the finished PEF stockpile. PROC 34 *Online Analyser Calibration Procedure* provides further information (refer Appendix C).

Appendix B – PROC 28 – Incoming Waste Customer Pre Qualification Procedure

STANDARD OPERATING PROCEDURE

INCOMING WASTE CUSTOMER PRE-QUALIFICATION PROCEDURE

Purpose

The purpose of this procedure is:

- To ensure that only those new customers with allowable waste materials are accepted by ResourceCo to deliver waste to ResourceCo's Wetherill Park Resource Recovery Facility (RRF)
- To identify which NSW EfW Policy Resource Recovery Criteria the waste will fit into
- To ensure that new customers understand the conditions by which ResourceCo will accept their allowable waste streams

Scope

This procedure is to be used when assessing all new potential incoming waste customers for ResourceCo's Wetherill Park Resource Recovery Facility (RRF).

References

NSW Energy from Waste Policy Statement (January 2015)

NSW EPA Eligible Waste Fuel Guidelines (December 2016)

Definitions

C&I Commercial and Industrial Waste

C&D Construction and Demolition Waste

EfW Energy from Waste

Assessment

1. The potential customer will be assessed against a set of criteria to determine the following:
 - a. Appropriately licensed EPA waste facility
 - b. Commitment to WHS
 - c. Control measures are in place for the control of Hazardous Waste Materials, to ensure that Hazardous waste materials are not delivered to ResourceCo's Wetherill Park Resource Recovery Facility.

STANDARD OPERATING PROCEDURE

2. The potential customer's waste will be assessed to determine whether it is:
 - a. Currently being sent to landfill, or
 - b. Currently being sent to a competitive resource recovery facility, and if it wasn't sent to this facility, would it be sent to landfill, or
 - c. Currently being sent to competitive resource recovery facility. Is this facility a higher order use resource recovery facility? If yes, then the potential customer will not be allowed to deliver waste to ResourceCo's Wetherill Park Resource Recovery Facility.
3. The potential customer's waste will be assessed against a set of criteria to determine the following:
 - a. Are there any materials in the potential customer's waste stream that the facility is either not licensed to accept or do not meet the facility's limit as listed in Tables 1 and 2. If yes, then the potential customer will not be allowed to deliver waste to the facility
 - b. Which NSW EfW Policy Resource Recovery Criteria the waste will fit into. The allowable criteria for the facility are listed in Table 3.
 - c. The estimated volumes of waste materials for each NSW EfW Policy Resource Recovery Criteria
4. The potential customer's waste will be assessed against a set of criteria to determine the following:
 - a. Calorific value
 - b. Levels of inert material
 - c. Moisture
5. The completed form is to then be submitted to the NSW Operations Manager who will make the ultimate decision as to whether the waste can be accepted to the facility, and if so which Resource Recovery Criteria the waste fits into

Criteria to Determine Waste Material Acceptability

At the highest level of waste definition, the facility can accept the following:

- Dry Commercial and Industrial waste materials
- Dry Mixed Construction and Demolition waste materials
- Dry residual materials from mixed Construction and Demolition recycling facilities

In terms of the general characteristics of the waste materials being sought they are as follows:

- Solid
- Dry
- Non-putrescible
- Non-hazardous
- High calorific value
- Low levels of inert material
- Able to meet the NSW EfW Policy's Resource Recovery Criteria

In terms of the specific constituent materials in these waste categories, the following tables outline the degrees of acceptability of various waste materials ResourceCo's Wetherill Park Resource Recovery Facility.

STANDARD OPERATING PROCEDURE

Table 1: Unacceptable Waste Materials

Unacceptable Waste Material	Details
Asbestos	Zero allowance
Liquid wastes	Zero allowance
Listed Wastes	Zero allowance
Chemical wastes	Zero allowance
Medical wastes	Zero allowance
Contaminated soils	Zero allowance
Municipal Solid Waste (MSW)	Zero allowance
Explosives	Zero allowance
Poisons	Zero allowance
Radioactive wastes	Zero allowance
Pharmaceutical's	Zero allowance
Food waste	Zero targeted, <5% allowable in a mixed load
Green waste	Zero targeted, <5% allowable in a mixed load
Electronic wastes	Zero targeted, <1% allowable in a mixed load
CCA preservative treated timber	<5% allowable in a mixed load
PVC plastics	<1% allowable in a mixed load

Table 2 specifies materials which will be accepted but are unable to be processed, and therefore will incur additional fees for handling and/or disposing of to a licensed receival facility.

Table 2: Non-Processable Waste Materials

Waste Material	Details
End of life tyres	Sent off site to a tyre recycler
Car batteries	Sent off site to a battery recycler
Mattresses	Sent off site to a mattress recycler

NSW EfW Policy's Resource Recovery Criteria

It is important to ensure that the waste materials being delivered to materials ResourceCo's Wetherill Park Resource Recovery Facility are appropriately categorized from the NSW EfW Policy Resource Recovery Criteria. This is because ResourceCo's Wetherill Park Resource Recovery Facility must comply with the limits of PEF able to be manufactured from these various criteria of waste streams.

STANDARD OPERATING PROCEDURE

Table 3: NSW EfW Policy Resource Recovery Criteria for Waste Categorization

Waste Stream	Processing Facility	% Residual Waste Allow for Energy Recovery (by weight)
Mixed commercial and industrial waste (C&I)	Facility processing mixed C&I waste	50%
Mixed commercial and industrial waste (C&I)	Facility processing mixed C&I waste sourced solely from an entity that has separate collection systems for all relevant waste streams	100% ⁽²⁾
Mixed construction and demolition waste (C&D) waste	Facility processing mixed C&D waste	25%
Residuals from mixed C&D recycling facilities	C&D recycling residuals waste	100% ⁽¹⁾

- (1) To fit into this category, the customer must provide ResourceCo with an EPA compliant declaration on a monthly basis that the residuals being sent to ResourceCo are less than 25% of the mixed C&D waste intake for their mixed C&D recycling facility, and that ResourceCo is the only customer of their residuals for energy recovery purposes.
- (2) NSW EPA is required to approve any waste streams that request this classification.

Documentation

FORM 57 Incoming Waste Pre-Qualification Form

Appendix C – PROC 34 Online Analyser Calibration Procedure

STANDARD OPERATING PROCEDURE

ON-LINE ANALYSER CALIBRATION PROCEDURE (DRAFT)

Purpose

The purpose of this procedure is to describe the calibration methodology for the proposed on-line analyser that will be used to measure chlorine, calorific value and moisture content of the finished Processed Engineered Fuel (PEF).

Scope

This procedure is to be used for calibration of the proposed on-line analyser for the measurement of chlorine, calorific value and moisture at ResourceCo's Wetherill Park Resource Recovery Facility (RRF).

References

EN 15442:2011 Solid Recovered Fuels – Methods for Sampling

Definitions

Nil

Introduction

The proposed analyser that will be used to measure chlorine, calorific value and moisture content of the finished Processed Engineered Fuel (PEF) is:

Tomra AUTOSORT[NIR1-NIR2][H-600][X-L]

Background

With the Tomra AUTOSORT for PEF online analysis, it is possible to continuously determine quality parameters for refuse derived fuel. The TOMRA Online analyser continuously scans the surface of the conveyor underneath the scanner. Near infrared sensors detect the chlorine and water content – as well as the calorific value. The DUOLINE® scanning technology automatically detects the materials contact-free during the production process.

STANDARD OPERATING PROCEDURE

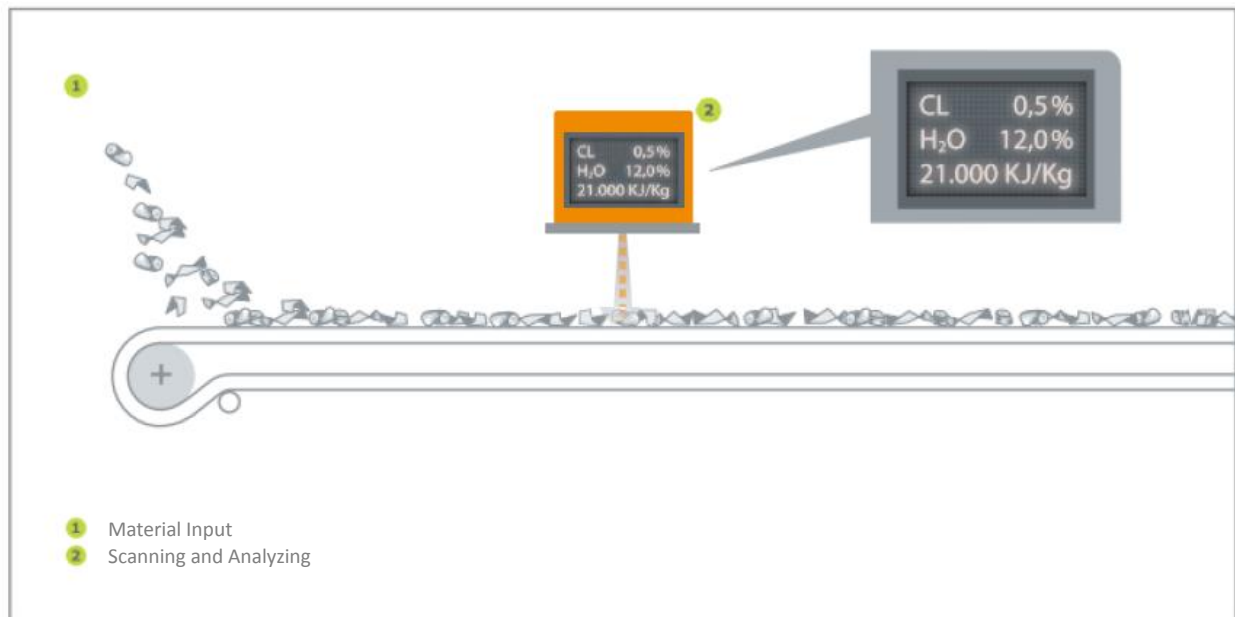


Figure 1. Functional Principle of a Typical On-Line Analyser

Operating Thresholds

The operating thresholds of the TOMRA Online analyser will be commensurate to the finished PEF specifications. The proposed thresholds are:

Parameter	Threshold Range
Chlorine w/w	0.05% - 1.50%
Calorific Value (MJ/kg)	5 - 40
Moisture w/w	5% - 40%

Calibration

The AUTOSORT analyser includes Tomra's unique FLYING BEAM® technology which performs a self-calibration with every scan. Parameterization of the estimated chlorine, moisture content and calorific value must be adapted to the finished PEF stream through comparison of the AUTOSORT measured values against laboratory samples for the same time period.

Chlorine

Adaptation – measurement of chlorine content in the range of 0.05% - 1.50 %

Samples will be taken of the finished PEF for laboratory analysis, and comparison against the AUTOSORT analyser at the time the online measurements were recorded. Sampling will be performed as per

STANDARD OPERATING PROCEDURE

EN 15442:2011 Solid Recovered Fuels – Methods for Sampling. Based on the samples' laboratory analysis, Tomra will optimize the parameterization of the analysis.

Adaptation needs to be performed in steps of 0.05 %, with every measurement to be repeated at least 3 times.

Acceptance test for reproducibility of area measurements:

The TOMRA Online analyser continuously scans the surface of the conveyor underneath the scanner and measures the surface area of PVC in the total material stream. This measured area is presented in % of the total material stream (surface area) and in cm². By entering average values for the thickness and other relevant properties of the different materials into a database, the unit is able to calculate the mass of the materials and then the calorific value and PVC content of the total sample.

A minimum of 3 different samples will be taken of the described finished PEF material. Sampling will be performed as per EN 15442:2011 Solid Recovered Fuels – Methods for Sampling. Each sample should be at minimum 10 kg. Each sample will be scanned 7-10 times by the AUTOSORT analyser. It is necessary that the samples are presented to the machine in a monolayer and with constant speed of the conveyor. Total measured area and area of PVC will be logged, and deviation from the average measured value will be calculated. The reproducibility of the measurements will be a maximum of 5% average deviation compared to the average measured value.

Moisture

Adaptation – measurement of moisture content in the range of 5% - 40 %

Samples will be taken of the finished PEF for laboratory analysis, and comparison against the AUTOSORT analyser at the time the online measurements were recorded. Sampling will be performed as per EN 15442:2011 Solid Recovered Fuels – Methods for Sampling. Based on the samples' laboratory analysis, Tomra will optimize the parameterization of the analysis.

Adaptation needs to be performed in steps of 5 %, with every measurement to be repeated at least 3 times.

Calorific Value

Adaptation – measurement of calorific value in the range of 5 MJ/kg – 40 MJ/kg

Calorific value will be checked against known, pre-defined test materials, with the weight and specific properties of the material known in advance. The test material will be scanned a minimum of 5 times by the AUTOSORT analyser. It is necessary that the test materials are presented to the machine in a monolayer and with constant speed of the conveyor.

Testing and Review

This procedure will be reviewed and updated to reflect the actual calibration practices developed and used during the calibration of the on-line analyser.

Appendix D – PROC 40 Managing Out of Specification Solid Recovered Fuel

STANDARD OPERATING PROCEDURE

MANAGING OUT OF SPECIFICATION SOLID RECOVERED FUEL

Purpose

The purpose of this procedure is to describe the procedure to be used for managing out of specification Solid Recovered Fuel.

Scope

This procedure is to be used for the managing of out of specification Solid Recovered Fuel (SRF) at ResourceCo's Wetherill Park Resource Recovery Facility.

References

Supply Agreement for *The Provision of Waste Wood Derived Fuel and/or Solid Recovered Fuel*, between Boral Shared Business Services Pty Ltd and ResourceCo RRF Pty Ltd

PROC 41 SRF Sampling Procedure – Stockpile Testing

I.S. EN 15443:2011 Solid Recovered Fuels - Methods for the Preparation of the Laboratory Sample

Definitions

SRF Solid Recovered Fuel (or Process Engineered Fuel – PEF)

Introduction

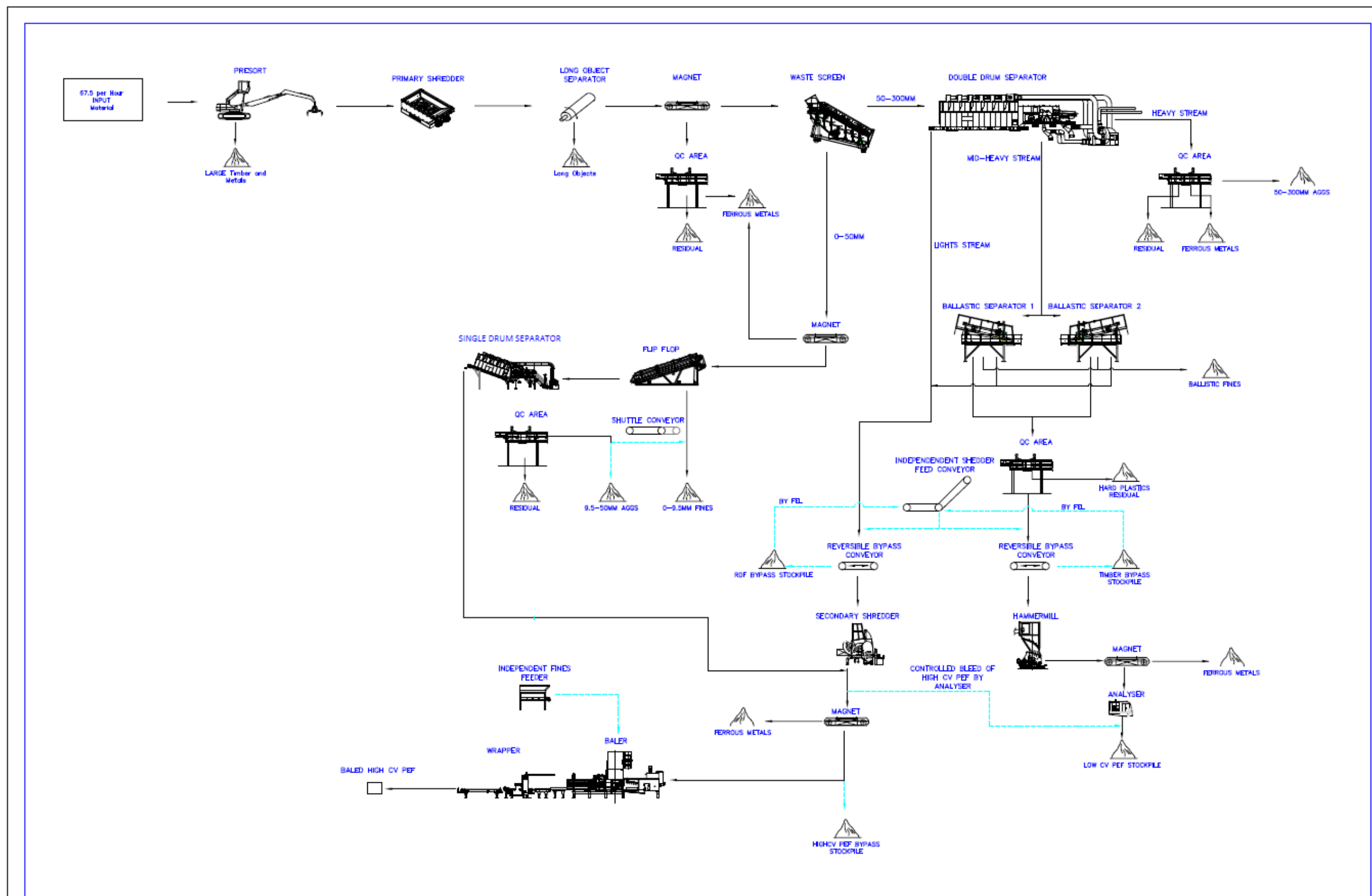
ResourceCo's Wetherill Park resource recovery process converts relevant waste materials into reusable commodities such as metal, aggregates and timber, and manufactures two different Process Engineered Fuel's. The resource recovery process is depicted in Figure 1.

The two distinct grades of Process Engineered Fuel that are manufactured are:

- Low CV PEF. This is produced through the hammer mill, is the heavier fraction of the recovered material, and is predominantly timber based. The Low CV PEF is manufactured to Specification A as detailed in Appendix 1.
- High CV PEF. This is produced through the secondary shredder, is a lighter fraction of the recovered material, and is predominantly plastic based. The High CV PEF is manufactured to Specification B as detailed in Appendix 1

STANDARD OPERATING PROCEDURE

Figure 1 Process Flow Diagram



STANDARD OPERATING PROCEDURE

Online Analyzer

An online analyzer has been installed on the low CV PEF finished product outfeed conveyor line only, and provides real time feedback on the major parameters of chlorine content (Cl), calorific value (CV) and moisture (H₂O) for the Low CV grade Processed Engineered Fuel (PEF).

Quality Control

The online analyzer provides real time feedback on the major parameters of chlorine content (Cl), calorific value (CV) and moisture (H₂O) for the Low CV grade Processed Engineered Fuel (PEF). Should the online analyzer detect that any of these major parameters are out of specification then, the “swish arm” on the outfeed conveyor will be activated which will divert the out of specification product into a quarantine stockpile. This will prevent the out of specification PEF from contaminating the finished PEF stockpile.

The quarantine stockpile has a maximum capacity of 180 tonnes. Once this capacity threshold has been reached then the production line is stopped and cleared to remove the material causing the out of specification issue. This will ensure that any out of specification PEF is separated and quarantined from finished in specification PEF.

Managing Out of Specification PEF

The quarantined stockpile of out of specification PEF is to be sampled for the purpose of in-house laboratory testing, as per PROC 41 SRF Sampling Procedure – Stockpile Testing.

The sample is to be prepared for in-house testing as per I.S. EN 15443:2011 - Solid Recovered Fuels - Methods for the Preparation of the Laboratory Sample.

The sample is to be in-house tested for the following parameters, and compared against both specifications – Specification A and Specification B as detailed in Appendix 1.

- Gross Calorific Value (CV)
- Moisture (as H₂O)
- Chlorine (Cl)

Assessment of the laboratory analysis against the specifications in Appendix 1 will determine which of the following categories the quarantined PEF falls into, and the associated course of action:

- Meets specification A
- Doesn't meet Specification A, but meets Specification B
- Doesn't meet Specification A or Specification B

Quarantined PEF Meets Specification A

In the event that the laboratory analysis determines that the quarantined PEF complies with Specification A requirements, then a second sample is to be taken from the quarantined stockpile as per PROC 41 SRF Sampling Procedure – Stockpile Testing for the purpose of in-house laboratory testing. The sample is to be tested for the parameters specified above, and compared against both Specification A and Specification B to determine a course of action.

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If the second sample laboratory analysis determines that the quarantine PEF complies with Specification A, the quarantined PEF can be transported to the finished PEF stockpile.

An investigation into the discrepancy between laboratory analysis and the on-line analyzer measurements will be performed, and where necessary the on-line analyzer optimized.

Quarantined PEF Doesn't Meet Specification A, but Meets Specification B

In the event that the laboratory analysis determines that the quarantined PEF does not comply with Specification A requirements, but complies with Specification B requirements, then all material from the quarantined stockpile is to be manually diverted to the High CV PEF product line.

Quarantined PEF Doesn't Meet Specification A, or Specification B

In the event that the laboratory analysis determines that the quarantined PEF does not comply with either Specification A or Specification B, then all material will be disposed of at an EPA approved facility for the receipt of such material.

A non-conformance is to be raised, with a CAR (Corrective Action Request) form (Form 1) to be completed.

Laboratory Testing

Regular in-house laboratory testing will be conducted on the low CV PEF finished product to provide analysis of the major parameters of chlorine content (Cl), calorific value (CV), moisture (H₂O), ash content and particle size for the Low CV grade Processed Engineered Fuel (PEF).

Quality Control

Laboratory testing provides quality assurance and control to support the performance of PEF manufacture, and to understand process capability.

Managing Out of Specification PEF

In the event that a regular laboratory test returns an out of specification result on any of the major parameters of chlorine content (Cl), calorific value (CV), moisture (H₂O), ash content and particle size for the Low CV grade PEF, then:

1. The duplicate retained sample will be tested only on the major parameter that was out of specification.

If the test results of the duplicate retained sample conform to specification, then:

1. No further action.
2. An investigation into any discrepancy between laboratory analysis and the on-line analyzer measurements will be performed, and where necessary the on-line analyzer optimized.

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If the test results of the duplicate retained sample verify the out of specification, then:

1. The finished PEF stockpile will be quarantined pending further investigation
2. A detailed investigation using relevant information from quality control records, production records, CCTV footage and any other source, will be undertaken to determine the area of the finished PEF stockpile that has out of specification material.

Once the out of specification material has been identified, it is to be manually removed from the finished PEF stockpile to a quarantine area. Sufficient additional material is to be removed from the adjacent area of the finished PEF stockpile to ensure that all out of specification material has been quarantined, and there is no contamination of the finished PEF stockpile.

In the event that the out of specification material cannot be satisfactorily identified within the finished PEF stockpile, then the entire finished PEF stockpile is to be quarantined. Additionally, if the out of specification material cannot be successfully removed to ensure no contamination of the finished PEF stockpile, then the entire stockpile is to be quarantined.

Quarantined PEF Doesn't Meet Specification A, but Meets Specification B

In the event that the laboratory analysis determines that the quarantined PEF does not comply with Specification A requirements, but complies with Specification B requirements, then all material from the quarantined stockpile is to be manually diverted to the High CV PEF product line.

Quarantined PEF Doesn't Meet Specification A, or Specification B

In the event that the laboratory analysis determines that the quarantined PEF does not comply with either Specification A or Specification B, then all material will be disposed of at an EPA approved facility for the receipt of such material.

A non-conformance is to be raised, with a CAR (Corrective Action Request) form (Form 1) to be completed.

Documentation

FORM 01 Corrective Action Request Form

STANDARD OPERATING PROCEDURE

Appendix 1 Solid Recovered Fuel Specifications

Parameter	Specification A	Specification B
Gross Calorific Value (MJ/kg)	≥15.0	>18.0
Moisture (as H ₂ O)	≤15.0% m/m	<35.0%
Chlorine (as Cl)	≤0.2% m/m	<0.8% m/m
Ash	≤15.0% m/m	<15.0%
Particle size	≤ 50 mm in any direction	≤ 50 mm in any direction
Particle size	≥95% passing 35mm	
Total Fluorine, Bromine,	≤0.2% m/m	Not specified
Sulphur (as S)	≤1.0% m/m	<3.0%
Bulk density (kg/m ³) bailed	≥ 700	Not specified
K ₂ O (%)	1.0	Not specified
Na ₂ O (%)	0.5	Not specified
Mercury (Hg) (mg/kg)	≤1.2	<1.0
Cadmium (Cd) (mg/kg)	≤20	<100
Thallium (Tl) (mg/kg)	≤20	<100
Total Group II metals (mg/kg) Cadmium (Cd) + Thallium (Tl)	≤30	<100
Copper (mg/kg)	≤500	<3,000
Lead (mg/kg)	≤1000	<10,000
Zinc (mg/kg)		<30,000
Total Group III metals (mg/kg) Antimony (Sb) + Arsenic (As) + Cobalt (Co) + Copper (Cu) + Chromium (Cr) + Lead (Pb) + Manganese (Mn) + Nickel (Ni) +	≤3000	<10,000
PCB's (Polychlorinated)	< 10 mg/kg	< 5 mg/kg
PCP's (Phencyclidines)	< 100 mg/kg	

Appendix E – PROC 35 SRF Sampling Procedure – Characterisation Testing

STANDARD OPERATING PROCEDURE

SRF SAMPLING PROCEDURE – CHARACTERIZATION TESTING

Purpose

The purpose of this procedure is to describe the sampling process to be used to generate a representative sample of a defined quantity of Solid Recovered Fuel (SRF), for the purpose of Characterization Testing.

Scope

This procedure is to be used for the sampling of Solid Recovered Fuel (SRF) at ResourceCo's Wetherill Park Resource Recovery Facility. The samples are for Characterization Testing of the SRF.

References

I.S. EN 15357:2011	Solid Recovered Fuels – Terminology, Definitions and Descriptions
I.S. EN 15442:2011	Solid Recovered Fuels - Methods for Sampling
I.S. EN 15443:2011	Solid Recovered Fuels - Methods for the Preparation of the Laboratory Sample

Definitions

Increment Sample	Means the portion of SRF extracted in a single operation of the sampling device
Lot	Means a discrete or defined quantity of SRF for which the quality is to be determined

Introduction

The principle for sampling under I.S. EN 15442:2011 is that sampling shall be conducted by a means where every particle in the lot of SRF to be represented by the sample should have an equal probability of being included in the sample.

The main principle for sample preparation under I.S. EN 15443:2011 is that the composition of the sample as taken shall not be changed during each step of the sample preparation. Each sub-sample shall be representative for the original sample. To reach this goal every particle in the sample before sample preparation shall have an equal probability of being included in the sub-sample retained after sample preparation.

STANDARD OPERATING PROCEDURE

Characterization Testing Requirements

Characterization Testing is to be undertaken in the following circumstances:

1. It is a contractual obligation prior to the commencement of supply of SRF to Boral
2. Where there is a change in supplier who supplies more than 10% of the total waste received, either entry or exit of that supplier
3. Where there is a change in a number of suppliers within a period of less than 30 days who combined supply more than 10% of the total waste received, either entry and/or exit of those suppliers.

20 samples of SRF must be taken, and analyzed. Each sample must consist of 4 increment samples of equal size. The increments shall be taken on consecutive days of plant operation.

Tools and Equipment

- 150 litre Heavy Duty storage container with lid
- Coning and quartering aluminum strip – 2m x 250mm x 6mm
- Plastic sheeting
- Shovel
- Scales
- Sample bag (2 off)
- Permanent Marker

Safety

PPE – as per site requirements, gloves

- Notify all personnel of your presence in the area

Sampling

Four increment samples are to be taken at random intervals across a minimum 8-hour window. Ideally, two samples shall be taken in the morning and two samples shall be taken in the afternoon of each consecutive day the plant is operating. Samples should not be taken less than 1 hour apart.

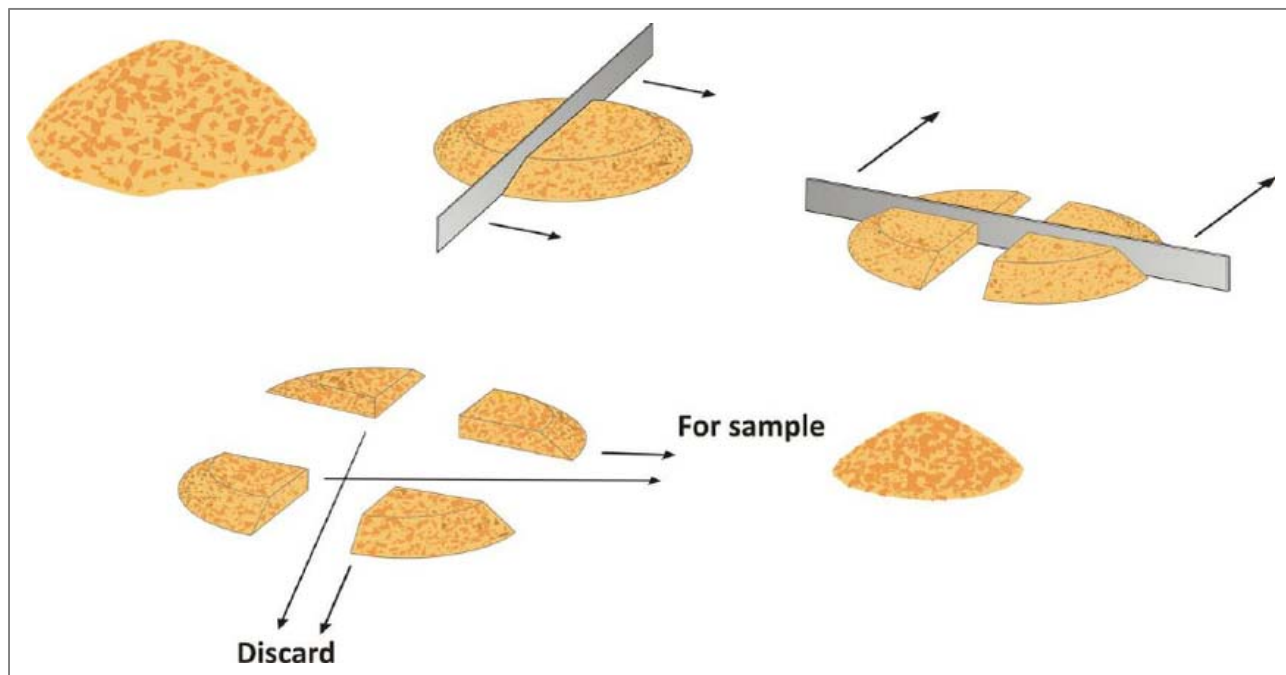
1. Before taking an increment sample, the process must have been in consistent operation for a minimum of 30 minutes.
2. The increment sample is to be taken from the entire flow of the SRF finished product conveyor.
3. A 20kg (approximately 140 litres) increment sample is to be taken and stored in a 150 litre plastic storage container. The lid is to be placed on the storage container.
4. The increment sample is to be reduced to a 5kg sample using the Coning and Quartering Method. Refer below.
5. Steps 1-4 above are to be repeated for the four daily increment samples.

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Coning and Quartering Method

1. Place the increment sample on a clean, hard plastic sheeting.
2. Shovel the sample into a conical pile, placing each shovelful on top of the preceding one in such a way that the solid recovered fuel runs down all sides of the cone and is evenly distributed and different particle sizes become well mixed.
3. Repeat this process three times, forming a new conical pile each time.
4. Flatten the third cone by inserting the shovel repeatedly and vertically into the peak of the cone to form a flat heap that has a uniform thickness and diameter. The flat heap should be no more than 200mm high.
5. Quarter the flat heap along two diagonals at right angles by inserting the aluminium strip vertically into the heap. See Figure 1
6. Discard one pair of opposite quarters.
7. Repeat the coning and quartering process until a sub-sample of 5kg is obtained.

Figure 1 **Coning and Quartering Method**



STANDARD OPERATING PROCEDURE

Sample Combining

The four 5kg reduced mass increment samples must be combined and thoroughly mixed to form a homogenous sample. This is achieved by:

1. Place the four increment samples separately on a clean, hard plastic sheeting.
2. Take one shovel from the first increment sample and form a conical pile.
3. Take one shovel from each of the second increment sample, then the third and the fourth increment sample, placing each shovelful on top of the preceding one in such a way that the solid recovered fuel runs down all sides of the cone and is evenly distributed and different particle sizes become well mixed.
4. Repeat step 3 for all four increment samples in the same order, until all the material has been combined.
5. Shovel the combined sample into a new conical pile, placing each shovelful on top of the preceding one in such a way that the solid recovered fuel runs down all sides of the cone and is evenly distributed and different particle sizes become well mixed.
6. Repeat this process three times, forming a new conical pile each time.

Sample Reduction

The combined sample is to be reduced to two 5kg laboratory samples using the Coning and Quartering Method.

The two retained parts are laboratory samples Part A and Part B, of 5kg each.

Laboratory Sample

The 5 kg laboratory samples (Part A and Part B) shall be placed into separate sample bags and sealed, with the following identification on each sample bag:

- Date of sampling
- Sample (Solid Recovered Fuel)
- Sample weight (5kg)
- Sample Identification, including sample part (Part A or Part B)
- Source of Supply
- Name of person performing sampling
- Sampling performed in accordance with I.S. EN 15442, I.S. EN 15443

Post Sampling

Thoroughly clean all sampling tools and equipment to prevent cross contamination during future sampling events.

STANDARD OPERATING PROCEDURE

Sampling Plan

I.S. EN 15442:2011 requires a sampling plan be developed upon the basis of the objective for the sampling process.

General information

Product name	Solid Recovered Fuel (SRF)
Description of material for sampling	Solid Recovered Fuel, composed of plastics, textiles, paper, cardboard and wood products, with >95% of the material less than 35mm in size.
Sampling objective	The objective of this sampling plan is to produce a sample representative of the product that the customer can expect to receive during the course of the supply agreement.

Definition of lot and lot size

Material flow	Approximately 20 tonnes/hr
Sampling period	1 day (nominal 8 hours)
Lot size	160 tonnes (maximum)

Sampling location and sampling procedure

Sampling method	Manual sampling from a falling stream
Sampling location	Discharge point of the product conveyor
Sampling equipment	<ul style="list-style-type: none">• 150 litre Heavy Duty storage container with lid• Coning and quartering aluminum strip – 2m x 250mm x 6mm• Plastic sheeting• Shovel• Scales• Sample bag (2 off)• Permanent Marker
Dimensions of the sampling device	N/A

STANDARD OPERATING PROCEDURE

Information on solid recovered fuel

Nominal top size d_{95}	35mm
Dominant shape of particles	Elongated/needle shaped
Bulk density	150 kg/m ³
Particle density	0.001g/mm ³

Information on increment and sample sizes

No of increments	4
Minimum increment size	20 kg (140 litres)
Effective increment size	20 kg (140 litres)
Minimum sample size	1.8 kg (12 litres)
Actual daily sample size for analysis	5 kg (35 litres)

STANDARD OPERATING PROCEDURE

Mass and size reduction plan for Characterization Testing

	Description	Method of reduction	Technique and equipment	Mass before reduction	Mass after reduction	Nominal top size before reduction	Nominal top size after reduction	Shape factor before reduction	Shape factor after reduction	Mass to be withheld for analysis	Purpose of product of this reduction step
Step 1	Splitting each increment to produce a combined sample for external and internal testing	Mass reduction	Coning and Quartering	20 kg (140 litres)	5 kg (35 litres)	35 mm	35mm	0.29	0.29	N/A	Manageable size increment sample for combining into a representative daily combined sample
Step 2	Combining increment samples to produce combined sample			5 kg (35 litres)	20 kg (140 litres)	35 mm	35 mm	0.29	0.29	Sample A 20 kg	Increment sample combining for internal and external testing
Step 3	Splitting the combined sample 'A' to produce <ul style="list-style-type: none"> a sample for external and internal testing a retained sample 	Mass reduction	Coning and Quartering	20 kg (140 litres)	5 kg (35 litres) (Part A) 5 kg (35 litres) (Part B)	35 mm	35mm	0.29	0.29	Sample B 4 kg Sample C 500 g	External testing for baseline testing requirements Internal testing for moisture

Appendix F – PROC 36 SRF Sampling Procedure – Routine Testing

STANDARD OPERATING PROCEDURE

SRF SAMPLING PROCEDURE – ROUTINE TESTING

Purpose

The purpose of this procedure is to describe the sampling process to be used to generate a representative sample of a defined quantity of Solid Recovered Fuel (SRF), for the purpose of routine testing.

Scope

This procedure is to be used for the sampling of Solid Recovered Fuel (SRF) at ResourceCo's Wetherill Park Resource Recovery Facility. The samples are for routine testing of the SRF.

References

I.S. EN 15357:2011	Solid Recovered Fuels – Terminology, Definitions and Descriptions
I.S. EN 15442:2011	Solid Recovered Fuels - Methods for Sampling
I.S. EN 15443:2011	Solid Recovered Fuels - Methods for the Preparation of the Laboratory Sample

Definitions

Increment Sample	Means the portion of SRF extracted in a single operation of the sampling device
Lot	Means a discrete or defined quantity of SRF for which the quality is to be determined

Introduction

The principle for sampling under I.S. EN 15442:2011 is that sampling shall be conducted by a means where every particle in the lot of SRF to be represented by the sample should have an equal probability of being included in the sample.

The main principle for sample preparation under I.S. EN 15443:2011 is that the composition of the sample as taken shall not be changed during each step of the sample preparation. Each sub-sample shall be representative of the original sample. To reach this goal every particle in the sample before sample preparation shall have an equal probability of being included in the sub-sample retained after sample preparation.

STANDARD OPERATING PROCEDURE

Routine Testing Requirements

It is a contractual obligation that every month a composite sample of SRF must be taken for determining compliance with the customer's specification by an external laboratory.

I.S. EN 15442 requires that the composite monthly sample is made up of at least 24 increment samples, of approximately equal size.

To ensure that a minimum of 24 increment samples are taken each month, two increments shall be taken on each day of plant operation, one in the morning and one in the afternoon.

Tools and Equipment

- 150 litre Heavy Duty storage container with lid
- Coning aluminum strip – 2m x 250mm x 6mm
- Plastic sheeting
- Shovel
- Scales
- Cement Mixer
- Laboratory Dispensing Scoop – 450ml
- Sample bag (2 off)
- Permanent Marker

Safety

PPE – as per site requirements, gloves

- Notify all personnel of your presence in the area

Sampling

Two increment samples shall be taken at random times across each day of plant operation, one in the morning and one in the afternoon. Samples should not be taken less than 1 hour apart.

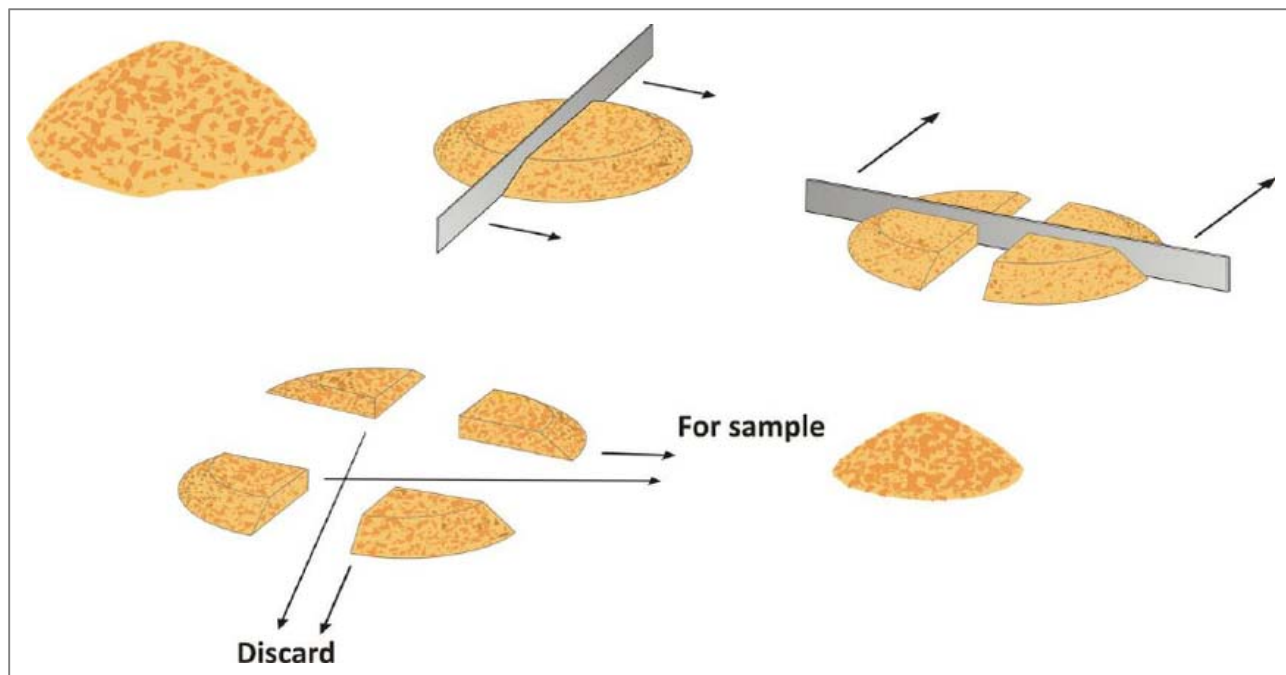
1. Before taking an increment sample, the process must have been in consistent operation for a minimum of 30 minutes.
2. The increment sample is to be taken from the entire flow of the SRF finished product conveyor.
3. A 20kg (approximately 140 litres) increment sample is to be taken and stored in a 150 litre plastic storage container. The lid is to be placed on the storage container.
4. The increment sample is to be reduced to a 1kg sample using the Coning and Quartering Method. Refer below.

STANDARD OPERATING PROCEDURE

Coning and Quartering Method

1. Place the sample on a clean, hard plastic sheeting.
2. Shovel the sample into a conical pile, placing each shovelful on top of the preceding one in such a way that the solid recovered fuel runs down all sides of the cone and is evenly distributed and different particle sizes become well mixed.
3. Repeat this process three times, forming a new conical pile each time.
4. Flatten the third cone by inserting the shovel repeatedly and vertically into the peak of the cone to form a flat heap that has a uniform thickness and diameter. The flat heap should be no more than 200mm high.
5. Quarter the flat heap along two diagonals at right angles by inserting the aluminum strip vertically into the heap. See Figure 1
6. Discard one pair of opposite quarters.
7. Repeat the coning and quartering process until a sub-sample of 1kg is obtained.

Figure 1 Coning and Quartering Method



Sub-Sample Reduction

The 1kg sub-sample is to be reduced to two 500g laboratory samples using the Coning and Quartering Method.

The two retained parts are laboratory sample Part A and Part B, of 500g each.

STANDARD OPERATING PROCEDURE

Laboratory Sample

The 500g laboratory samples (Part A and Part B) shall be placed into separate sample bags and sealed, with the following identification on each sample bag:

- Date of sampling
- Sample (Solid Recovered Fuel)
- Sample weight (500g)
- Sample Identification, including sample part (Part A or Part B)
- Source of Supply
- Name of person performing sampling
- Sampling performed in accordance with I.S. EN 15442, I.S. EN 15443

One part of the laboratory sample is to be used for daily internal testing, the other part is to be retained.

Laboratory Sample Combining

The morning 500g laboratory sample retained part, and the afternoon 500g laboratory sample retained part are to be combined each day. The samples must be thoroughly combined and mixed to form a homogeneous daily retained sample. This is achieved by:

1. Place the two daily laboratory samples separately on a clean, hard plastic sheeting.
2. Take one scoop from the first sample and form a conical pile.
3. Take one scoop from the second sample, placing the scoopful on top of the preceding one in such a way that the solid recovered fuel runs down all sides of the cone and is evenly distributed and different particle sizes become well mixed.
4. Repeat step 3 for both samples in the same order, until all the material has been combined.
5. Scoop the combined sample into a new conical pile, placing each scoopful on top of the preceding one in such a way that the solid recovered fuel runs down all sides of the cone and is evenly distributed and different particle sizes become well mixed.
6. Repeat this process three times, forming a new conical pile each time.

This sample should be 1kg.

The 1kg daily samples shall be placed into a sample bag and sealed, with the following identification on each sample bag:

- Date of sampling
- Sample (Solid Recovered Fuel)
- Sample weight (1kg)
- Sample Identification
- Source of Supply
- Name of person performing sampling
- Sampling performed in accordance with I.S. EN 15442, I.S. EN 15443

STANDARD OPERATING PROCEDURE

Daily Sample Combining

Each week, the 1kg daily samples are to be combined to form a weekly combined sample. The samples must be thoroughly combined and mixed to form a homogeneous weekly sample. This is achieved by:

1. Emptying all 1kg daily samples into the cement mixer
2. Mixing the samples in the cement mixer for a minimum of 5 minutes.

Note: It is important that the full contents of the cement mixer are discharged, including any residual fines.

The minimum mass of the combined sample should be 5kg.

The 5kg weekly sample is to be reduced to two 2.5kg samples using the Coning and Quartering Method. The two retained parts are weekly sample Part A and Part B, of 2.5kg each.

One part of the weekly sample is to be used for particle size distribution testing, the other part is to be retained.

The 2.5kg weekly samples (Part A and Part B) shall be placed into separate sample bags and sealed, with the following identification on each sample bag:

- Date of sampling
- Sample (Solid Recovered Fuel)
- Sample weight (2.5kg)
- Sample Identification
- Source of Supply
- Name of person performing sampling
- Sampling performed in accordance with I.S. EN 15442, I.S. EN 15443

Weekly Sample Combining

Each month, the 2.5kg weekly samples are to be combined to form a monthly combined sample. The samples must be thoroughly combined and mixed to form a homogeneous monthly sample.

This is achieved by:

1. Emptying all 2.5kg weekly samples into the cement mixer
2. Mixing the samples in the cement mixer for a minimum of 5 minutes.

The monthly combined sample is to be reduced to two 5kg samples using the Coning and Quartering Method.

The two retained parts are monthly composite sample Part A and Part B, of 5kg each.

The 5kg monthly composite samples (Part A and Part B) shall be placed into separate sample bags and sealed, with the following identification on each sample bag:

- Date of sampling
- Sample (Solid Recovered Fuel)
- Sample weight (2.5kg)
- Sample Identification
- Source of Supply

STANDARD OPERATING PROCEDURE

- Name of person performing sampling
- Sampling performed in accordance with I.S. EN 15442, I.S. EN 15443

One part of the monthly composite sample is to be used for external testing, the other part is to be retained for a minimum of three months.

Note:

Where the month starts in the middle of a week, the following applies:

- On the last day of the month, the daily combined samples are reduced into two equal parts, using the Coning and Quartering method.
- One part of the daily combined sample is added to the retained weekly samples to complete the monthly combined sample for the entire calendar month.
- The other part of the daily combined sample is retained, and added to the reduced weekly combined sample part that is used for particle size testing, to complete the entire week for particle size testing.
- The same process applies for the beginning of the month.

Therefore, the combined monthly sample will consist of representative samples for the entire calendar month, and the combined weekly sample will consist of representative samples for the entire working week.

STANDARD OPERATING PROCEDURE

Sampling Plan

I.S. EN 15442:2011 requires a sampling plan be developed upon the basis of the objective for the sampling process.

General information

Product name	Solid Recovered Fuel (SRF)
Description of material for sampling	Solid Recovered Fuel, composed of plastics, textiles, paper, cardboard and wood products, with >95% of the material less than 35mm in size.
Sampling objective	The objective of this sampling plan is to produce a sample representative of one month of production of SRF for testing by an external laboratory to demonstrate compliance with the customer's supply agreement

Definition of lot and lot size

Material flow	Approximately 20 tonnes/hr
Sampling period	1 calendar month
Lot size	3,000 tonnes

Sampling location and sampling procedure

Sampling method	Manual sampling from a falling stream
Sampling location	Discharge point of the product conveyor
Sampling equipment	<ul style="list-style-type: none">• 150 litre Heavy Duty storage container with lid• Coning and quartering aluminum strip – 2m x 250mm x 6mm• Plastic sheeting• Shovel• Cement mixer• Scales• Laboratory dispensing scoop – 450ml• Sample bag (2 off)• Permanent Marker
Dimensions of the sampling device	N/A

STANDARD OPERATING PROCEDURE

Information on solid recovered fuel

Nominal top size d_{95}	35mm
Dominant shape of particles	Elongated/needle shaped
Bulk density	150 kg/m ³
Particle density	0.001g/mm ³

Information on increment and sample sizes

Minimum number of increments	24
Minimum increment size	20 kg (140 litres)
Effective increment size	20 kg (140 litres)
Minimum sample size	1.8 kg (12 litres)
Actual daily sample size for analysis	500 g (3.5 litres)
Actual weekly sample size for analysis	2.5 kg (17.5 litres) for sizing analysis
Actual monthly sample size for analysis	1.8 kg (12 litres)

STANDARD OPERATING PROCEDURE

Mass and size reduction plan for Routine Testing

	Description	Method of reduction	Technique and equipment	Mass before reduction	Mass after reduction	Nominal top size before reduction	Nominal top size after reduction	Shape factor before reduction	Shape factor after reduction	Mass to be withheld for analysis	Purpose of product of this reduction step
Step 1	Splitting each increment to produce a sub-sample for testing	Mass reduction	Coning and Quartering	20 kg (140 litres)	1 kg (7 litres)	35 mm	35mm	0.29	0.29	N/A	Manageable size increment sample for combining into a representative daily combined sample
Step 2	Splitting sub-sample to produce laboratory samples	Mass reduction	Coning and Quartering	1 kg (7 litres)	500 g (3.5 litres) (Part A) 500 g (3.5 litres) (Part B)	35 mm	35 mm	0.29	0.29	Sample A 500 g Sample B 500g	Internal testing for determination of moisture, CV, CI Retained for production of daily combined sample
Step 3	Combining laboratory samples to produce daily combined samples			500 g (3.5 litres)	1 kg (7 litres)	35mm	35mm	0.29	0.29	Sample C 1kg	Retained for production of weekly combined sample
Step 4	Combining and splitting daily samples 'C' produce weekly samples	Mass reduction	Coning and Quartering	5 kg (35 litres)	2.5 kg (17.5 litres) (Part A) 2.5 kg (17.5 litres) (Part B)	35 mm	35 mm	0.29	0.29	Sample D 2.5 kg Sample E 2.5kg	Internal testing for determination of particle size Retained for production of monthly composite sample

STANDARD OPERATING PROCEDURE

	Description	Method of reduction	Technique and equipment	Mass before reduction	Mass after reduction	Nominal top size before reduction	Nominal top size after reduction	Shape factor before reduction	Shape factor after reduction	Mass to be withheld for analysis	Purpose of product of this reduction step
Step 5	Combining and splitting weekly samples 'E' produce monthly composite samples	Mass reduction	Coning and Quartering	10 kg (70litres)	5 kg (35 litres) (Part A) 5 kg (35 litres) (Part B)	35 mm	35 mm	0.29	0.29	Sample F 2.5 kg Sample G 2.5kg	External testing for determination of all parameters to demonstrate compliance with customer specification. Retained for minimum 3 months as per customer supply agreement

Appendix G – PROC 41 SRF Sampling Procedure – Stockpile Testing

STANDARD OPERATING PROCEDURE

SRF SAMPLING PROCEDURE – STOCKPILE TESTING

Purpose

The purpose of this procedure is to describe the sampling process to be used to generate a representative sample from a static stockpile of Solid Recovered Fuel (SRF), for the purpose of in-house quality testing.

Scope

This procedure is to be used for the sampling of Solid Recovered Fuel (SRF) from static a stockpile at ResourceCo's Wetherill Park Resource Recovery Facility.

References

I.S. EN 15357:2011	Solid Recovered Fuels – Terminology, Definitions and Descriptions
I.S. EN 15442:2011	Solid Recovered Fuels - Methods for Sampling
I.S. EN 15443:2011	Solid Recovered Fuels - Methods for the Preparation of the Laboratory Sample

Definitions

Increment Sample	Means the portion of SRF extracted in a single operation of the sampling device
Lot	Means a discrete or defined quantity of SRF for which the quality is to be determined

Introduction

The principle for sampling under I.S. EN 15442:2011 is that sampling shall be conducted by a means where every particle in the lot of SRF to be represented by the sample should have an equal probability of being included in the sample.

The main principle for sample preparation under I.S. EN 15443:2011 is that the composition of the sample as taken shall not be changed during each step of the sample preparation. Each sub-sample shall be representative of the original sample. To reach this goal every particle in the sample before sample preparation shall have an equal probability of being included in the sub-sample retained after sample preparation.

STANDARD OPERATING PROCEDURE

Tools and Equipment

- Wheel Loader
- 150 litre Heavy Duty storage container with lid
- Coning aluminum strip – 2m x 250mm x 6mm
- Plastic sheeting
- Scales
- Cement Mixer
- Laboratory Dispensing Scoop – 450ml
- Laboratory Dispensing Scoop – 1500ml
- Sample bag (2 off)
- Permanent Marker

Safety

PPE – as per site requirements, gloves

- Notify all personnel of your presence in the area

Stockpile Preparation

I.S. EN 15442 requires that the sample is made up of at least 24 increment samples, of approximately equal size.

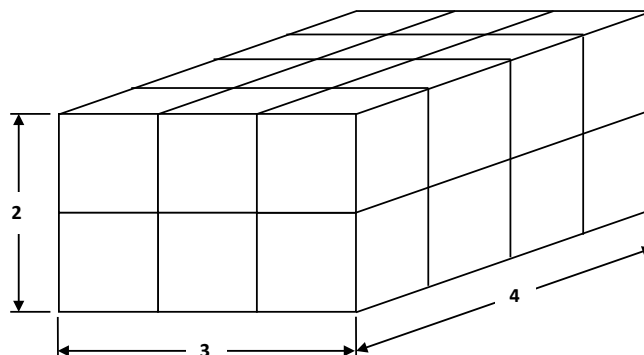
Using the wheel loader, flatten out the stockpile to produce a rectangular shape stockpile of approximate dimensions as shown in Figure 1.

Determine and record the mass of the stockpile by:

- Measuring the approximate length, width and height of the stockpile
- Calculate the volume
- Calculate the mass by $\text{Mass} = \text{Volume} \times \text{Density} (150\text{kg/m}^3)$

By eye or approximation, divide the stockpile into equal area's as shown in Figure 1, to give 24 sampling locations.

Figure 1 **Stratified Sampling Increments**



STANDARD OPERATING PROCEDURE

Sampling

One increment sample shall be taken from each of the 24 stockpile increments.

1. The increment sample is to be taken at random positions within each stockpile increment, but varying between the top, middle and bottom of the stockpile increment with each successive sample.
2. Using the 1500ml Laboratory Dispensing Scoop an increment sample is to be taken and stored in a 150 litre plastic storage container. The scoop is to be driven into the stockpile increment, randomly varying between front, middle and back of the stockpile increment with each successive sample. When the scoop is at the required depth the increment sample is extracted from the stockpile.
3. Each successive increment sample can be placed in the same 150 litre plastic storage container, as the increments samples will be combined to form a combined representative sample. The lid is to be placed on the storage container.

Note: A small gap may be created in the stockpile to allow access to the internal stockpile increments for sampling.

Increment Sample Combining

The 24 increment samples are to be combined and thoroughly mixed to form a homogeneous sample.

This is achieved by:

1. Emptying all increment samples into the cement mixer
2. Mixing the samples in the cement mixer for a minimum of 5 minutes.

Note: It is important that the full contents of the cement mixer are discharged, including any residual fines.

The minimum mass of the combined sample should be 5.4 kg.

The 5.4 kg combined sample is to be reduced to one 600g sample using the Coning and Quartering Method. The sample is to be used for in-house quality testing.

The 600g sample shall be placed into a sample bag and sealed, with the following identification on the sample bag:

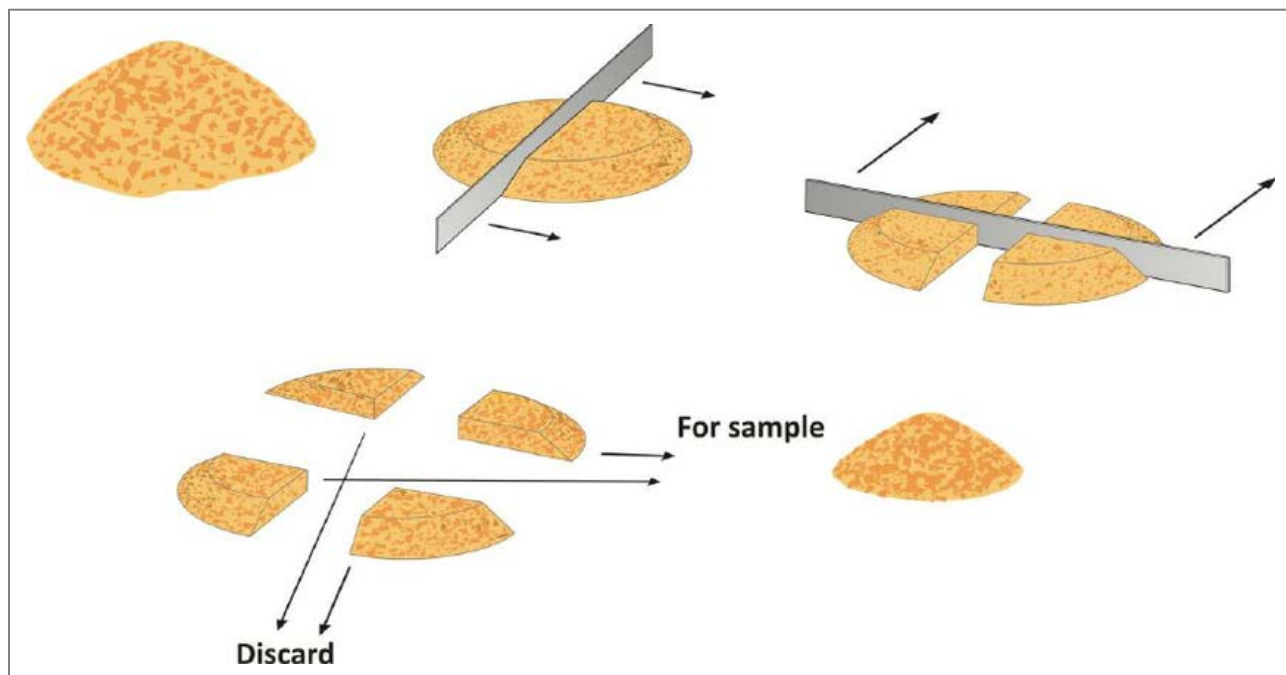
- Date of sampling
- Sample (Solid Recovered Fuel)
- Sample weight (600 g)
- Sample Identification
- Source of Supply
- Name of person performing sampling
- Sampling performed in accordance with I.S. EN 15442, I.S. EN 15443

STANDARD OPERATING PROCEDURE

Coning and Quartering Method

1. Place the sample on a clean, hard plastic sheeting.
2. Shovel or scoop the sample into a conical pile, placing each shovelful on top of the preceding one in such a way that the solid recovered fuel runs down all sides of the cone and is evenly distributed and different particle sizes become well mixed.
3. Repeat this process three times, forming a new conical pile each time.
4. Flatten the third cone by inserting the shovel or scoop repeatedly and vertically into the peak of the cone to form a flat heap that has a uniform thickness and diameter. The flat heap should be no more than 200mm high.
5. Quarter the flat heap along two diagonals at right angles by inserting the aluminum strip vertically into the heap. See Figure 1
6. Discard one pair of opposite quarters.
7. Repeat the coning and quartering process until a sub-sample of 600g is obtained.

Figure 1 **Coning and Quartering Method**



STANDARD OPERATING PROCEDURE

Sampling Plan

I.S. EN 15442:2011 requires a sampling plan be developed upon the basis of the objective for the sampling process.

General information

Product name	Solid Recovered Fuel (SRF)
Description of material for sampling	Solid Recovered Fuel, composed of plastics, textiles, paper, cardboard and wood products, with >95% of the material less than 35mm in size.
Sampling objective	The objective of this sampling plan is to produce a sample representative of the entire static stockpile of SRF for in-house quality testing.

Definition of lot and lot size

Dimensions of static lot: <ul style="list-style-type: none">• Height• Depth• Length	<ul style="list-style-type: none">• metres• metres• metres
Volume of static lot	<ul style="list-style-type: none">• m³
Bulk Density	150 kg/m ³
Lot size	<ul style="list-style-type: none">• tonnes

Sampling location and sampling procedure

Sampling method	Stratified random sampling
Sampling equipment	<ul style="list-style-type: none">• 150 litre Heavy Duty storage container with lid• Cement mixer• Scales• Laboratory dispensing scoop – 1500ml• Sample bag (2 off)

STANDARD OPERATING PROCEDURE

	<ul style="list-style-type: none">• Permanent Marker
Dimensions of the sampling device	120mm diameter x 240mm long

Information on solid recovered fuel

Nominal top size d_{95}	35mm
Dominant shape of particles	Elongated/needle shaped
Bulk density	150 kg/m ³
Particle density	0.001g/mm ³

Information on increment and sample sizes

Minimum number of increments	24
Minimum increment size	225 g (1.5 litres)
Effective increment size	225 g (1.5 litres)
Minimum sample size	175 g (1.2 litres)
Actual sample size for analysis	600 g (4 litres)

STANDARD OPERATING PROCEDURE

Mass and size reduction plan for Stockpile Testing

	Description	Method of reduction	Technique and equipment	Mass before reduction	Mass after reduction	Nominal top size before reduction	Nominal top size after reduction	Shape factor before reduction	Shape factor after reduction	Mass to be withheld for analysis	Purpose of product of this reduction step
Step 1	Combining increment samples to produce a combined sample			225 g (1.5 litres)	5.4 kg (36 litres)	35mm	35mm	0.29	0.29	Sample A 5.4 kg	Retained for production of laboratory sample
Step 2	Splitting the combined Sample A to produce a sample for internal testing	Mass Reduction	Coning and Quartering	5.4 kg (36 litres)	600 g (4 litres)	35mm	35mm	0.29	0.29	Sample B 600 g	Internal testing for Chlorine (Cl), Calorific Value (CV) and Moisture (H ₂ O)

Appendix H – Test Methods

Test Methods

Parameter	Reporting unit	Test Method
Gross Calorific value	MJ/kg	I.S. EN 15400:2011
Ash	%	I.S. EN 15403:2011
Moisture	% H ₂ O	I.S. EN 15414:2011
Chlorine	% Cl	I.S. EN 15408:2011
Fluorine	% F	I.S. EN 15408:2011
Bromine	% Br	I.S. EN 15408:2011
Iodine	% I	I.S. EN 15408:2011
Sulphur	% S	I.S. EN 15408:2011
Potassium	% K ₂ O	I.S. EN 15410:2011
Sodium	% Na ₂ O	I.S. EN 15410:2011
Mercury	mg/kg Hg	I.S. EN 15411:2011
Cadmium	mg/kg Cd	I.S. EN 15411:2011
Thallium	mg/kg Tl	I.S. EN 15411:2011
Copper	mg/kg Cu	I.S. EN 15411:2011
Lead	mg/kg Pb	I.S. EN 15411:2011
Antimony	mg/kg Sb	I.S. EN 15411:2011
Arsenic	mg/kg As	I.S. EN 15411:2011
Cobalt	mg/kg Co	I.S. EN 15411:2011
Chromium	mg/kg Cr	I.S. EN 15411:2011
Manganese	mg/kg Mn	I.S. EN 15411:2011
Nickel	mg/kg Ni	I.S. EN 15411:2011
Vanadium	mg/kg V	I.S. EN 15411:2011
Polychlorinated biphenyls	mg/kg PCB	SW846 USEAP
Phencyclidines	mg/kg PCP	SW846 USEPA
Particle Size 50 mm, 35 mm	% passing 50 mm % passing 35 mm	I.S. EN 15415-1:2011

Appendix I – Layers of Control

Boral

The Environmental Assessment entitled '*Use of Waste Derived Fuels Kiln 6, Berrima Cement Works DA 401-11-2002 – Modification 9*' dated July 2015, which forms part of Boral's Development Consent (DA 401-11-2002-i), as approved by the EPA, details the following risk based approach adopted by Boral to minimise any potential environmental impact of using SWDF. Boral's approach involves four levels of risk protection as follows:

Detailed fuel specifications:

European Union countries have been using waste derived fuels extensively in cement manufacture for around 50 years now. Boral has developed detailed fuel specifications for the proposed SWDF based on established European and USA standards. The levels of contaminants, such as heavy metals, in these standards are low enough to ensure that when used as a fuel in the cement kiln, emissions are unlikely to exceed the limits defined in the Energy from Waste Policy and the site's EPL. The fuel specifications would be the basis of acceptance of deliveries of fuels from suppliers.

Supplier control systems:

Suppliers of SWDF to Berrima would be required to establish rigorous Quality Assurance / Quality Control procedures to ensure the SWDF products produced from their operations meet Boral's specifications. The QA/QC of suppliers would be subject to regular audit by Boral or external parties.

Check sampling and testing of waste fuels supplied:

Regular statistical check sampling and testing of dispatched waste fuel products would be established based on the European standards. Using this methodology, samples of fuel would be taken at either the supplier's site or at the Cement Works on a regular basis and analysed to determine compliance with the fuel specification. This will provide a regular check of the effectiveness of the supplier's quality assurance processes. Analysis of test results would be undertaken by suitably accredited laboratories using standard test methods.

Inherent capture efficiency of the cement kiln process:

Boral and industry data demonstrates that cement kilns have inherently high capture efficiency for contaminants, such as heavy metals, which are captured as a stable component of the kilns clinker product.¹ High temperatures maintained in the clinker kiln and the kiln's highly alkaline environment cause most of the metals to precipitate becoming irreversibly bound into the newly formed clinker. Therefore, in the unlikely event that the preceding three stages fail to prevent out of specification fuels being fed into the kiln, the risk of a significant environmental impact resulting from such an event is low.

In addition to the above risk based approach adopted by Boral to minimise any potential environmental impact of using SWDF, in 2004 Boral upgraded Kiln 6 and installed additional equipment specifically suited to the burning of SWDF, which included the installation of continuous monitoring equipment for key gaseous pollutants, which allows prompt response to any adverse trends in stack emissions.

ResourceCo

ResourceCo has a long history of the manufacture of PEF for use as alternative fuel in cement kilns.

Adelaide:

Working closely with Adelaide Brighton Cement Limited, ResourceCo developed Processed Engineered Fuel (PEF) as a partial replacement for fossil fuels in the Adelaide Brighton cement kiln. The process harnessed the energy contained in combustible material that would have traditionally gone to landfill and resulted in the commissioning of Australia's first PEF manufacturing plant in South Australia in 2007.

Malaysia:

ResourceCo is an industry leader in waste recycling and waste management in Malaysia and Asia. It is a pioneer in the region for converting commercial and industrial waste into alternative energy; specifically, alternative fuels for the cement industry.

ResourceCo own the region's first waste to energy processing plant in Ipoh Malaysia, designed for the production of Processed Engineered Fuel (PEF). ResourceCo is in a long-term partnership to supply Lafarge Malaysia - a leading global cement manufacturer with approximately 70,000 tonnes per annum of alternative fuels for its cement kilns.

ResourceCo's approach to minimise any potential environmental impact or harm to human health by Boral using PEF in their cement kiln involves six levels of risk protection as follows:

Customer Pre-Qualification

All potential waste customers will be required to be pre-qualified before being allowed to bring waste to the facility. This pre-qualification process will determine if the potential customers' waste meets the approved acceptance criteria for the site, whether it will enable high quality PEF products to be produced, and which category it meets for the PEF processing criteria.

Refer to attached document:

PROC 28 – *Incoming Waste Customer Pre-Qualification Procedure*

Waste Screening and Acceptance

1. Screening

A comprehensive waste screening process is undertaken prior to receipt of all incoming waste.

As outlined in Section 3 of the EfWMP, when a vehicle enters the weighbridge, the Customer Service and Weighbridge Operator will check with the driver if the waste meets the acceptance criteria, and will visually inspect the load for waste types not accepted or to be excluded from the production process. If part or all of the load is identified as not be approved for tipping in the facility the truck will not be unloaded and will be directed to leave the site immediately. The Customer Service and Weighbridge Operator will also ensure that all waste that is controlled under a tracking system has the appropriate documentation prior to acceptance at the site.

If the waste meets the acceptance criteria then the waste delivery truck will be directed to the waste tipping area inside the manufacturing building. Once the load is tipped the Waste Receival Inspection Officer will inspect the load for waste types not accepted or to be excluded from the production process, and to ensure that all waste that is controlled under a tracking system has the appropriate documentation prior to acceptance at the site.

Wastes that are not able to be accepted will either be sent back out of the site on the same waste delivery truck (if it is able to be) or removed from site as soon as possible by a licenced collector at the customers expense (if the incoming waste truck has left the site or if it is not able to be reloaded). Item 3 below outlines the approach to handling and disposal of hazardous materials such as asbestos, sharps and chemical/biological materials that, despite the waste acceptance procedures, have been delivered to site.

2. Monitoring

As outlined in Section 3 of the EfWMP, the following details will be recorded and kept on file for all incoming waste received on the site:

- Quantity, type and source of waste
- Date and time of receipt
- PEF processing criteria category
- Copies of all documentation relating to tracking for controlled waste brought to the site
- Details of any hazardous or other prohibited materials (including asbestos) brought to the site, along with handling and disposal activities undertaken and a record of any related documentation

As per the requirements of the supply agreement between Boral and ResourceCo, ResourceCo must maintain an auditable chain of custody for the PEF from ResourceCo's facility to the Boral Premises. Each vehicle load of PEF dispatched from ResourceCo's facility shall be assigned a transport certificate detailing the following;

- Delivery date;
- Time of departure;
- Description of the Goods (eg Solid Recovered Fuel);
- Gross/tare weights of the delivering/exporting vehicle;
- Vehicle registration number; and
- Unique reference number assigned to the load.

3. Hazardous Materials

As outlined in Section 3 of the EfWMP, any specific waste types not permitted to be accepted into the facility will be immediately rejected from the site where safe to do so and staff will be trained to ensure that these materials are first quickly identified and secondly safely removed from the waste stream.

Specific management techniques for key hazardous waste types are provided below.

Asbestos

The following will be implemented to manage the potential for asbestos in the waste stream:

- Direct education with the customer base to ensure that only materials that are asbestos free will be accepted at the site. This is particularly focussed upon in the pre-qualification process with a potential new customer.
- Well positioned, appropriate signage at the entrance, weighbridge on weight dockets and at the drop off point
- Asbestos identification training for all relevant staff on site.
- Safe asbestos management and removal training for all relevant staff on site.

- Safe asbestos management and removal procedures are outlined in the Asbestos Management Plan (PROC 29).

Sharps and medical waste

Sharps and medical waste identification training for all relevant staff on site. Refer to SOP 72 *Hazardous Chemicals – including Dangerous Goods and Sharps Procedure*.

Chemicals and oils

Hazardous Chemicals identification training for all relevant staff on site. Refer to SOP 72 *Hazardous Chemicals – including Dangerous Goods and Sharps Procedure*.

Oil spill kits will be kept on site at all times and staff will be trained in its appropriate use.

Chemicals will be managed on an as needs basis with supervisors with dangerous goods training quickly assessing if the spill can be safely managed internally or if external assistance is required i.e. NSW Fire and Rescue.

Characterization / baseline testing

Characterization or baseline testing is used to identify and quantify chemicals or other attributes, and to determine the physical properties of a material, to provide scientific understanding of the said engineered material. A characterization study is designed to determine how a process performs under actual operating conditions, to capture the variations in materials and operations, and to understand process capability. Knowing process capability allows one to predict, quantitatively, how well a process will meet specifications.

The comprehensive initial (baseline) sampling and testing of the PEF will enable the characterization of the PEF in terms of its typical composition and variability. This will allow for a quantitative assessment of the PEF and knowing its ability to meet specification, and how well the PEF will meet specification, prior to its use by Boral. Based on ResourceCo's experience and history of PEF manufacture, the characterization study will demonstrate that the PEF will be well within specification, and the process is very capable of manufacturing PEF to the specification, providing reassurance that the risk of producing out of specification PEF is low.

Routine testing

Routine testing of the PEF is undertaken to demonstrate ongoing compliance with the specification, and confirms the product's ability to meet specification, and how well it meets specification, on an ongoing or regular basis.

Monitoring

The monitoring of the on-line analyser, and analysis of the on-site laboratory results will allow changes to be implemented both short term and long term to prevent PEF from going out of specification. As detailed in Section 8.1 of the EfWMP, real time feedback from the on-line analyser will enable continual refinement of the process to ensure that the key parameters remain within specification.

If monitoring of the on-line analyser and analysis of on-site laboratory results demonstrate abnormalities in the PEF, then a one-off sample may be sent to an independent NATA accredited laboratory for testing of all the parameters specified in the specification, to demonstrate compliance with the specification.

Trend Analysis

Trends in the composition of the PEF material will be monitored through:

- On-line analyser

- Laboratory Information Management System.

Analysis of data, particularly for the LIMS, will:

- Capture the variations in the PEF, and to understand process capability.
- Capture changing trends in the composition of PEF over time

This analysis will enable continual refinement of the process to ensure that all parameters remain within specification.

Appendix J – EPA Correspondence



DOC17/384733

ResourceCo RRF Pty Ltd
Corner Hines and Wingfield Roads
Wingfield SA 5013

EMAIL

Attention: Bill Hudson

EPA response to your Energy from Waste Management Plan

ResourceCo RRF Pty Ltd hold environment protection licence 20937 (**the Licence**) for scheduled development works at 35-37 Frank Street, Wetherill Park NSW 2164 (**the Premises**).

The EPA understands that condition B8 of Development Consent SSD7256 requires you to prepare an Energy from Waste Management Plan in consultation with the EPA. The EPA has reviewed your draft Energy from Waste Management Plan submitted on 7 July 2017 (EfWMP). The EPA requires you to address the following matters.

Out of specification PEF – online analyser

Out of specification needs to be defined

The EfWMP needs to identify the thresholds which the online analyser will be testing for. The threshold at which PEF is determined to be out of specification and is required to be sent to quarantine must be documented.

This operating threshold should match the current PEF specification. If it does not, justification of the difference in thresholds must be provided.

Out of specification PEF cannot be reprocessed without further testing

Section 8.2 of the EfWMP states “*The principle way of dealing with out of specification PEF will be to immediately transport the material back to the infeed waste pile for reprocessing through the plant*”. This is indirect contradiction to the paragraph below which states “*Out of specification PEF materials would not be reprocessed until further analysis demonstrates that it meets the relevant criteria.*”

In addition, both the EPA’s general terms of approval and condition B8(b)(v) of Development Consent SSD7256 require that out of specification PEF not be reprocessed until further analysis demonstrates that it meets criteria.

The EPA does not support returning of the out of specification PEF to the infeed stockpile for re-processing, if the cause of the issue is unknown. Out of specification PEF must be kept in quarantine until the results of laboratory testing have been received. Only material that meets the specification may be returned to the infeed stockpile for reprocessing. PEF that is confirmed to be out of specification by laboratory testing must be removed from the Premises and transported to a place that can lawfully receive that waste type.

Out of specification PEF – laboratory sampling

Sampling and testing is required before dispatch

The EPA expects that sampling is undertaken and results returned before the PEF is supplied to a consumer. It is likely, that the receiving facility will not lawfully be able to receive out of specification material. By dispatching material prior to validation by confirmation of test results, you are at risk of breaching section 143 of the *Protection of the Environment Operations Act 1997*, being the transport of waste to a place that cannot lawfully be used as a waste facility for that waste.

The proposed sampling regime involves monthly testing of composite samples. We understand that at maximum capacity, the facility will be processing 12,500t per month. The EfWMP states that “*The PEF storage location is able to store approximately 1,800 tonnes. 10% of the PEF storage location capacity to be designated quarantine area for out of specification PEF diversion temporary storage.*” This storage location will be insufficient to store PEF until monthly test results have been returned.

Validation of PEF material prior to dispatch must be addressed in the EfWMP. You may address this through an alternative sampling regime or alternative storage arrangements.

You must have a procedure in place to manage out of specification PEF

There is no procedure included for PEF that is laboratory tested and does not meet the agreed specification requirements. You must document the course of action that will be taken if laboratory results indicate that PEF is out of specification.

We note that if the proposed sampling regime is adopted, that may require the disposal to landfill of 12,500t of material if a monthly test returns an out of specification result. This will be a significant cost to ResourceCo RRF Pty Ltd.

Sampling and testing requirements

Sampling Frequency

The EPA considers it best practice to undertake a higher-frequency sampling regime to characterise the PEF material during commissioning. This characterisation would:

- assess variability in the material;
- assess ability to conform to the specification;
- validate the process as achieving the desired outcomes; and
- inform any modifications to the process that would be needed during the initial setup.

A procedure to characterise the PEF must be included in the EfWMP.

Sampling and Testing Procedures

Appendix 1 - Physical Sampling Procedure states that one 3L sample will be taken from every 70t of PEF material despatched. At full capacity, the facility will be processing 12,500t per month. This equates to approximately 180 samples per month. The procedure also states that a single sample composited from a maximum of 180 samples would be tested. This would result in one composite sample volume of 540L (180 x 3L). In such a large volume, capturing any contamination in subsamples would be difficult. This sampling procedure may be considered inappropriate as the PEF material is likely to be heterogenous.

The sampling procedure is not clear and must be described in detail and preferably as a stepwise process. The collection of discrete or composite samples must be clarified.

PEF Specifications

Justification and rationale should be provided for the parameters, associated limits and standards provided in the table entitled *PEF Specification (current PEF customers)* in Appendix 1 including:

- How was this specification derived?
- Why was it considered appropriate to group certain analytes (such as Group 2 and 3 metals)?
- Why were volatile organic parameters not included in the analytical suite?

- Why are PCPs and PCBs included in the testing regime? Further discussion should be provided on the rationale behind the thresholds of PCBs (10 mg/kg) and PCPs (100 mg/kg). Why are these a concern for the PEF material?

Consideration should be given to the source and composition of the PEF material, and potential constituents of concern. An insufficient level of detail about the input materials was provided to allow an assessment of the suitability of this specification.

Test methods

The EPA requests clarification of the test methods for the parameters listed in the table entitled *PEF Specification (current PEF customers)*.

Monitoring trends

The EfWMP must detail how you will monitor and respond to changing trends in the composition of the PEF material over time. For example, identifying upward trends will allow changes to be implemented (if required) to prevent material going out of specification.

Communication of results

The EfWMP must outline how ResourceCo RRF Pty Ltd will continuously communicate changes in the composition of the input waste and the PEF material, test results or non-conformances with suppliers or customers.

Meeting the Requirements of the EPA's *NSW Energy from Waste Policy Statement*

Processing construction demolition waste to meet energy from waste targets

Section 4 of the EfWMP states that you intend to receive raw mixed construction demolition waste. You must provide additional detail on how this waste stream will meet the 25% resource recovery criteria in Table 1 of the EPA's *NSW Energy from Waste Policy Statement (the Policy)*, i.e. what recovery will occur on the Premises.

Removal of hazardous wastes

The Policy requires that waste streams proposed for energy recovery do not contain any hazardous wastes. Section 8 of the EfWMP refers to quality control including removal of hazardous waste. However the only hazardous waste documented for removal is PVC. The EfWMP must list all potential hazardous wastes which may enter the facility and procedures for identifying and removing such waste from the waste stream.

You must also document any procedures required of 'pre-qualified suppliers' to remove hazardous wastes.

No Limit C&I Category

You are proposing to receive "No limit mixed C&I" at the Premises. You do not yet have any approval for waste sources supplying this type of waste. The EfWMP must include a requirement that the "No limit mixed C&I" category cannot be used until you have approval from the EPA.

Customer declarations

Section 4 of the EfWMP refers to an "*EPA compliant declaration*" to be provided by suppliers of construction and demolition residual waste. Please note that the EPA will not approve or endorse declarations provided by suppliers.

Incidents

Section 7.2 of the EfWMP must include identification of non-compliances with the EPA's Energy from Waste Policy and the EfWMP.

Other matters

New construction and demolition waste minimum standards must be met

The EPA has proposed a series of changes for the NSW construction and demolition waste sector that will set minimum standards to ensure the safety of the community, the protection of the environment and the maximisation of resource recovery.

As a facility that will be licenced for resource recovery of building and demolition waste in NSW you will be required to meet those minimum standards. You will need to have documented procedures outlining how your receipt, inspection, sorting and processing processes meet the requirements of the minimum standards. Please refer to the EPA's website for more information

<http://www.epa.nsw.gov.au/wasteregulation/managing-construction-demolition-waste-minimum-standards.htm>.

Sampling of other waste streams

No sampling and testing procedures for the other waste streams such as timber, aggregates and fines have been included in the EfWMP.

These matters may be addressed in an operational environment management plan.

If you have any questions regarding this matter, please contact Melissa Ward on 9995 5747.

Yours sincerely



8 August 2017

CELESTE FORESTAL
Unit Head Waste Compliance
Environment Protection Authority

Contact officer: MELISSA WARD
(02) 9995 5747

18 September 2017

NSW Environmental Protection Authority
Waste and Resource Recovery Branch
P.O. Box A290
Sydney South
NSW 1232

Attention: Melissa Ward

e-mail

ResourceCo's response to NSW EPA's response (dated 8th August 2017) to ResourceCo's Energy from Waste Management Plan

Condition B8 of Development Consent SSD 7256 requires ResourceCo to prepare an Energy from Waste Management Plan (EfWMP) in consultation with the NSW EPA. ResourceCo submitted a draft EfWMP to the EPA on 7 July 2017, for review. The EPA raised a number of matters for ResourceCo to address in its response, dated 8 August 2017. ResourceCo has reviewed the matters raised by the EPA, and provides the following detailed responses to these matters.

NSW EPA Matter:

Out of specification needs to be defined

The EfWMP needs to identify the thresholds which the online analyser will be testing for. The threshold at which PEF is determined to be out of specification and is required to be sent to quarantine must be documented.

This operating threshold should match the current PEF specification. If it does not, justification of the difference in thresholds must be provided.

ResourceCo Response:

A paragraph has been inserted into Section 8.1 and Section 8.2 of the EfWMP defining:

- On-line analyser testing parameters – namely Calorific Value (CV), chlorine (Cl) and moisture (H₂O)
- Specification limits for each parameter.

The operating thresholds match the current PEF Specification A, as detailed in Appendix A of the EfWMP.

NSW EPA Matter:

Out of specification PEF cannot be reprocessed without further testing

Section 8.2 of the EfWMP states “*The principle way of dealing with out of specification PEF will be to immediately transport the material back to the infeed waste pile for reprocessing through the plant*”.

This is indirect contradiction to the paragraph below which states “*Out of specification PEF materials would not be reprocessed until further analysis demonstrates that it meets the relevant criteria.*”

In addition, both the EPA’s general terms of approval and condition B8(b)(v) of Development Consent SSD7256 require that out of specification PEF not be reprocessed until further analysis demonstrates that it meets criteria.

The EPA does not support returning of the out of specification PEF to the infeed stockpile for reprocessing, if the cause of the issue is unknown. Out of specification PEF must be kept in quarantine until the results of laboratory testing have been received. Only material that meets the specification may be returned to the infeed stockpile for reprocessing. PEF that is confirmed to be out of specification by laboratory testing must be removed from the Premises and transported to a place that can lawfully receive that waste type.

ResourceCo Response:

Section 8.2 of the EfWMP has been amended, and a written procedure has been developed for the management of out of specification PEF. The amendment and the procedure include the following:

- Define the parameters for determining whether the PEF is out of specification
- Prescribe sampling methods and further laboratory testing and analysis to determine a course of action for the out of specification PEF
- Does not involve returning the out of specification PEF to the infeed stockpile for reprocessing
- Disposal of confirmed out of specification PEF at an EPA approved facility

Refer to attached documents:

PROC 40 – *Managing out of Specification Solid Recovered Fuel*

PROC 41 – *SRF Sampling Procedure – Stockpile Testing*

NSW EPA Matter:

Sampling and testing is required before dispatch

The EPA expects that sampling is undertaken and results returned before the PEF is supplied to a consumer. It is likely, that the receiving facility will not lawfully be able to receive out of specification material. By dispatching material prior to validation by confirmation of test results, you are at risk of breaching section 143 of the *Protection of the Environment Operations Act 1997*, being the transport of waste to a place that cannot lawfully be used as a waste facility for that waste.

The proposed sampling regime involves monthly testing of composite samples. We understand that at maximum capacity, the facility will be processing 12,500t per month. The EfWMP states that “*The PEF storage location is able to store approximately 1,800 tonnes. 10% of the PEF storage location capacity to be designated quarantine area for out of specification PEF diversion temporary storage.*” This storage location will be insufficient to store PEF until monthly test results have been returned.

Validation of PEF material prior to dispatch must be addressed in the EfWMP. You may address this through an alternative sampling regime or alternative storage arrangements.

ResourceCo Response:

It is important to note that ResourceCo's sampling and testing protocols were determined by Boral's requirements, and Boral's requirements were agreed with the EPA as part of Boral's Development Consent. ResourceCo's EMP in its approved Development Consent mirrored Boral's requirements. Therefore, the sampling and testing protocols in ResourceCo's Development Consent reflect those agreed between Boral and the EPA. ResourceCo was specifically advised by Boral prior to the approval of the Development Consent that the EPA had agreed with Boral that testing prior to despatch was not required.

As the EPA has alluded to in its response, it is neither practical due to the timing and storage of quantities necessary to undertake this, or feasible due to the constraints that have been placed around our operations through the Development Consent i.e. ResourceCo is not permitted to store this volume of finished material on site.

ResourceCo was advised by Boral that Boral has undertaken significant and detailed investigations into the development of the product specification, characterization testing requirements and routine testing requirements, and that these were approved by the EPA. The characterization testing and routine testing proposed in ResourceCo's EfWMP meets Boral's requirements and were included in ResourceCo's EMP which was approved as part of ResourceCo's Development Consent. Specifically of note, testing was not required prior to despatch and consumption of the PEF. Therefore, the level of sampling and testing proposed by the EPA before despatch is not required.

Meeting at NSW EPA 59-61 Goulburn Street, Sydney 8 September 2017 between NSW EPA (Celeste Forestal, Aisling Carroll, Natalie Alves) and ResourceCo (Bill Hudson, Ben Sawley – phone).

The EPA asked what procedures are in place in the event that the monthly combined sample routine test returned an out of specification result on any of the parameters in the specification. ResourceCo enquired, and the EPA confirmed that in this case, the specification is the SWDF specification approved by the EPA as part of Boral's Development Consent (DA 410-11-2002-i)

ResourceCo Response:

ResourceCo will collate and provide detailed information about the "layers" of control that ResourceCo and Boral have in place around PEF, to ensure that there is no risk of harming the environment or human health through the use of PEF by Boral.

ResourceCo will respond to this question in a separate document.

NSW EPA Matter:

You must have a procedure in place to manage out of specification PEF

There is no procedure included for PEF that is laboratory tested and does not meet the agreed specification requirements. You must document the course of action that will be taken if laboratory results indicate that PEF is out of specification.

We note that if the proposed sampling regime is adopted, that may require the disposal to landfill of 12,500t of material if a monthly test returns an out of specification result. This will be a significant cost to ResourceCo RRF Pty Ltd.

ResourceCo Response:

A written procedure has been developed for the management of out of specification PEF. The procedure includes the following:

- Define the parameters for determining whether the PEF is out of specification
- Prescribe sampling methods and further laboratory testing and analysis to determine a course of action for the out of specification PEF
- Does not involve returning the out of specification PEF to the infeed stockpile for reprocessing
- Disposal of confirmed out of specification PEF at an EPA approved facility

Refer to attached documents:

PROC 40 – *Managing out of Specification Solid Recovered Fuel*

PROC 41 – *SRF Sampling Procedure – Stockpile Testing*

NSW EPA Matter:

Sampling Frequency

The EPA considers it best practice to undertake a higher-frequency sampling regime to characterise the PEF material during commissioning. This characterisation would:

- assess variability in the material;
- assess ability to conform to the specification;
- validate the process as achieving the desired outcomes; and
- inform any modifications to the process that would be needed during the initial setup.

A procedure to characterise the PEF must be included in the EfWMP.

ResourceCo Response:

Written procedures have been developed for the sampling of the PEF for the purposes of characterization testing, and for on-going routine testing. These procedures have been developed to meet the requirements of European Standards EN 15442 Solid Recovered Fuels – Methods for Sampling and EN 15443 Solid Recovered Fuels – Methods for the Preparation of the Laboratory Sample, which is a contractual requirement of ResourceCo's supply agreement with Boral.

Refer to attached documents:

PROC 35 – *SRF Sampling Procedure – Characterization Testing*

PROC 36 – *SRF Sampling Procedure – Routine Testing*

NSW EPA Matter:

Sampling and Testing Procedures

Appendix 1 - Physical Sampling Procedure states that one 3L sample will be taken from every 70t of PEF material despatched. At full capacity, the facility will be processing 12,500t per month. This equates to

approximately 180 samples per month. The procedure also states that a single sample composited from a maximum of 180 samples would be tested. This would result in one composite sample volume of 540L (180 x 3L). In such a large volume, capturing any contamination in subsamples would be difficult. This sampling procedure may be considered inappropriate as the PEF material is likely to be heterogeneous.

The sampling procedure is not clear and must be described in detail and preferably as a stepwise process. The collection of discrete or composite samples must be clarified.

ResourceCo Response:

Appendix A of the EfWMP has been amended, and written procedures have been developed for the sampling of the PEF for the purposes of characterization testing, and for on-going routine testing. These procedures have been developed to meet the requirements of European Standards EN 15442 Solid Recovered Fuels – Methods for Sampling and EN 15443 Solid Recovered Fuels – Methods for the Preparation of the Laboratory Sample, which is as agreed between Boral and the EPA, and a contractual requirement of ResourceCo's supply agreement with Boral.

Refer to attached documents:

PROC 35 – *SRF Sampling Procedure – Characterization Testing*

PROC 36 – *SRF Sampling Procedure – Routine Testing*

NSW EPA Matter:

PEF Specifications

Justification and rationale should be provided for the parameters, associated limits and standards provided in the table entitled *PEF Specification (current PEF customers)* in Appendix 1 including:

- How was this specification derived?
- Why was it considered appropriate to group certain analytes (such as Group 2 and 3 metals)?
- Why were volatile organic parameters not included in the analytical suite?
- Why are PCPs and PCBs included in the testing regime? Further discussion should be provided on the rationale behind the thresholds of PCBs (10 mg/kg) and PCPs (100 mg/kg). Why are these a concern for the PEF material?

Consideration should be given to the source and composition of the PEF material, and potential constituents of concern. An insufficient level of detail about the input materials was provided to allow an assessment of the suitability of this specification.

ResourceCo Response:

The specifications have not been developed by ResourceCo, but rather by our customers. Specification A is the requirements of Boral, and Specification B is the requirement of our customer in Malaysia. ResourceCo is not in a position to be able to justify and provide a rationale for the parameters and the limits in the specifications, as we were not involved in the development of the specification. ResourceCo understands that there is a prescribed specification in Boral's approved development consent, which formed the basis for the specification which Boral provided ResourceCo.

Upon reflection of the EPA's question, ResourceCo believes it would be simpler to use the same specification that Boral had approved by the EPA and which forms part of Boral's Development Consent (DA 410-11-2002-i). Therefore, ResourceCo would recommend replacing the specifications in its current Development Consent with this EPA approved Boral specification.

NSW EPA Matter:

Test methods

The EPA requests clarification of the test methods for the parameters listed in the table entitled *PEF Specification (current PEF customers)*.

ResourceCo Response:

A listing of testing parameters as defined in the specification, and the associated test method is detailed in the attached document *PEF Specification – Test Methods*.

NSW EPA Matter:

Monitoring trends

The EfWMP must detail how you will monitor and respond to changing trends in the composition of the PEF material over time. For example, identifying upward trends will allow changes to be implemented (if required) to prevent material going out of specification.

ResourceCo Response:

Trends in the composition of the PEF material will be monitored through:

- On-line analyser
- Laboratory Information Management System.

The monitoring of the on-line analyser, and analysis of the LIMS database will allow changes to be implemented both short term and long term to prevent PEF from going out of specification. As detailed in Section 8.1 of the EfWMP, real time feedback from the on-line analyser will enable continual refinement of the process to ensure that the key parameters remain within specification.

NSW EPA Matter:

Communication of results

The EfWMP must outline how ResourceCo RRF Pty Ltd will continuously communicate changes in the composition of the input waste and the PEF material, test results or non-conformances with suppliers or customers.

ResourceCo Response:

Feedback to suppliers will only occur when a non-conformance occurs at the time of receipt of incoming waste. As outlined in Section 3.1.3 of the EfWMP, incoming waste will be inspected to determine if the waste meets the acceptance criteria and does not include wastes types that are not accepted. Non-conformances will be managed as per Section 7.2 of the EfWMP.

The reporting of test results to Boral, is as per the supply agreement between Boral and ResourceCo, and consists of the following:

- Testing of a monthly composite sample by an independent NATA accredited laboratory against all parameters in Specification A, Appendix A of the EfWMP.
- A weekly particle size analysis test using a representative composite sample. The result shall be provided to Boral the next working day.
- Daily monitoring of Calorific Value (CV), chlorine (Cl) and moisture (H₂O) prior to delivery. The results from this monitoring will be available for Boral upon request.

NSW EPA Matter:

Processing construction demolition waste to meet energy from waste targets

Section 4 of the EfWMP states that you intend to receive raw mixed construction demolition waste. You must provide additional detail on how this waste stream will meet the 25% resource recovery criteria in Table 1 of the EPA's NSW Energy from Waste Policy Statement (the Policy), i.e. what recovery will occur on the Premises.

ResourceCo Response:

A comprehensive response to this item was provided in *ResourceCo's Response to NSW EPA's 11 July 2016 Energy from Waste Questions regarding ResourceCo's Resource Recovery Facility Wetherill Park SSD 7256*, dated 11/10/2016. Refer to attached document for reference.

NSW EPA Matter:

Removal of hazardous wastes

The Policy requires that waste streams proposed for energy recovery do not contain any hazardous wastes. Section 8 of the EfWMP refers to quality control including removal of hazardous waste. However, the only hazardous waste documented for removal is PVC. The EfWMP must list all potential hazardous wastes which may enter the facility and procedures for identifying and removing such waste from the waste stream.

You must also document any procedures required of 'pre-qualified suppliers' to remove hazardous wastes.

ResourceCo Response:

This is addressed in ResourceCo's Operational Environmental Management Plan (OEMP). The relevant sections of the OEMP have been copied into Section 3 of the EfWMP. Additional controls of Hazardous Waste are documented in the following attached documents:

PROC 28 – *Incoming Waste Customer Pre-Qualification Procedure*

FORM 57 – *Incoming Waste Customer Pre-Qualification Form*

PROC 29 – *Asbestos Management Plan*

SOP 72 – *Hazardous Chemicals (including Dangerous Goods and Sharps) Management Procedure*

Position Description – Waste Receiving Inspection Officer

NSW EPA Matter:

No Limit C&I Category

You are proposing to receive “No limit mixed C&I” at the Premises. You do not yet have any approval for waste sources supplying this type of waste. The EfWMP must include a requirement that the “No limit mixed C&I” category cannot be used until you have approval from the EPA.

ResourceCo Response:

Section 2 of the EfWMP has been amended to include a statement to this effect.

ResourceCo will initiate the process with the EPA to gain formal approval for the receipt of “No limit mixed C&I” at the facility.

Meeting at NSW EPA 59-61 Goulburn Street, Sydney 8 September 2017 between NSW EPA (Celeste Forestal, Aisling Carroll, Natalie Alves) and ResourceCo (Bill Hudson, Ben Sawley – phone).

ResourceCo enquired about how it can progress with the formal approval process for the receipt of “No limit mixed C&I” category waste. The EPA indicated that a confirmation process to demonstrate compliance to this category is required for each entity that supply’s waste in this category.

ResourceCo Response:

ResourceCo will undertake an independent audit of each proposed “No limit mixed C&I” category waste supplier by a suitably qualified party. The purpose of the audit will be to confirm that the supplier has effective and operating collection systems for all waste streams they generate that have reuse or recycling opportunities. Until verification and approval by the EPA, the waste will be classified as “50% mixed C&I” waste.

NSW EPA Matter:

Section 4 of the EfWMP refers to an “EPA compliant declaration” to be provided by suppliers of construction and demolition residual waste. Please note that the EPA will not approve or endorse declarations provided by suppliers.

ResourceCo Response:

Section 4 of the EfWMP has been amended to remove the wording “EPA compliant”.

NSW EPA Matter:

Section 7.2 of the EfWMP must include identification of non-compliances with the EPA’s Energy from Waste Policy and the EfWMP.

ResourceCo Response:

Section 7.2 of the EfWMP has been amended to specifically include identification of non-conformances from NSW EPA’s Energy from Waste Policy, the OEMP, and the EfWMP.

NSW EPA Matter:

New construction and demolition waste minimum standards must be met

The EPA has proposed a series of changes for the NSW construction and demolition waste sector that will set minimum standards to ensure the safety of the community, the protection of the environment and the maximisation of resource recovery.

As a facility that will be licenced for resource recovery of building and demolition waste in NSW you will be required to meet those minimum standards. You will need to have documented procedures outlining how your receipt, inspection, sorting and processing processes meet the requirements of the minimum standards. Please refer to the EPA's website for more information

<http://www.epa.nsw.gov.au/wasteregulation/managing-construction-demolition-waste-minimumstandards.htm>.

ResourceCo Response:

This is addressed in ResourceCo's Operational Environmental Management Plan (OEMP). The relevant sections of the OEMP have been copied into Section 3 of the EfWMP.

NSW EPA Matter:

Sampling of other waste streams

No sampling and testing procedures for the other waste streams such as timber, aggregates and fines have been included in the EfWMP.

These matters may be addressed in an operational environment management plan.

ResourceCo Response:

ResourceCo has developed the following for the sampling and testing of other waste streams.

Aggregates

Procedures for the sampling of aggregates have been developed to meet the requirements of AS1141 – Methods for Sampling and Testing Aggregates. Testing of aggregates will be performed by a NATA laboratory for chemical and other attributes as required by NSW EPA The Recovered Aggregate Order 2014.

Refer to attached documents:

PROC 38 – 9.5mm – 50mm Aggregates Sampling Procedure

PROC 39 – 50mm – 300mm Aggregates Sampling Procedure

Fines

A procedure for the sampling of fines has been developed to meet the requirements of AS1141 – Methods for Sampling and Testing Aggregates. Testing of fines will be performed by a NATA laboratory for chemical and other attributes as required by NSW EPA New Minimum Standards for Managing Construction and Demolition Waste in NSW.

Refer to attached documents:

PROC 37 – 9.5mm Fines Sampling Procedure

27 September 2017

NSW Environmental Protection Authority
Waste and Resource Recovery Branch
P.O. Box A290
Sydney South
NSW 1232

Attention: Melissa Ward

e-mail

ResourceCo's response to NSW EPA's response (dated 8th August 2017) to ResourceCo's Energy from Waste Management Plan

Condition B8 of Development Consent SSD 7256 requires ResourceCo to prepare an Energy from Waste Management Plan (EfWMP) in consultation with the NSW EPA. ResourceCo submitted a draft EfWMP to the EPA on 7 July 2017, for review. The EPA raised a number of matters for ResourceCo to address in its response, dated 8 August 2017. ResourceCo has reviewed the matters raised by the EPA, and provides the following detailed responses to these matters.

NSW EPA Matter:

You must have a procedure in place to manage out of specification PEF

There is no procedure included for PEF that is laboratory tested and does not meet the agreed specification requirements. You must document the course of action that will be taken if laboratory results indicate that PEF is out of specification.

We note that if the proposed sampling regime is adopted, that may require the disposal to landfill of 12,500t of material if a monthly test returns an out of specification result. This will be a significant cost to ResourceCo RRF Pty Ltd.

Meeting at NSW EPA 59-61 Goulburn Street, Sydney 8 September 2017 between NSW EPA (Celeste Forestal, Aisling Carroll, Natalie Alves) and ResourceCo (Bill Hudson, Ben Sawley – phone).

The EPA asked what procedures are in place in the event that the monthly combined sample routine test returned an out of specification result on any of the parameters in the specification. ResourceCo enquired, and the EPA confirmed that in this case, the specification is the SWDF specification approved by the EPA as part of Boral's Development Consent (DA 410-11-2002-i)

ResourceCo Response:

Both Boral and ResourceCo have multiple ‘layers of control’ in place around PEF, to ensure there is no risk of harm to the environment or to human health through the use of PEF by Boral. These are detailed below.

Boral

The Environmental Assessment entitled ‘*Use of Waste Derived Fuels Kiln 6, Berrima Cement Works DA 401-11-2002 – Modification 9*’ dated July 2015, which forms part of Boral’s Development Consent (DA 401-11-2002-i), as approved by the EPA, details the following risk based approach adopted by Boral to minimise any potential environmental impact of using SWDF. Boral’s approach involves four levels of risk protection as follows:

Detailed fuel specifications:

European Union countries have been using waste derived fuels extensively in cement manufacture for around 50 years now. Boral has developed detailed fuel specifications for the proposed SWDF based on established European and USA standards. The levels of contaminants, such as heavy metals, in these standards are low enough to ensure that when used as a fuel in the cement kiln, emissions are unlikely to exceed the limits defined in the Energy from Waste Policy and the site’s EPL. The fuel specifications would be the basis of acceptance of deliveries of fuels from suppliers.

Supplier control systems:

Suppliers of SWDF to Berrima would be required to establish rigorous Quality Assurance / Quality Control procedures to ensure the SWDF products produced from their operations meet Boral’s specifications. The QA/QC of suppliers would be subject to regular audit by Boral or external parties.

Check sampling and testing of waste fuels supplied:

Regular statistical check sampling and testing of dispatched waste fuel products would be established based on the European standards. Using this methodology, samples of fuel would be taken at either the supplier’s site or at the Cement Works on a regular basis and analysed to determine compliance with the fuel specification. This will provide a regular check of the effectiveness of the supplier’s quality assurance processes. Analysis of test results would be undertaken by suitably accredited laboratories using standard test methods.

Inherent capture efficiency of the cement kiln process:

Boral and industry data demonstrates that cement kilns have inherently high capture efficiency for contaminants, such as heavy metals, which are captured as a stable component of the kilns clinker product.¹ High temperatures maintained in the clinker kiln and the kiln’s highly alkaline environment cause most of the metals to precipitate becoming irreversibly bound into the newly formed clinker. Therefore, in the unlikely event that the preceding three stages fail to prevent out of specification fuels being fed into the kiln, the risk of a significant environmental impact resulting from such an event is low.

In addition to the above risk based approach adopted by Boral to minimise any potential environmental impact of using SWDF, in 2004 Boral upgraded Kiln 6 and installed additional equipment specifically suited to the burning of SWDF, which included the installation of continuous monitoring equipment for key gaseous pollutants, which allows prompt response to any adverse trends in stack emissions.

ResourceCo

ResourceCo has a long history of the manufacture of PEF for use as alternative fuel in cement kilns.

Adelaide:

Working closely with Adelaide Brighton Cement Limited, ResourceCo developed Processed Engineered Fuel (PEF) as a partial replacement for fossil fuels in the Adelaide Brighton cement kiln. The process harnessed the energy contained in combustible material that would have traditionally gone to landfill and resulted in the commissioning of Australia's first PEF manufacturing plant in South Australia in 2007.

Malaysia:

ResourceCo is an industry leader in waste recycling and waste management in Malaysia and Asia. It is a pioneer in the region for converting commercial and industrial waste into alternative energy; specifically, alternative fuels for the cement industry.

ResourceCo own the region's first waste to energy processing plant in Ipoh Malaysia, designed for the production of Processed Engineered Fuel (PEF). ResourceCo is in a long-term partnership to supply Lafarge Malaysia - a leading global cement manufacturer with approximately 70,000 tonnes per annum of alternative fuels for its cement kilns.

ResourceCo's approach to minimise any potential environmental impact or harm to human health by Boral using PEF in their cement kiln involves six levels of risk protection as follows:

Customer Pre-Qualification

All potential waste customers will be required to be pre-qualified before being allowed to bring waste to the facility. This pre-qualification process will determine if the potential customers' waste meets the approved acceptance criteria for the site, whether it will enable high quality PEF products to be produced, and which category it meets for the PEF processing criteria.

Refer to attached document:

PROC 28 – Incoming Waste Customer Pre-Qualification Procedure

Waste Screening and Acceptance

1. Screening

A comprehensive waste screening process is undertaken prior to receipt of all incoming waste.

As outlined in Section 3 of the EfWMP, when a vehicle enters the weighbridge, the Customer Service and Weighbridge Operator will check with the driver if the waste meets the acceptance criteria, and will visually inspect the load for waste types not accepted or to be excluded from the production process. If part or all of the load is identified as not be approved for tipping in the facility the truck will not be unloaded and will be directed to leave the site immediately. The Customer Service and Weighbridge

Operator will also ensure that all waste that is controlled under a tracking system has the appropriate documentation prior to acceptance at the site.

If the waste meets the acceptance criteria then the waste delivery truck will be directed to the waste tipping area inside the manufacturing building. Once the load is tipped the Waste Receiving Inspection Officer will inspect the load for waste types not accepted or to be excluded from the production process, and to ensure that all waste that is controlled under a tracking system has the appropriate documentation prior to acceptance at the site.

Wastes that are not able to be accepted will either be sent back out of the site on the same waste delivery truck (if it is able to be) or removed from site as soon as possible by a licenced collector at the customers expense (if the incoming waste truck has left the site or if it is not able to be reloaded). Item 3 below outlines the approach to handling and disposal of hazardous materials such as asbestos, sharps and chemical/biological materials that, despite the waste acceptance procedures, have been delivered to site.

2. Monitoring

As outlined in Section 3 of the EfWMP, the following details will be recorded and kept on file for all incoming waste received on the site:

- Quantity, type and source of waste
- Date and time of receipt
- PEF processing criteria category
- Copies of all documentation relating to tracking for controlled waste brought to the site
- Details of any hazardous or other prohibited materials (including asbestos) brought to the site, along with handling and disposal activities undertaken and a record of any related documentation

As per the requirements of the supply agreement between Boral and ResourceCo, ResourceCo must maintain an auditable chain of custody for the PEF from ResourceCo's facility to the Boral Premises. Each vehicle load of PEF dispatched from ResourceCo's facility shall be assigned a transport certificate detailing the following;

- Delivery date;
- Time of departure;
- Description of the Goods (eg Solid Recovered Fuel);
- Gross/tare weights of the delivering/exporting vehicle;
- Vehicle registration number; and
- Unique reference number assigned to the load.

3. Hazardous Materials

As outlined in Section 3 of the EfWMP, any specific waste types not permitted to be accepted into the facility will be immediately rejected from the site where safe to do so and staff will be trained to ensure that these materials are first quickly identified and secondly safely removed from the waste stream. Specific management techniques for key hazardous waste types are provided below.

Asbestos

The following will be implemented to manage the potential for asbestos in the waste stream:

- Direct education with the customer base to ensure that only materials that are asbestos free will be accepted at the site. This is particularly focussed upon in the pre-qualification process with a potential new customer.
- Well positioned, appropriate signage at the entrance, weighbridge on weight dockets and at the drop off point
- Asbestos identification training for all relevant staff on site.
- Safe asbestos management and removal training for all relevant staff on site.
- Safe asbestos management and removal procedures are outlined in the Asbestos Management Plan (PROC 29).

Sharps and medical waste

Sharps and medical waste identification training for all relevant staff on site. Refer to SOP 72 *Hazardous Chemicals – including Dangerous Goods and Sharps Procedure*.

Chemicals and oils

Hazardous Chemicals identification training for all relevant staff on site. Refer to SOP 72 *Hazardous Chemicals – including Dangerous Goods and Sharps Procedure*.

Oil spill kits will be kept on site at all times and staff will be trained in its appropriate use.

Chemicals will be managed on an as needs basis with supervisors with dangerous goods training quickly assessing if the spill can be safely managed internally or if external assistance is required i.e. NSW Fire and Rescue.

Characterization / baseline testing

Characterization or baseline testing is used to identify and quantify chemicals or other attributes, and to determine the physical properties of a material, to provide scientific understanding of the said engineered material. A characterization study is designed to determine how a process performs under actual operating conditions, to capture the variations in materials and operations, and to understand process capability. Knowing process capability allows one to predict, quantitatively, how well a process will meet specifications.

The comprehensive initial (baseline) sampling and testing of the PEF will enable the characterization of the PEF in terms of its typical composition and variability. This will allow for a quantitative assessment of the PEF and knowing its ability to meet specification, and how well the PEF will meet specification, prior to its use by Boral. Based on ResourceCo's experience and history of PEF manufacture, the characterization study will demonstrate that the PEF will be well within specification, and the process is very capable of manufacturing PEF to the specification, providing reassurance that the risk of producing out of specification PEF is low.

Routine testing

Routine testing of the PEF is undertaken to demonstrate ongoing compliance with the specification, and confirms the product's ability to meet specification, and how well it meets specification, on an ongoing or regular basis.

Monitoring

The monitoring of the on-line analyser, and analysis of the on-site laboratory results will allow changes to be implemented both short term and long term to prevent PEF from going out of specification. As detailed in Section 8.1 of the EfWMP, real time feedback from the on-line analyser will enable continual refinement of the process to ensure that the key parameters remain within specification.

If monitoring of the on-line analyser and analysis of on-site laboratory results demonstrate abnormalities in the PEF, then a one-off sample may be sent to an independent NATA accredited laboratory for testing of all the parameters specified in the specification, to demonstrate compliance with the specification.

Trend Analysis

Trends in the composition of the PEF material will be monitored through:

- On-line analyser
- Laboratory Information Management System.

Analysis of data, particularly for the LIMS, will:

- Capture the variations in the PEF, and to understand process capability.
- Capture changing trends in the composition of PEF over time

This analysis will enable continual refinement of the process to ensure that all parameters remain within specification.

Procedure for Managing Out of Specification PEF – Monthly Combined Composite Sample

In the unlikely event that the monthly combined composite sample routine test returned an out of specification result on any of the parameters in the specification approved by the EPA as part of Boral's Development Consent (DA 410-11-2002-i), then ResourceCo will implement the following procedure:

1. ResourceCo will communicate the results of the monthly composite sample as per the requirements of the supply agreement between Boral and ResourceCo.
2. ResourceCo will send the retained duplicate monthly combined composite routine sample to an independent NATA accredited laboratory for testing to all parameters specified in the specification.

If the test results of the retained duplicate monthly combined composite routine sample conform to specification, then:

1. ResourceCo will communicate the results of the retained duplicate monthly combined composite sample as per the requirements of the supply agreement between Boral and ResourceCo.
2. No further action.

If the test results of the retained duplicate monthly combined composite routine sample verify the out of specification, then:

1. ResourceCo will communicate the results of the retained duplicate monthly combined composite sample as per the requirements of the supply agreement between Boral and ResourceCo.
2. ResourceCo will notify the EPA within seven days of becoming aware that it has not complied with the specification.
3. Resource will conduct a root cause analysis to determine the source of the out of specification, utilizing information from:
 - a. Customer pre-qualification processes;
 - b. Waste Inspection processes;
 - c. Routine testing;
 - d. Trend analysis; and
 - e. Any other relevant sourcesas detailed above.
4. ResourceCo will implement corrective and preventive actions to prevent a reoccurrence.
5. ResourceCo may consider increased routine testing to confirm the products ability to meet specification, and how well it meets specification.

If you have any questions, please contact me.

Yours sincerely,

William Hudson
ResourceCo RRF Pty Ltd

Attachments:

PROC 28 – *Incoming Waste Customer Pre-Qualification Procedure*

PROC 29 – *Asbestos Management Plan*

SOP 72 – *Hazardous Chemicals – including Dangerous Goods and Sharps Procedure.*

Note 1. Refer to Academic research, such as the article below, for further information.

Conesa, J, Rey, L, Egea, S, and Rey, M, 2011 'Pollutant Formation and Emissions from Cement Kiln Stack Using a Solid Recovered Fuel from Municipal Solid Waste', *Environmental Science and Technology*, 2011, vol. 45, no. 13, pp5878-5884



DOC17/497844

ResourceCo RRF Pty Ltd
Corner Hines and Wingfield Roads
Wingfield SA 5013

EMAIL

Attention: Bill Hudson

EPA response to your Energy from Waste Management Plan

ResourceCo RRF Pty Ltd hold environment protection licence 20937 (**the Licence**) for scheduled development works at 35-37 Frank Street, Wetherill Park NSW 2164 (**the Premises**).

The EPA has reviewed your revised draft Energy from Waste Management Plan (EfWMP) submitted on 20 September 2017 with additional information provided on 27 September 2017. The EPA requests further clarification on the following matters:

Characterisation sampling

The EPA understands that it is proposed to undertake characterisation sampling prior to the supply of PEF. The EfWMP should also identify other circumstances where characterisation sampling may be required such as a change in supplier.

Definition of out of specification PEF

Out of specification PEF may refer to material which has exceeded criteria measured by the online analyser, or laboratory testing. At present the EfWMP only identifies out of specification PEF as that exceeding the criteria measured by the online analyser. This definition must be expanded to include material that does not meet specifications through laboratory testing.

Managing out of specification PEF – online analyser

We understand that it is proposed, where the online analyser identifies material that is out of specification, it will be sent to the quarantine area and subject to laboratory testing for gross calorific value, moisture and chlorine. If the laboratory analysis determines that the quarantine PEF complies with Specification A, it will be transported to the finished PEF stockpile.

Can you please confirm that material, which has complied with laboratory testing and is transported to the finished PEF stockpile, will then be subject to routine testing for the wider range of specifications, along with the remainder of the finished PEF stockpile.

Managing out of specification PEF – laboratory testing

Information provided in regards to 'layers of control' under "*Procedure for Managing Out of Specification PEF – Monthly Combined Composite Sample*" must be included in the EfWMP.

In addition, this section states that in the event of an exceedance in routine testing, ResourceCo "may consider increased routine testing". The EPA recommends that increased routine testing be practiced following an exceedance until you are satisfied that the issue has been investigated and resolved and that material is continuously meeting the relevant specification.

Onsite laboratory testing

The information provided refers to testing at both Australian based NATA accredited laboratories and on site laboratories. Can you please confirm what testing will be done on site and what will be done at NATA accredited laboratories. Please also confirm who will be doing the sampling.

You are at risk of breaching the Protection of the Environment Operations Act 1997

We have reviewed the information you have provided on the 'layers of control' regarding product quality. We acknowledge that the controls in place will reduce the risk of producing out of specification PEF; however it will not eliminate it.

As results of routine testing will not be received until material has been removed from the Premises, there is a risk you may transport out of specification PEF to the consumer, being Boral. The EPA understands that under EPL 1698, Boral is not permitted to receive out of specification PEF.

We advise you, that by transporting out of specification PEF to Boral, you may be considered in breach of s143 of the *Protection of the Environment Operations Act 1997*, being the unlawful transport of waste. The EPA may take regulatory action for such a breach, including issue of a \$15,000 penalty notice; and/or prosecution. The maximum penalty for an offence under s143 of the Act is:

- a. in the case of a corporation—\$1,000,000, or
- b. in the case of an individual—\$250,000.

If you have any questions regarding this matter, please contact Melissa Ward on 9995 5747.

Yours sincerely



9 October 2017

CELESTE FORESTAL
Unit Head Waste Compliance
Environment Protection Authority

Contact officer: MELISSA WARD
(02) 9995 5747

19 October 2017

NSW Environmental Protection Authority
Waste and Resource Recovery Branch
P.O. Box A290
Sydney South
NSW 1232

Attention: Melissa Ward

e-mail

ResourceCo's response to NSW EPA's response (dated 9th October 2017) to ResourceCo's Energy from Waste Management Plan

Condition B8 of Development Consent SSD 7256 requires ResourceCo to prepare an Energy from Waste Management Plan (EfWMP) in consultation with the NSW EPA. ResourceCo submitted a draft EfWMP to the EPA on 7 July 2017, for review. The EPA raised a number of matters for ResourceCo to address in its response, dated 8 August 2017. ResourceCo responded to the matters raised by the EPA through the submission of a revised draft EfWMP to the EPA on 18 September 2017, with additional information provided on 27 September 2017. The EPA raised a number of matters for ResourceCo to address in its response dated 9 October 2017. ResourceCo has reviewed the matters raised by the EPA, and provides the following detailed responses to these matters.

NSW EPA Matter:

Characterization Sampling

The EPA understands that it is proposed to undertake characterisation sampling prior to the supply of PEF. The EfWMP should also identify other circumstances where characterisation sampling may be required such as a change in supplier.

ResourceCo Response:

Characterization testing is used to identify and quantify chemicals or other attributes, and to determine the physical properties of a material, to provide scientific understanding of the said engineered material. A characterization study is designed to determine how a process performs under actual operating conditions, to capture the variations in materials and operations, and to understand process capability. Knowing process capability allows one to predict, quantitatively, how well a process will meet specifications.

Characterization testing prior to the supply of PEF to Boral is a contractual requirement.

ResourceCo has the following procedures in place to minimize the potential variation of the finished PEF.

1. As detailed in *ResourceCo's Response to NSW EPA's 11 July 2016 Energy from Waste Questions regarding ResourceCo's Resource Recovery Facility Wetherill Park SSD 7256*, dated 11/10/2016, ResourceCo has identified in excess of 100 potential suppliers of suitable waste to the Wetherill Park resource recovery facility. Due to the large number and diverse range of suppliers of waste, any impact due to a change in supplier, either entry or exit, is likely to be negligible on the waste mix, and hence the characteristics of the finished PEF.
2. All potential waste customers will be required to be pre-qualified before being allowed to bring waste to the facility. This pre-qualification process will determine if the potential customers' waste meets the approved acceptance criteria for the site, whether it will enable high quality PEF products to be produced, and which category it meets for the PEF processing criteria. Refer to attached document:
PROC 28 – Incoming Waste Customer Pre-Qualification Procedure
3. Routine testing of the PEF is undertaken to demonstrate ongoing compliance with the specification, and confirms the product's ability to meet specification, and how well it meets specification, on an ongoing or regular basis. Routine testing data will be stored in the Laboratory Information Management System Database, which will allow monitoring of and response to trends in the finished PEF characteristics, other attributes, and physical properties.

Taking the above into consideration, ResourceCo will amend the EfWMP so that it allows for additional characterization testing in the following situations:

1. Where there is a change in supplier who supplies more than 10% of the total waste received, either entry or exit of that supplier; or
2. Where there is a change in a number of suppliers within a period of less than 30 days who combined supply more than 10% of the total waste received, either entry and/or exit of those suppliers.

PROC 35 – SRF Sampling Procedure – Characterization Testing has been amended to include the above.

NSW EPA Matter:

Definition of out of specification PEF

Out of specification PEF may refer to material which has exceeded criteria measured by the online analyser, or laboratory testing. At present the EfWMP only identifies out of specification PEF as that exceeding the criteria measured by the online analyser. This definition must be expanded to include material that does not meet specifications through laboratory testing.

ResourceCo Response:

PROC 40 – Managing out of Specification Solid Recovered Fuel has been amended to include material that doesn't meet specification through laboratory testing.

Refer to attached document:

PROC 40 – Managing out of Specification Solid Recovered Fuel

NSW EPA Matter:

Managing out of specification PEF – online analyser

We understand that it is proposed, where the online analyser identifies material that is out of specification, it will be sent to the quarantine area and subject to laboratory testing for gross calorific value, moisture and chlorine. If the laboratory analysis determines that the quarantine PEF complies with Specification A, it will be transported to the finished PEF stockpile.

Can you please confirm that material, which has complied with laboratory testing and is transported to the finished PEF stockpile, will then be subject to routine testing for the wider range of specifications, along with the remainder of the finished PEF stockpile.

ResourceCo Response:

Sampling for routine testing is to be conducted to meet the requirements of European Standard EN 15442 Solid Recovered Fuels – Methods for Sampling. The principle for sampling under I.S. EN 15442:2011 is that sampling shall be conducted by a means where every particle in the lot of SRF to be represented by the sample should have an equal probability of being included in the sample. A ‘lot’ is defined as a discrete or defined quantity of SRF for which the quality is to be determined. For routine testing, the lot size is determined over a one-month sampling period, and has a size of 3,000 tonnes. Refer to PROC 36 – *SRF Sampling Procedure – Routine Testing*.

Therefore, ResourceCo can confirm that material which has complied with laboratory testing and is transported to the finished PEF stockpile will be subject to routine testing as per principles for sampling as required by I.S. EN 15442:2011 Solid Recovered Fuels – Methods for Sampling.

NSW EPA Matter:

Managing out of specification PEF – laboratory testing

Information provided in regards to ‘layers of control’ under “*Procedure for Managing Out of Specification PEF – Monthly Combined Composite Sample*” must be included in the EfWMP.

In addition, this section states that in the event of an exceedance in routine testing, ResourceCo “may consider increased routine testing”. The EPA recommends that increased routine testing be practiced following an exceedance until you are satisfied that the issue has been investigated and resolved and that material is continuously meeting the relevant specification.

ResourceCo Response:

Section 8.3 has been added to the EfWMP detailing the procedure for Managing Out of Specification PEF – Monthly Combined Composite Sample. Sub-point 5 in the above procedure has been amended to include increased routine testing until it is confirmed that the product is able to satisfactorily meet specification on an ongoing basis.

Appendix H has been added to the EfWMP detailing the ‘layers of control’ that both Boral and ResourceCo have in place around PEF.

NSW EPA Matter:

Onsite laboratory testing

The information provided refers to testing at both Australian based NATA accredited laboratories and on-site laboratories. Can you please confirm what testing will be done on site and what will be done at NATA accredited laboratories? Please also confirm who will be doing the sampling.

ResourceCo Response:

A list of testing parameters as defined in the specification, associated test methods and testing arrangements is detailed in the attached document *PEF Specification – Test Methods and Testing Arrangements*.

All sampling will be performed by ResourceCo's Technical Officer. The Technical Officer will be suitably qualified, and will be trained and assessed for competency in sampling methods and requirements of the relevant European Standards for Solid Recovered Fuels.

NSW EPA Matter:

You are at risk of breaching the Protection of the Environment Operations Act 1997

We have reviewed the information you have provided on the 'layers of control' regarding product quality. We acknowledge that the controls in place will reduce the risk of producing out of specification PEF; however, it will not eliminate it.

As results of routine testing will not be received until material has been removed from the Premises, there is a risk you may transport out of specification PEF to the consumer, being Boral. The EPA understands that under EPL 1698, Boral is not permitted to receive out of specification PEF.

We advise you, that by transporting out of specification PEF to Boral, you may be considered in breach of s143 of the *Protection of the Environment Operations Act 1997*, being the unlawful transport of waste. The EPA may take regulatory action for such a breach, including issue of a \$15,000 penalty notice; and/or prosecution. The maximum penalty for an offence under s143 of the Act is:

- a. in the case of a corporation—\$1,000,000, or
- b. in the case of an individual—\$250,000.

ResourceCo Response:

ResourceCo notes the EPA advice that by transporting out of specification PEF to Boral, ResourceCo may be considered to be in breach of s143 of the *Protection of the Environment Operations Act 1997*. ResourceCo has multiple 'layers of control' in place around PEF to ensure that out of specification PEF is not transported to Boral, including:

- A long history of manufacture of PEF for use as alternative fuels in cement kilns, both in Australia and Malaysia

- A robust customer pre-qualification process to ensure potential customer's waste meets the approved acceptance criteria, and it is suitable to enable high quality PEF products to be produced.
- A comprehensive waste screening and acceptance process prior to the receipt of incoming waste
- Characterization or baseline testing to identify and quantify chemicals or other attributes, and to determine the physical properties of the PEF, to provide scientific understanding of the material
- Routine testing of the PEF to confirm the products ability to meet specification on a regular basis, and additional testing if there are changes in suppliers that constitute more than 10% of the overall volume, as outlined above.
- Monitoring and trend analysis of test data and response to trends in finished PEF characteristics, other attributes and physical properties.

In the unlikely event that out of specification product is transported to Boral, ResourceCo has comprehensive procedures in place to prevent a reoccurrence, including:

- Determining the root cause analysis of the out of specification
- Implementing preventative and corrective actions to prevent a reoccurrence
- Conducting increased routine testing to confirm the products ability to meet specification, and how well it meets specification

If you have any questions, please contact me.

Yours sincerely,

William Hudson
ResourceCo RRF Pty Ltd

Attachments:

ResourceCo Energy from Waste Management Plan, Rev 3, dated 18/10/2017
 ResourceCo's Response to NSW EPA's 11 July 2016 Energy from Waste Questions regarding
 ResourceCo's Resource Recovery Facility Wetherill Park SSD7256
PEF Specification – Test Methods and Testing Arrangements
PROC 28 – Incoming Waste Customer Pre-Qualification Procedure
Included as Appendices in the EfWMP
PROC 35 – SRF Sampling Procedure – Characterization Testing
PROC 36 – SRF Sampling Procedure – Routine Testing
PROC 40 – Managing out of Specification Solid Recovered Fuel



DOC17/548187-03

ResourceCo RRF Pty Ltd
Corner Hines and Wingfield Roads
Wingfield SA 5013

EMAIL

Attention: Mr Bill Hudson

EPA response to your revised draft Energy from Waste Management Plan

ResourceCo RRF Pty Ltd hold environment protection licence 20937 (the Licence) for scheduled development works at 35-37 Frank Street, Wetherill Park NSW 2164 (the Premises).

The EPA has reviewed your revised draft Energy from Waste Management Plan (EfWMP) submitted on 19 October 2017. The EPA makes no further comments on the draft EfWMP, however would like to highlight the following matters for your attention.

EPA propose vary your licence

The EPA is proposing to vary your licence to require compliance with the Energy from Waste Management Plan. Please provide a finalised copy of the Energy from Waste Management Plan for our records.

Approval is required for C&I waste

We remind you that information in the EfWMP is not sufficient to allow an assessment of the no limit C&I category. Approval will still need to be sought by ResourceCo prior to processing of this material.

You are at risk of breaching the Protection of the Environment Operations Act 1997

As advised in our previous letter we remind you that although the controls you have put in place will reduce the risk of producing out of specification PEF; they will not eliminate that risk.

We advise you, that by transporting out of specification PEF to Boral, you may be considered in breach of s143 of the *Protection of the Environment Operations Act 1997*, being the transport of waste to a place that cannot lawfully be used as a waste facility for that waste.

If you have any questions regarding this matter, please contact Melissa Ward on 9995 5747.

Yours sincerely

A handwritten signature in black ink, appearing to read 'CF', with a large, stylized loop at the end.

9 November 2017

CELESTE FORESTAL
Unit Head Waste Compliance
Environment Protection Authority

GHD

Level 15

133 Castlereagh Street

T: 61 2 9239 7100 F: 61 2 9239 7199 E: sydmall@ghd.com

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Document Status

Revision	Author	Reviewer		Approved for Issue		
		Name	Signature	Name	Signature	Date
0	A Montgomery	D Gamble		D Gamble		4/7/17
1	A Montgomery	D Gamble		D Gamble		22/8/17
2	A Montgomery	D Gamble		D Gamble		8/9/17
3	A Montgomery	D Gamble		D Gamble		18/9/17
4	A Montgomery	D Gamble		D Gamble		16/11/17
5	A Montgomery	D Gamble		D Gamble		22/2/18
6	A Montgomery	D Gamble		D Gamble		27/2/18

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