VEOLIA
ENVIRONMENTAL SERVICES

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Submissions
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SUBMISSION TO THE GARNAUT CLIMATE CHANGE REVIEW – EMISSIONS TRADING SCHEME DISCUSSION PAPER

Veolia Environmental Services is pleased to make the following submission with regard to the Garnaut Climate Change Review on the topic of the proposed National Emissions Trading Scheme (NETS).

Company Background

Veolia Environmental Services (VES) is Australia's leading provider of environmental services, including waste management and resource recovery for the commercial and residential sectors, and industrial services, such as cleaning and facility management.

VES is a division of Veolia Environnement, which provides waste management and resource recovery, energy, transport and water solutions to customers throughout the World (employing over 320,000 with an annual turnover of €40 Billion globally).

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VES currently employs some 3,300 employees and its operations extend to every Australian State. The company's waste management and resource recovery operations in Australia include:

- Solid waste disposal facilities;
- Bioreactors;
- Liquid treatment plants;
- Material recovery facilities (MRFs) for recycling systems;
- Composting facilities;
- Use of rail rather than road transport of waste to facilities
- Construction and demolition (C&D) resource recovery facilities; and
- Supply of sorted and tested materials for use as alternative fuels.

VES's bioreactors – at Ti Tree in SE Queensland and Woodlawn near Goulburn in NSW – are considered world's best practice facilities. They are designed to reverse the predominant paradigm for waste disposal from one of mere containment of end-of-life materials to one of specific design for environmental outcomes, particularly maximum landfill gas extraction and renewable energy production. (See Appendix A for further discussion.)

By the very nature of our activities, sustainable development is at the heart of everything we do. It characterizes the partnerships we have cultivated with governments, industries and the community; it drives the innovative research and development for which the company is renowned; and it reflects our corporate business. Accordingly, it should come as no surprise that VES (previously known as Collex) was Australia's first environmental services company to develop and publish regular Sustainability Reports.

It should be noted that VES's comments in relation to NETS are preliminary at this stage and will evolve as more design details emerge about NETS with the Commonwealth Government's release of its Green Paper on NETS later this year.

VES Summary of Key Issues

VES's key points highlighted in the following submission are :

1. VES wishes to make a positive contribution to NETS and its important objectives

2. The effectiveness of a NETS scheme will be determined by its design and associated measurement methodologies

3. It is understood throughout the Environmental Services Industry that measurement issues are currently perceived as the most problematic area to be confronted in developing a fair and equitable scheme.

4. Emphasis should be given to not disadvantaging industry participants that have already invested in achieving positive GHG outcomes. To this end pre- 2010 abatement successes need to be taken into account in any 'cap and trade' based scheme

5. A fundamental of the scheme should be in simple terms that low GHG emission bioreactors should be treated more favourably than high emission landfills and maximum resource value processing facilities should be treated more favourably than lower value (often high volume) facilities

6. VES recommends the formation of a high level industry/public sector group to develop potential options for NETS treatment of waste

General Position

VES believes that - compared to other greenhouse gas (GHG) emission reduction policy options such as carbon taxation - NETS is likely to be comparatively lower in cost to Australia's economy and provide greater flexibility for industry, including the waste management and resource recovery sectors.

VES supports the inclusion in NETS's scope of waste-related activities in due course, as better management of waste and recyclables has an important role to play in climate change and environmental protection

However, to be environmentally optimal and least cost to the economy and householders, it is VES' strong view that NETS' design needs to:

a. be based on reliable GHG emission measurement methods for waste-related activities;
b. treat waste-related activities in a holistic manner rather than narrowly focus only on the single activity that is "traditional" disposal of solid waste to land and its associated GHG emissions;
c. consider recent investment if lowering GHG emissions (eg in the last 5 years) and alternative transportation methods (eg. Rail)
d. not detract from current progress in GHG emission reduction by our industry, including inhibitions on further expansion of resource recovery systems; and
e. not duplicate existing environmentally-related charges.

Crucially, NETS' design needs to reflect the reality that waste-related activities can be both generators of GHG emissions (approximately 2.6% of national total) from solid waste to land disposal and abaters of GHG emissions (potentially 7% of national total) through gas extraction from facilities and other resource recovery systems.[1]

It needs to be also acknowledged that GHG emissions from solid waste disposal on land are likely to have fallen from 1990 levels[2]. Inasmuch, it

[1] "Potential for Greenhouse Gas Abatement from Waste Management and Resource Recovery Activities in Australia", Warnken ISE, March 2007.
[2] "Waste Sector Greenhouse Gas Projections", Australian Greenhouse Office, December 2007.

appears that existing strategies, such as the transition to state-of-the-art facilities such as bioreactors or the increased diversion of materials away from disposal to resource recovery, are already resulting in GHG emission reduction from waste-related activity. (The positive trend in GHG emission reductions would be even greater if embedded energy savings from recycling activities is considered.)

VES would be very concerned if NETS' design inadvertently created perverse outcomes, which could reverse the current positive trend. This could include the creation of unintended disincentives for the further expansion of resource recovery systems, including their broader environmental benefits.

Poor design of the NETS in relation to waste-related activities – such as an approach that treats GHG emissions from landfill as a liability while not crediting GHG abatement from recycling and resource recovery – could see a substantial additional cost to VES which would be passed on to customers, including local Councils and their ratepayers. By corollary, investment in value-adding resource recovery would slow, as the only option for the purposes of reducing the cost of permit allocation is to extract more landfill gas where possible.

Key NETS Design Considerations

<u>GHG Emissions Measurement from Waste-Related Activities</u>

VES believes there are several technical difficulties in accurately measuring historic, current and future GHG emissions from landfills.

First, there is the issue of waste composition. Waste streams vary markedly according to the sector from which they are generated, eg, municipal solid waste versus commercial/industrial waste versus construction/demolition waste versus specialised waste and so on. This is particularly so in terms of the percentage of organic material in a given waste stream (and therefore its GHG generation potential).

Secondly, there is the issue of historic waste deposits. While the contemporary waste disposal industry has a good sense of the material entering the facilities that it manages, it is often very difficult to determine the composition and quantity (and therefore GHG generation potential) of

materials disposed prior to modern management procedures, including the introduction of regulatory regimes.

Thirdly, there is the issue of reliance on broad assumptions in measurement methodologies. For example, a key assumption in the current methodology advocated by the Commonwealth Government for GHG emissions from landfill is the so-called k-value for the effect of climate on the rate of material degradation in different States/Territories of Australia. The following table illustrates the significance of the k-value assumption on potential GHG emissions using VES' Woodlawn facility as the base case.

Applying the k-value assumption, GHG emissions would be calculated as 45 percent lower if Woodlawn were located in Victoria, Western Australia, South Australia or the ACT - which is encircled by NSW and is less than 50 kilometres from Woodlawn's actual site. Or, GHG emissions would be calculated as 30 percent higher if Woodlawn were located in the Northern Territory or Queensland - be it some 20 kilometres north of the NSW/Queensland border at Broadbeach or some 2,000 kilometres north of the border at Cooktown.

Constituency	**k-value**				**Net release of methane (t CH_4)**
	Food	**Paper / Cardboard**	**Garden/ Green**	**Wood**	
Victoria, WA, SA, Tas or ACT	0.06	0.04	0.05	0.02	952
NSW	0.17	0.06	0.1	0.03	1,728
Qld or NT	0.35	0.07	0.17	0.03	2,497

As some facilities do not have physical measurement systems in place, another uncertainty in terms of greenhouse gas emission calculations is the rate of methane capture from landfill. The level of capture is highly

dependent on the initial design and engineering of a site, as well as its on-going operation and maintenance. Given the wide variability in types of sites, including technologies deployed and the materials they do or do not take and when they received them, it is difficult to estimate what the methane capture rate may be.

The AGO has estimated the net rate of methane recovery from solid waste for in Australia in 2003 to be 23.6 percent. When the international literature is reviewed, various expert reports claim that methane capture rates vary from below 50 to over 90 percent. An independent report by GHD regarding Woodlawn (Attachment A) estimated a capture rate of 91.7 percent.

If again looking at the Woodlawn case study, this assumption is crucial. The net release of methane is halved when assuming a 75 percent recovery rate rather than a 50 percent recovery rate. The release of methane decreases by 80 percent when assuming a 90 percent capture rate rather than 46 percent, as illustrated below.

Methane capture assumption	**Net release of methane (t CH_4)**
46%	1,728
50%	1,600
75%	800
90%	320

We must stress here that if the AGO average of approximately 23% is used then Woodlawn would be assessed as releasing 3,456 tonnes of methane. However, if our own independently verified recovery rate of 91.7% is applied than methane releases decrease to approximately 320 tonnes of methane.

This week, the US EPA stated the following in the released report, "*Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990 – 2006*"[3]:

> "*Several types of uncertainty are associated with the estimates of CH_4 emissions from landfills. The primary uncertainty concerns the characterization of landfills. Information is not available on fundamental factors affecting CH_4 production:*
>
> - *the amount and composition of waste placed in every landfill for each year of its operation;*
> - *estimation of the contribution of industrial wastes to total CH_4 generation;*
> - *estimation of oxidation by cover soils; [and]*
> - *uncertainty in the estimates of methane that is recovered by flaring and energy projects (10-50 percent uncertainty).*"

The same US EPA report also features the below table which demonstrates a very substantial difference in the "lower bound" and the "upper bound" of emission estimates.

Table 8-5. Tier 2 Quantitative Uncertainty Estimates for CH_4 Emissions from Landfills (Tg CO_2 Eq. and Percent)

Source	Gas	2006 Emission Estimate (Tg CO_2 Eq.)	Uncertainty Range Relative to Emission Estimate[a] (Tg CO_2 Eq.)		(%)	
			Lower Bound	Upper Bound	Lower Bound	Upper Bound
Landfills	CH_4	125.7	74.7	168.5	-41%	+34%

[a] Range of emission estimates predicted by Monte Carlo Stochastic Simulation for a 95 percent confidence interval.

Another specific area where uncertainty exists is the estimating the GHG footprint of wood, cardboard and paper that are disposed to landfill. The argument has been elsewhere advanced that these materials contain degradable organic carbon which is not dissimilated, but rather stored in the landfill. Accordingly, it has been suggested the host landfill should be credited – including in measurement methodologies - with this carbon sequestration to offset its net methane emissions.[4]
In 1999, the AGO recognised the inherent complexity and the following statement by the AGO largely remains accurate:

[3] US Environmental Protection Agency, 2008.
[4] "Submission to NGERS Technical Guidelines Discussion Paper", Sam Bateman for Hanson Landfill Services, February 2008.

> *"The physical and behavioural relationships underpinning emissions from these activities are often more complex, identification and monitoring of emissions presents greater difficulties, and the links between readily observed inputs (or outputs) and the emissions produced appear to be weaker. At present, the best available techniques for estimating emissions from these sources still encompass a high degree of uncertainty. Application of these approaches to determining permit obligations or allocations could introduce incentives that are detrimental to both economic and greenhouse objectives. Reducing these uncertainties through direct monitoring or sampling methods could prove so costly that the benefit of including smaller emitters is entirely eroded. More work needs to be done in this area."*[5]

Additionally, as recently pointed out by legal counsel to the Waste Management Association of Australia, there is further uncertainty in terms of measuring the GHG emission footprint of AWT facilities, including the appropriate approach to take when such facilities are co-located with host landfill facilities.[6] A submission by the independent consultancy, Hyder, made the following related point in a recent submission to the NGERS Technical Guidelines Discussion Paper:

> *"Carbon balances for alternative management options exist and should be included to ensure that the assessment of solid waste management is not piecemeal and focused entirely on avoided landfill."*[7]

Holistic Scope of Waste-Related Activities

To date, there appears to have been a tendency in greenhouse public policy to focus on one end of the spectrum of waste-related activity in Australia, eg, solid waste disposal to land.

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[5] "Emissions Trading: Establishing the Boundaries", Australian Greenhouse Office, 1999.
[6] "Draft Carbon Pathways Issues Paper", Deacons for NSW Carbon Committee of the Waste Management Association of Australia, March 2008.
[7] "Submission to NGERS Technical Guidelines Discussion Paper", Leanne Philpott for Hyder Consulting, February 2008.

Within that narrow band itself, there seems to have been limited appreciation in greenhouse public policy formulation for a wide range of engineering, technological and operational variations from facility to facility.

VES believes it is important for NETS design that the broad and holistic sweep of waste-related activities be considered. While facilities for solid waste disposal to land are a net generator of GHG emissions (including where best practice methane extraction is practiced), resource recovery activities undertaken by the very same companies do and can contribute to GHG abatement, including through the return of recycled organic matter (and carbon) to soil and the provision of recyclate materials for manufacturing processes.

Even when looking at solid waste disposal to land in isolation, VES believes it is important for NETS design to consider the significant differences in environmental outcomes that are produced by state-of-the-art facilities, such as bio-reactors and other AWT facilities, compared to older and often non-engineered "tips".

Generally speaking, broad assumptions about facilities for solid waste disposal to land cannot reflect the reality of such facilities in Australia which is highly diverse. There is substantial variation between individual facilities based on their original design, their use of technology, on-going management and operation, their location, their input materials, and their age. Some companies / facilities have already made significant investments to attain, for example, best practice in the extraction of methane from landfill while others have done little to nothing.

As VES has repeatedly argued in the context of other public policy submissions, there is no one-size-fits-all solution. Specific circumstances need to be well understood and strategies need to be selected according to those circumstances, not just because they are used elsewhere and appear the most cost effective and administratively efficient on the surface.

Where NETS design sets the boundary for what is considered waste-related activity or the "waste management industry" is critical, as demonstrated by the following two scenarios.

Scenario A

The "waste management industry" is included in the scope of NETS with liability for landfill emissions but no opportunity for offset credits from its resource recovery activities.

Under this Scenario, it is highly probable that an important incentive for further expansion of resource recovery activities will be removed, eg, the activities that are currently resulting in a progressive reduction of GHG emissions attributable to "waste". Affected activities would include:

- enhanced source segregation and recycling of organic material from both commercial / industrial and municipal solid waste streams;
- the avoidance of landfill gas generation (and associated landfill gas emissions) by diverting this material from landfills;
- the production of renewable energy as electricity from anaerobic digestion;
- the carbon sequestration achieved by returning this material to land;
- improvement of kerbside recycling for the household sector including better facilities to optimise material recovery and contribute to resource conservation;
- further expansion of paper, cardboard and container packaging recycling in the commercial / industrial waste stream; and
- development of Alternative Waste Treatment facilities to address residual waste from both the commercial / industrial and municipal solid waste streams.

At the same time, due to the intended "comprehensive scope" for NETS that has been suggested by your Review, existing voluntary markets for offsets from methane extraction could be, in the Review's words, "cannibalised". Hence, the remaining incentive for methane extraction will be solely to reduce facility liability exposure under NETS and its permit system.

To reduce their net liability and permit cost, it is likely that integrated players in the waste management sector will limit their emissions reduction activities to enhanced methane extraction and neglect a range of other GHG abatement options associated with advanced waste processing and resource recovery.

Meanwhile, depending on the facility emission levels enshrined in NETS permits, those players who have already significantly invested in methane extraction – and indeed designed their entire facilities with that end in mind – may end up penalised for having taken early action. Eg, they will be confronting the point of diminishing returns – and technological feasibility – in terms of further methane extraction.

Recent preliminary advice from Deacons to the Waste Management Association of Australia raises an additional equity / market distortion issue. Namely, Deacons advises that:

> *"For example, it is anticipated that there may be only as few as 20 facilities which may trigger the threshold requirements for the NGER Act. If permit liability only attaches to those entities covered by the NGER Act, then a significant part of the industry will not be covered by NETS. In addition, if only facilities subject to the NGER Act are to be covered by NETS, then a whole segment of the waste industry – namely, facilities operated by local government – will be excluded. This arises because the NGER Act only captures 'constitutional corporations' and Councils are not considered 'constitutional corporations' except for a couple in Queensland."*[8]

In practice, many of the bigger facilities are actually operated in a more sustainable and compliant manner than the smaller industry particpants.

Affected players may be further disadvantaged where Councils who are customers do not have the ability to pass through additional costs to rate-payers as a result of State governments' rate-pegging policies.

Such a scenario is likely to lead to increased financial costs for sector players (and their customer bases and potentially householders) with limited environmental benefits for society. On a commercial-in-confidence basis, Veolia is prepared to provide independent modelling that specifically estimates these costs and benefits as they apply to its operations.

[8] "Draft Carbon Pathways Issues Paper"

Scenario B

The "waste management industry" is included in the scope of NETS with liability for landfill emissions but with opportunity for offset credits (either internal or external) from resource recovery activities.

Setting the boundary in this manner – eg, allowing sector players to integrate their waste disposal and resource recovery activities and establish permits at a net balance of their emission liabilities and their emission abatement credits – would provide an incentive to both better manage landfill sites and invest in resource recovery.

Such a scenario is likely to lead to a net neutral position in terms of economic costs and benefits for sector players (and their customer bases including householders) with significant environmental benefits for society. Such a scenario would improve the position – both in terms of potential and cost/benefit – of municipal solid waste management improvement as a GHG reduction strategy (as demonstrated by the NSW Department of Energy, Utilities and Sustainability.

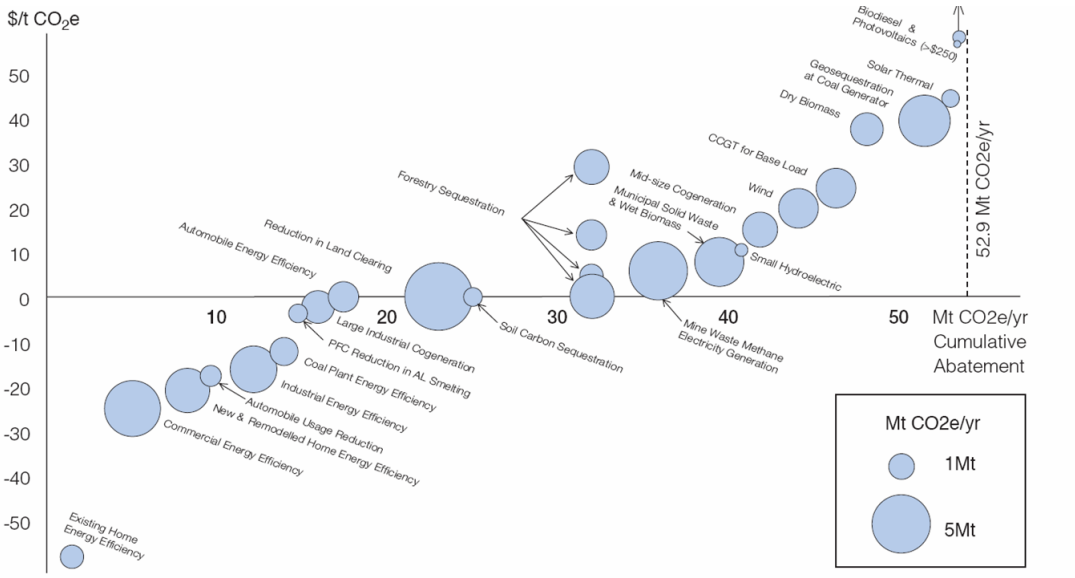

Figure 6: NSW GHG Abatement Cost Curve to 2014

Again, on a commercial-in-confidence basis, Veolia is prepared to provide independent modelling that specifically estimates these costs and benefits as they apply to its operations.

Existing Environmentally-Related Charges

Many Australian constituencies currently apply environmentally-related charges to achieve policy outcomes in terms of solid waste disposal to land. Presumably, these charges in part exist to "put a price" on the environmental cost of solid waste disposal to land, including GHG emissions, and thereby motivate alternative waste management methods such as increased resource recovery. The following table outlines the current level of environmentally-related charges by State jurisdiction.

	Municipal			**Industrial**		
	Metro	**Provincial**	**Rural**	**Metro**	**Provincial**	**Rural**
NSW	$38.60	$31.60	-	-	-	-
Victoria	$9	$9	$7	$15	$15	$13
SA	$23.40	$11.70	-	-	-	-
WA	$3 to $6	-	-	-	-	
Queensland	-	-	-	-	-	-
Tasmania	$1.70[1]	-	-	-	-	-
1 Some councils						

Note that NSW increase their section 88 levy by $7/tonne annually. Further, it is widely acknowledged that NSW are already applying a levy with exceeds the estimated externality costs of landfill.

If one objective of NETS is to equally "put a price" on the environmental externality that is GHG emissions from waste-related activity, it could be argued that this to some degree constitutes "double dipping". Namely, the economic instrument to stimulate improved waste management behaviours already exists and would be partially duplicated.

Given the existence of these waste levies, there is significant potential for adding another layer of costs to the economy for limited environmental gain if care is not particularly taken in the NETS' approach to pricing, auctioning or allocating permits for waste management sector players. This is not to mention the obvious equity issue or the potential to create distortion between different players within the sector who may be

operating in different geographical locations or applying different waste management methods.

There may well be a case for compensation of affected sector players, including through discounts to the initial permit price or through extended forms of tax deductions. At a minimum, consideration should be given to addressing any additional household costs from waste-related aspects of NETS (in addition to those that are being anticipated for increased energy costs).

Conclusion

VES believes that NETS can act as an incentive to:
a) further reduce the GHG footprint of solid waste disposal to land facilities, and;
b) further increase the GHG abatement of other resource recovery activity.
However, this is highly dependent on NETS design. In this submission, VES has outlined some of its initial thoughts on design considerations.

As VES wishes to make a positive contribution to NETS and its important objectives, VES is currently investing in the development of specific and detailed policy options for how NETS can best claim the opportunities inherent in waste-related activity without unnecessarily adding to system costs or creating unintended disincentives. VES looks forward to further consultative opportunities including the Government's Green Paper.

Among the concepts that VES is scoping is, for example, the setting of performance standards for both waste disposal and resource recovery facilities, as is the emerging trend in the EU. Under such an approach, NETS permits could be auctioned based on a target emission per tonne of waste to landfill and a target emission abatement per tonne of waste diverted from landfill, or as currently suggested in a Queensland policy framework, satisfaction of a specified list of environmental performance criteria such as landfill gas capture, leachate collection and liner systems.[9]

[9] "Let's Not Waste Our Future: Queensland Waste Strategy Discussion Paper", EPA Queensland, 2007.

Relatedly, VES recommends and would strongly support a high level industry / public sector group be formed to develop potential policy options for NETS' treatment of waste. These options should be modelled for their integrated economic / environmental / social costs and benefits, and the best sustainability-based option should be adopted for inclusion in NETS in due course.

Please feel free to contact Tony Cade on (02) 85710000 should you to discuss any aspect of our submission.

Yours sincerely,

Mr Doug Dean

Managing Director

Appendix A: Bioreactors

The fundamental principle behind the design of a Bioreactor facility is that it is a purpose built and fully engineered operation that maximises and accelerates the rate of decay of putrescibles waste. It is designed to use the naturally occurring microbes that live in organic matter to rapidly degrade the organic and other wastes placed into the facility using an anaerobic process.

Integral to the core design are engineered collection systems constructed specifically to manage in the daily operating environment - liquid retention, its recirculation and methane capture. By scientifically and carefully balancing the placement of incoming waste, cover materials, recirculation and retention of all liquids, including the leachate itself, management of the internal biological systems are sustained thus maintaining the core operating environment to process the waste . This design keeps the internal operating environment healthy by drawing off the generated methane gas produced by the micro–organism environment and all waste placed is then rapidly stabilised and degrades in a controlled environment.

A Bioreactor facility's only comparison to landfill when located in a disused mine or similar escarpment, is that it is merely a tenant of the location, operating to remediate the site's previous use and does this in a controlled engineered way. As comparison, if the same process is compared to the practice of land filling waste, there are no internal heat controls monitored in a landfill, biological monitoring is not a usual part of the operations and in general terms liquid is usually captured at the bottom of the waste, treated on site and then discharged to sewer. Gas systems are also usually built and installed only when landfill cells are either filled; new cells built or a lift change at the placing of waste. These practices are not usually core to the daily operating environment in the placement of the waste, rather they are a by product add on from its placement.

A Bioreactor facility can only be compared to other fully engineered facilities or as are now termed "Alternate Waste Treatment' (AWT) plants. The significant difference between the two systems is that a Bioreactor facility design operates in a natural external environment, providing lower

capital establishment costs, and having lower long term operational and maintenance costs.

AWT plants are mostly designed to receive and process mixed residual wastes that generate and capture methane outputs for alternate reuse, with all residuals ultimately going back to landfill. All AWT plants, regardless of the technology, rely on landfill at some point of their process. The current situation in Australia for all operating AWT plants receiving and processing mixed waste is that the final outputs of the processed waste either ends up in limited agricultural applications or most of it is currently used as cover to remediate environmentally affected farming land, old landfills and mine areas. These plant designs require steel or concrete as the structural system boundaries. Bioreactors use clay, bentonite, HDPE and a multitude of other manmade and natural barriers as their system boundaries. The outcomes are very similar, waste is stabilised, recyclables can be recovered, where commercially economical, and methane capture significant.

Bioreactor facilities however have an additional advantage over AWT plants in that they require no additional disposal or externalities for managing residuals from the process. Throughout the world, regardless of the technology used to process waste, at some part of its process all require the support of landfills to manage their residuals, sometimes these being quite toxic.

VES would be pleased to forward reports from Energetics in relation to the environmental performance of the company's Woodlawn Bioreactor, which uses the same technology as the Ti Tree Bioreactor in Queensland. These reports provide technical quantification that a well-run bioreactor is comparable in environmental outcomes to other forms of AWT.

Attachment A: "Report for Woodlawn Bioreactor – Gas Flux Testing" by GHD for VES, June 2007