

Summary of submissions received during consultation on the Draft Protocol for Refuse Derived Fuel

A total of 10 submissions were received during consultation on the Draft Protocol for Refuse Derived Fuel (RDF). Below is a table representing the responses received relating to each part of the protocol.

Submissions received on each part of the protocol

Part	No. of supporting submissions	No. of opposing submissions	No. of submissions seeking clarification
General	3	-	2
Introduction	-	2	6
EPA's principles and expectations	-	-	4
Key considerations	1	3	6
Demonstrating suitability of RDF	1	4	6
Required information	1	3	5
Approvals and licensing	3	2	1

General

Some submissions indicated the protocol was a barrier to development of renewable energy infrastructure and the achievement of government targets on renewable energy. Four submissions applauded the fact that the EPA had produced the document and had undertaken comprehensive consultation.

Additional information has been added to the protocol to explain the regulatory framework for RDF including the *Environment Protection Act 1993* (EP Act), the draft *Environment Protection (Waste to Resources) Policy* (draft W2R EPP), South Australia's Waste Strategy 2005–2010 (the State Waste Strategy) and the Waste hierarchy. The EPA supports the waste hierarchy and it is integral to the draft W2R EPP and the State Waste Strategy. While the diversion of waste from landfill is supported, it needs to be done in a suitable, sustainable manner. The document will form a standard under clause 4 of the draft W2R EPP and has been modified to reflect this. In particular the title of the document will be renamed *Guideline: Refuse Derived Fuel—Standard for the production and use of refuse derived fuel*.

There have also been changes to the document to retain consistency with changes made to the Waste Derived Fill and Waste Derived Soil Enhancer documents during development and following consultation. These changes include modifications to the document structure and the modification of information on the EPA's statutory framework.

Part 1 Introduction

Concept	No. of supporting submissions	No. of opposing submissions	No. of submissions seeking clarification
Incineration vs RDF	-	-	4
Agreed and consistent specification	-	-	2
Joint application	-	2	1
Exclusions	-	-	3
Figure 1			4

Clarification has been included to distinguish between the combustion of RDF and the incineration of waste. Broadly, the term 'incineration' means the burning to ashes however, for the purposes of the protocol, incineration means the thermal destruction of waste for the primary purpose of disposal. The primary purpose of producing and combusting an RDF is for the beneficial recovery of waste by the replacement or supplement of fossil or other standard commercial fuels (directly or indirectly) in an industrial process such as an industrial kiln. It was suggested that it may be preferable to define these in terms of outputs such as emissions or energy recovery, however no changes were made to the document to address this as:

- emissions from combustion of RDF or incineration will be dependent on the inputs to the combustion and the emission controls on the facility
- the inclusion of an energy recovery threshold could restrict RDF proposals by limiting the waste types that may be suitable for inclusion based on factors other than calorific value.

The need to process all wastes prior to use within an RDF was questioned. Some clarification has been added to indicate that processing or assessment to transform or otherwise demonstrate that the waste is suitable.

The applicability of a consistent and agreed specification on waste streams that, by nature, are variable was questioned. No specific changes were made to the document however in a RDF proposal it may be suitable for the specification to include ranges rather than specific quantities, concentrations and volumes. This would need to be negotiated for the specific proposal.

The document has been reworded to indicate that it is not essential for applications for RDF to be jointly submitted by the producer and user(s) however it is recommended for parties who are newly undertaking the activities (production or use). If applications are made separately, the other party (either producer or user) must be identified in the proposal to demonstrate the source or market component and their suitability.

Clarification on materials exempted from the requirements of the protocol has been added to indicate that there may be additional exemptions in the future provided the fuel is subject to other controls and standards such as nationally applicable regulations. In addition clarification on sawdust has been included to avoid the potential for combustion of CCA timber sawdust.

Figure 1 'Process for developing an RDF including obtaining approvals' has been modified to better represent the process and include more information and references to the relevant sections. Although it is suggested that the flow diagram could be modified to actually reflect

the process for designing and developing an RDF, this was not incorporated as the EPA does not want to be prescriptive on each step in the production of an RDF provided the EPA requirements are met. Information has been included to provide guidance on additional scenarios such as an existing RDF facility proposing to use a new type of RDF.

Part 2 EPA’s statutory framework

This section has been modified to be consistent with the other waste management reform protocols and to more clearly highlight the legislative framework surrounding the production and use of RDF, in particular that of the draft W2R EPP and the State Waste Strategy. The heading has been changed from ‘EPA’s principles and expectations’ to ‘EPA’s statutory framework’ to reflect the content of the section.

Clarification has been added to explain the background for support of Figure 2 ‘RDF and the waste hierarchy’. Although not included within the document, advice was sought on the difference between reuse, recycle and recover:

- Reuse the waste for the original or a different purpose without further manufacture other than minor repair or refurbishment to extend the functional life of a product. For example, refilling glass bottles or reusing old computers or furniture.
- Recycle the waste via a set of physical or chemical processes that convert materials into useful products which can be for the same or a different purpose. For example, recycling aluminium cans into new cans or recycling used tyres into soft fall matting under play equipment.
- Recover part of the waste for reuse or recycling using a physical or chemical process. For example recovering valuable computer components including precious metals or using sawdust at sawmills as fuel (energy recovery).

Using this clarification on the waste hierarchy, the production and use of RDF is classified as a recovery activity.

Part 3 Key considerations

Concept	No. of supporting submissions	No. of opposing submissions	No. of submissions seeking clarification
General	-	1	2
Waste hierarchy	-	4	2
Immediate market	1	3	-
Risk-based approach	-	-	2
Prevent environmental harm	-	-	4
Beneficial purposes	1	-	7
No dilution	1	-	1
Consistent regulation	1	-	1

To avoid confusion the term ‘fossil fuel’ has been replaced with ‘fossil or other standard commercial fuel’.

It was raised that the EPA should not be involved with the process but rather limit its involvement to the outcomes. The aim of the document is to define the required environmental outcomes. However it is also necessary to describe the process required to demonstrate how the proposal meets the outcomes.

In addition, the questions within the boxes have been reworded to clearly indicate the preferred outcome.

3.1 The importance of appropriate support for the waste hierarchy

Clarification has been added to the document on the links to the regulation in support of the waste hierarchy, in particular the EPA's commitment to the State Waste Strategy and clause 7(1) of the draft W2R EPP which states:

the objective of this policy (the waste management objective) is to achieve sustainable waste management by applying the waste management hierarchy consistently with the principles of ecologically sustainable development set out in section 10 of the Act.

The lack of consideration of the concept of climate change and the organic or renewable content of RDF was questioned.

The EPA is satisfied with its stated position that the use and application of the waste hierarchy to guide and promote more preferable waste management option is appropriate. The application of this to ensure that higher order opportunities are not undermined by the production and use of RDF. Where production and use of RDF is beneficial and on balance preferable to landfill and where safe to do so, then in accordance with the hierarchy, RDF is placed above landfilling as a recovery activity.

Further, the EPA believes that options in the waste hierarchy not only meet environment and waste management aims, but are also generally valid with respect to climate change, resource efficiency, and social and economic considerations. Zero Waste SA, which sets policy in relation to recycling and diversion of waste from landfill, state that, 'Through re-use and recycling, the energy embodied in waste products is retained and thereby slows the potential for climate change¹'. Combustion uses up the embodied energy. The examples provided in Attachment 1 support this position.

It was requested that the statement: 'It will also consider if treatment or disposal (eg to an authorised landfill) is the more appropriate waste management method' be removed. While the EPA supports the recovery of energy from waste, this should only occur where it is safe and sustainable to do so. If it is not so, then treatment and disposal are likely to be the only alternatives and as such the statement is valid.

It was suggested that the market should be the only driver for the production and use of RDF and regulation, in particular the waste hierarchy, should not be a factor. Although the market does influence the use of wastes from an economic viability perspective, economics cannot be the only driver dictating waste management. Other aspects including sustainability and responsible waste management are key considerations. Thus regulation plays a role to influence the most appropriate use of wastes while supporting these key considerations as well as environmental improvement, community interest and expectations, the Objects of the EP Act and the broader aims, strategies and policies of the state. An example of the government using regulation and economic incentives or disincentives to influence change is

¹ <www.zerowaste.sa.gov.au/About.mvc/ClimateChange>.

the levy on the disposal of waste to encourage more sustainable options where these are appropriate.

3.2 The need for an immediate market

Conflicting submissions were received on this issue with some indicating that market opportunities need to be functioning before an RDF can be produced en masse while others indicated that this consideration resulted in disposal being the only option until an RDF proposal was approved.

No changes were made to this section as the EPA supports the waste hierarchy and diversion of waste from landfill should only occur if it is safe and sustainable to do so. The diversion of waste and production of an RDF with no market would result in speculative stockpiling and avoidance of disposal costs.

3.3 The requirement for a risk-based approach

Clarification was added to indicate that both environmental and human health risks need to be considered.

3.4 Demonstration of prevention of and minimised potential for environmental harm

Clarification has been added to the meaning of sound science and the possible need for third party scientific peer review for more complex or novel proposals.

Although no changes to the document were made, it is important to note that while existing legislation, such as the *Environment Protection (Air Quality) Policy 1994*, contains mandatory air quality criteria, proponents should not use these criteria as targets or design their RDF to meet the emission levels. Instead they should, as far as possible, endeavour to minimise emissions from any proposed RDF.

It was suggested that emission limits should be set for RDF. Due to the aim to minimise emissions and the possible variability in RDF, this is not possible on a broad level. Emission limits may be specified within licence conditions.

3.5 Demonstration of beneficial purposes

Clarification on the meaning of 'further processing' has been added to the document to indicate that waste will not be considered as an RDF; until it is ready to be used without any additional treatment or processing. This does not preclude waste that needs processing or treatment from being included in an RDF only that the treatment or processing must occur before the waste will be recognised as a product. Air drying of a waste would be part of the RDF production process.

Clarification has been added to indicate that an RDF can be used to replace or supplement a fossil or other standard fuel.

Clarification was sought on how wastes that emanate from related sources (for example the different parts of a plant, leaves, stem, fruit) should be considered in relation to testing and demonstration of beneficial purposes. Although not specifically added to the document, if the wastes were created in one stream it can be considered one stream. However, if variable wastes are created in separate streams they potentially have different alternate uses or chemical and physical properties that may affect the RDF product. Thus each stream should be dealt with separately. Mixed waste, such as unsorted commercial and industrial waste, must be sorted prior to use in RDF.

Clarification was also sought regarding the suitability of a waste with high moisture content but valuable calorific content. Due to the broad nature of the comment, no specific advice can be given on this, other than that high moisture content can reduce the effectiveness of combustion in the initial stages, as energy is taken up by the creation of steam and can increase the likelihood of dioxin and furan formation. Therefore RDF should be dried prior to combustion. If a proponent believes they have a waste stream that may be suitable as a RDF, a proposal in accordance with the protocol should be submitted.

This section has also been modified to better explain the difference between incineration and refuse derived fuel, including the need for an overall positive energy gain from the combustion of RDF. One submission supported the requirement for RDF to demonstrate an energy benefit to the process as its primary function.

3.6 The production of RDF must not involve the dilution of waste and chemical substances

No significant changes were made to this section.

3.7 A consistent approach to regulation

No changes were made to this section. It should be noted that the EPA does not intend to licence waste producers for the production of waste in addition to their main industrial activity unless they trigger an activity of environmental significance such as production of listed waste. Facilities not required to be licensed under the EP Act for their main activity will not be specifically licensed for the production of waste. Any facility that wants to produce an RDF on site they will need to submit an application in accordance with the protocol.

Part 4 Demonstrating suitability of RDF

Concept	No. of supporting submissions	No. of opposing submissions	No. of submissions seeking clarification
Prohibited wastes	-	4	6
Important characteristics	1	2	5

4.1 Prohibited wastes

The document has been modified to indicate that in extenuating circumstances if a proponent believes they can demonstrate why a prohibited waste is suitable for the production and combustion of RDF or if the prohibited waste can be treated or processed to render it appropriate, then the EPA will consider varying from the prohibited waste list however a thorough case will need to be provided.

Clarification on the suitability of CCA treated timber for RDF has been included to indicate that CCA treated timber as a specific source for inclusion in RDF is prohibited. It is acknowledged that some CCA may inadvertently be received within timber loads and thus RDF users should ensure pollution controls and monitoring to ensure emissions remain acceptable. However persons involved in the production of an RDF must endeavour to remove and segregate all CCA timber and ensure its appropriate management.

The inclusion of wastes with high mineral content on the prohibited list and the indication that they are of little calorific value were questioned, in particular with reference to possible applications of the ash produced. In general, materials with high mineral content are of lower calorific value and not beneficial to the effective combustion of an RDF. On its own, a

secondary benefit, such as subsequent use of a mineral based ash, is not sufficient justification for the incineration of waste with a high mineral content to be considered beneficial RDF combustion.

The document has been amended to indicate that the prohibition of scheduled wastes does not include the scheduled wastes that may be formed due to incomplete or low temperature combustion. However, users of RDF should design combustion facilities to minimise dioxin and furan formation and ensure pollution control equipment can control such emissions.

Concern was raised that wastes that have an available and practical higher-order recovery or reuse option according to the waste hierarchy were prohibited. This statement was retained in the document as the EPA is committed to supporting the State Waste Strategy and the waste hierarchy. This position is consistent with the stance taken by other states, including NSW which is demonstrated by the first question asked in its *Guidance Note—Assessment of Non-Standard Fuel*²: ‘Is a practical higher-order resource recovery opportunity currently available?’ (refer also to Attachment 1).

The onus of proof for demonstrating that an RDF does not contain prohibited wastes lies with the producer of RDF however users of RDF should have an understanding of the components of the RDF to ensure the combustion process is suitable.

4.2 Inputs and outputs

This section has been added to clarify why both the inputs to RDF and the outputs from combustion of RDF are important. It is important to know the inputs to ensure that the RDF can be reliably and consistently produced to:

- avoid a highly variable or unpredictable product
- ensure the combustion process is effective and efficient
- provide guidance on the expected emissions
- enable emissions to be effectively monitored and controlled with appropriate pollution control equipment

Information has also been added on the possible use of the tools referenced through the National Greenhouse and Energy Reporting System (NGERS) to assist with calculations and assessments relating to the production and combustion of RDF.

4.3 Important characteristics of RDF

Table 2 has been modified to better present the details of the characteristics of RDF including:

- clarification that the calorific values of the RDF and the contributing components as well as the furnace technology and pollution controls will contribute to the overall combustion efficiency
- inclusion of additional information to indicate that high water content can cause material to burn at a lower temperature which in turn can increase the likelihood of dioxin and furan formation
- reinforcing that the RDF assessment must be risk based and also address human health risks.

² <www.environment.nsw.gov.au/resources/air/nonstandardfuel05149.pdf>.

Part 5 Required information

Concept	No. of supporting submissions	No. of opposing submissions	No. of submissions seeking clarification
Sensitive use	-	-	1
Pilot trial	-	-	1
Facility design	-	-	1
Risk assessment	1	-	2
Definitive statement	-	4	-
Producer responsibilities	-	-	2
Transporter responsibilities	-	-	2
User responsibilities	-	-	1

5.1 Minimum information to be submitted to the EPA

The need for a third party scientific review for more complex or novel proposals has been added to the document and the need for pilot trials has also been clarified.

The list of examples of sensitive receptors has been expanded.

Minor changes were made to clarify facility design, specifically waste management areas, and risk assessment requirements, particularly the need to include potential by-products of combustion in the assessment.

The need for a definitive statement from a suitably qualified, experienced and independent person was questioned and there was some confusion on what, specifically, the person would be signing off. As such, this requirement has been modified to reflect that a suitably qualified, experienced and independent person needs to conduct an assessment on the suitability of the RDF and the risk of harm which must be submitted as part of the application accompanied by evidence for the conclusions reached.

5.2 General responsibilities

To address the possibility of an industry reusing residue ash, the producer responsibilities have been modified to indicate that disposal is not the only option provided the residual waste is responsibly managed.

Although suggested that the producer responsibility should read 'ensure that RDF is consistently produced to the approved RDF specification or better', the 'or better' was not incorporated as this could result in confusion on the definition of 'better'. Any changes to the specification should be approved by the EPA.

The document has been modified to clarify that transporters are only required to be licensed under the EP Act if they transport waste for fee or reward however the responsibilities lists are still recommended. Once the W2R EPP is operational, an EPA licence will not be required for the transport of an approved RDF product that is ready for use without the need for further processing.

An additional dot point has been added to user responsibilities requiring monitoring of the emissions from the combustion process.

Part 6 Approvals and licensing

Concept	No. of supporting submissions	No. of opposing submissions	No. of submissions seeking clarification
Licensing RDF producers	1	3	1
Licensing RDF users	4	-	1
Need for review at renewal	1	2	-

Although two submissions indicated that the producers of RDF should not be licensed, this requirement has remained as an RDF producer would be receiving waste and thus under Schedule 1 of the EP Act is required to be licensed under activity 3(3) Waste or recycling depot. There was also some confusion that the EPA would licence 'waste producers' however these facilities would only be licensed if their main activity triggered a prescribed activity of environmental significance. A licence under activity 3(3) may be required for these facilities in the circumstance that they wish to treat their waste, or accept waste from another site, to produce an RDF.

No changes were made to the need for users of RDF to be licensed. It is important to licence the users to ensure that the RDF is used in the manner for which it was produced and that emissions monitoring occurs. It should be noted that activity 8(2) of Schedule 1 of the Environment Protection Act is paraphrased in the document and is not an exact quotation.

The need for review of operations at renewal was supported by one submission and opposed by another. This requirement remains as, in addition to the environmental aspects, it is considered that the regular review of operations is good business practice and should include investigating the inputs as some streams may no longer be available or there may be new ones that are suitable.

It has also been clarified that the transport of RDF does not require a licence however there are general expectations for transporters to meet their general environmental duty.

Appendix 2

Clarification has been included to address that this information is for guidance but a specific sampling regime will need to be developed for each producer/user.

The EPA standard is that all analysis required in relation to licence conditions will need to be conducted by NATA accredited laboratories. However, companies wishing to undertake additional analysis can do so using in house expertise but EPA may then require independent verification.³

³ Refer EPA Guideline, *Regulatory monitoring and testing—Independent verification requirements* (2006), <www.epa.sa.gov.au/pdfs/guide_monitoring.pdf>.

Attachment 1 Examples supporting EPA's position on the waste hierarchy

Government agencies

The Environment Agency for England and Wales, Scottish Environment Protection Agency and Northern Ireland Environment and Heritage Service stated their position in the publication *Guidance for the Incineration of Waste and Fuel Manufactured from or Including Waste*. This position is that incineration (inclusive of RDF, gasification, pyrolysis and co-incineration plants) has a role in waste management provided that it does not undermine waste management options higher up in the waste hierarchy and provided it represents the best practicable environmental option for disposal taking into account the hierarchy.

NSW EPA as part of the Department of Environment and Climate Change also stated in their *Guidance Note: Assessment of Non-Standard Fuels* that conflict with those higher value alternative recovery options should be avoided, including extended producer responsibility schemes.

The USEPA have a comprehensive report, *Solid Waste Management and Greenhouse Gases: A Life-Cycle Assessment of Emissions and Sinks* in which they found that for most materials [including metals, glass, plastics, timber, tyres (retreading) and paper and cardboard], recycling represents the second best opportunity (reduction being number one) to reduce GHG emissions.

The UK Department for Environment, Food and Rural Affairs⁴ state that the treatment and disposal of products such as plastics which contain carbon derived from fossil fuels wastes has a direct influence on the emissions of these greenhouse gases:

Re-use of products and materials is almost as effective [as avoiding unnecessary waste], preventing the return of the carbon within the materials to the environment ... reduces demand for new raw materials and therefore reduces climatic impacts from this and associated materials transportation. Recycling reduces the need for raw materials, and keeps valuable resources from being disposed of and further contributing to greenhouse gas emissions.

They go on to note that incineration and energy recovery are 'further down the hierarchy' as the original material is converted to gas and ashes and energy thus requiring further resource extraction and, manufacturing and transport of new materials.

Independent research

Dr Jeffrey Morris, an economist with Sound Resource Management published a paper in 2005 entitled, 'Comparative LCAs for Curbside Recycling Versus Either Landfilling or Incineration with Energy Recovery' in the *International Journal of Life Cycle Assessment*. Sound Resource Management had also produced a report for the San Luis Obispo (SLO) County in the USA in 2002 on the same issue. Overall environmental burdens were compared including energy usage, increases in global warming, acidification, eutrophication from emissions, human health impacts and impacts on ecological systems. They concluded that recycling (of materials including paper, glass, plastics, and metals) uses less energy and resulted in lower environmental burdens than disposal of wastes either by incineration or landfilling (including when energy recovery is accounted for either disposal facility). They found that recycling was 5.3 times more effective per ton of material in reducing GHG emissions than waste to energy.

⁴ <www.defra.gov.uk/environment/waste/wip/newtech/pdf/ClimateChange3.pdf>.

Using materials recycled in SLO County to manufacture products reduced GHG emission to 26% of what it would take to manufacture these from raw materials.

A document entitled *Environmental benefits of recycling: an international review of life cycle comparisons for key materials in the UK recycling sector* outlines the findings of the Waste and Resources Action Programme who commissioned the Technical University of Denmark and the Danish Topic Centre on Waste to review 188 scenarios for recycling and life cycle comparisons for impacts including energy, resources, climate change, toxicity and biodiversity. The review of these scenarios showed that 83% concluded that recycling is more favourable than either landfilling or incineration (includes waste to energy plants such as RDF, pyrolysis, gasification, and co-generation).

A study, commissioned by the Confederation of European Waste-to-Energy Plants (CEWEP) in 2004 by Profu in Sweden, found that in relation to GHG emissions and global warming potential, material recycling is the best environmental option for source separated materials and stated the preference for incineration with energy recovery only after material recycling or high efficiency biological treatment had been accounted for.