Submission
No 46

The Forgotten Wasted Space

- ✓ Landfill space is becoming scarce and is presently being filled with soil. **Airspace costs a lot of money to produce.**
- ✓ Great success has been achieved at the front end with recycling and reducing waste to landfill. BUT ....
- ✓ Certain landfill practices are archaic in nature and as a result WASTE SPACE. This needs to be addressed.

"Effective waste management is vital to the States long-term sustainability. It is of growing concern to governments at all levels and, increasingly, the community. "

Introduction

Waste production and the problems associated with waste disposal are a natural part of civilization and urban life. The disposal of garbage and refuse is rapidly becoming an acute problem in densely populated areas all over the world. Some of these problems are

- Odour
- Airborne litter
- Spread of harmful organisms by biological vectors
- Scavenging by animals and bird life

Current Australian Environmental Protection Agency (hereafter referred to as EPA) regulations require the covering of the workface of every landfill with at least 200mm of topsoil at the end of each day's operations. And at every 3 meter lift they need to create a floor that covers the whole area that is at least 300mm deep. The result is a lot of commercially valuable space which is occupied by the daily addition of the topsoil.

The application of the topsoil cover requires the use of earth moving machinery and skilled personnel which is an added cost to the landfill operator.

During the twentieth century, the methods and procedures used for waste disposal moved towards the design and operation of environmentally safe landfill sites.

The conventional process of a refuse landfill essentially consists of:

1. Consolidation of refuse volumes at a transfer station
2. Recycling, resource recovery operations
3. Transfer of remaining refuse to the disposal facility
4. Direct tipping of the refuse onto the ground at a prepared site.
5. Placement, **Compaction and covering of the refuse at the site.**

What has been achieved?

Twenty years ago, Australians didn't think twice about chucking everything in the rubbish bin. So what if it all ended up at the tip? Now it's hard to imagine not separating glass products, cans, plastics, paper, cardboard and other recyclable items from the rest of our rubbish.

Today, thanks to community education and persistence of the industry we have come a long way in diverting a large amount of our waste from our landfills. To achieve this we have spent a considerable amount of energy, time and money and the results speak for themselves.

But while we have been focusing on the front end of our waste streams, unfortunately, the practices within landfills and the requirements of the EPA have continued to eat up the current available landfill space within Australia.

What can we do?

Because of Government regulations, constructing a landfill costs 10's of millions of dollars, therefore the cost of a m^3 of AIRSPACE is significant and over the last 5 years we have found this to vary around Australia from \$5-\$20 / m^3. Again because of another Government Regulations the current practice is to fill anywhere from 20-70% of the landfill up with soil therefore limiting the amount of AIRSPACE that is consumed by waste.

Therefore 20-70% of the 10's of millions of dollars spent to construct the AIRSPACE is wasted and consumed by non revenue generating soil.

Understanding that AIRSPACE is being wasted, solutions have been formed to mitigate these problems by applying an alternative daily cover (referred hereafter as ADC) to soil to conserve this AIRSPACE, ADC's will save 15-20%.

On top of this, recent technological advances in baling machines and totally degradable plastics have presented the opportunity to wrap bales of waste for delivery into landfills. This technology will enable the industry to be environmentally compliant to each states' EPA regulations of controlling odour, airborne litter, disease control and scavenging whilst at the same time reducing the WASTED SPACE by up to 60% at the disposal facility, delivering significant cost and space savings.

The major financial concern in the operation of a landfill disposal site is the optimization and conservation of available space. The more space for garbage to be dumped, compacted and covered at a disposal site, the **longer the life** of the disposal site for landfill operations.

By addressing the issues within landfill practices it offers the following major benefits to landfills:-

- **Capital cost pushed out**
- **Increase the amount of landfill space in the long term**
- **Save operational costs**

Best Practice

- ✓ ADC's
- ✓ Baling Process using new wrapping technology
- ✓ Alternative Waste Treatment Plants

Alternative Daily Covers (ADC's)

Some ADC's provide revenue enhancing qualities of any soil cover, not only in conserving valuable AIR SPACE, but significantly reducing leachate treatment requirements while mitigating against leachate outbreaks, and providing a mechanism for the proper control and containment of landfill gases leading to opportunities to create energy from gas. While at the same time some ADC's don't satisfy the EPA's requirements.

Below is a sample analysis showing the cost effectiveness of the use of a particular ADC being used within a landfill environment and comparing it to the use of soil as required by the current EPA regulations. The figures are based on an average of 600m2 of workface size per day, 5 days per week at a gate price of $50/ton and an engineered void cost of $5/m3.

Cost analysis

Soil cover volume and cost analysis			
Working days	**1**	**22**	**260**
	Daily	**Monthly**	**Annual**
Airspace used m3	125	3380	32,448
(wf x sd)			
Value of airspace used	$ 5,491.20	$ 118,976.00	$ 1,427,712.00
(daily airspace used x cr x (gp + ev) cost)			
Operating cost inc plant etc	$ 6,205.02	$ 134,442.06	$ 1,613,304.73
(value of airspace +operation costs)			

ADC volume and cost analysis			
	Daily	**Monthly**	**Annual**
Airspace used per m3	3.23	71.1	839.8
(wf x ADC thickness + compacted ballast)			
Value of airspace used	$ 142.12	$ 3,079.27	$ 36,951.20
(void used x cr x (gp + ev) cost)			
Operating cost of ADC inc mater	$ 910.32	$ 19,723.60	$ 236,683.20
(cost ADC and ballast + operating costs + value airspace)			

Actual Cost analysis ADC vs Soil per annum		
Annual Airspace saved by using ADC	**Soil**	32,448 m3
	ADC	840 m3
	Total	**31,608 m3**
Annual Cost savings using ADC	**Soil**	$ 1,613,304.73
	ADC	$ 236,683.20
Total operating Saving Using ADC		**$ 1,376,621.53**
If inert cover generates an income this should be deducted from total saving $s		

Calculated below is the m3 void consumned x the cost to engineer m3 + cost of equipment, man hours and material used to cover

P & L Impact of current cover cost Vs ADC cost			
ANNUAL SOIL INERT COVER COST Vs EC COST			
	Daily	**Monthly**	**Annual**
Current Cost to cover with inert ma	$ 1,337.82	$ 28,986.06	$ 347,832.73
Current Cost of inert materials p	**$ 2.23**		
(daily airspace consumned by soil x ev + daily operating costs soils)			
Projected Cost to cover with ADC	$ 784.35	$ 16,994.25	$ 203,931.00
Projected Cost of ADC per m2	**$ 1.31**		
(daily airspace consumned by ADC x ev + daily operating costs of ADC + cost of ADC)			
Difference P & L Impact per	$ 553.47	$ 11,991.81	**$ 143,901.73** **Saving**

Baling Process

Bale fills have been operated in Europe and around the world for many years to bale and store putrescible waste ready for incineration.

Without the availability of a landfill degradable stretch wrap to cover the bales, as all plastic technologies at the time did not degrade in this controlled landfill environment, the bale fills failed to be a viable option to land filling.

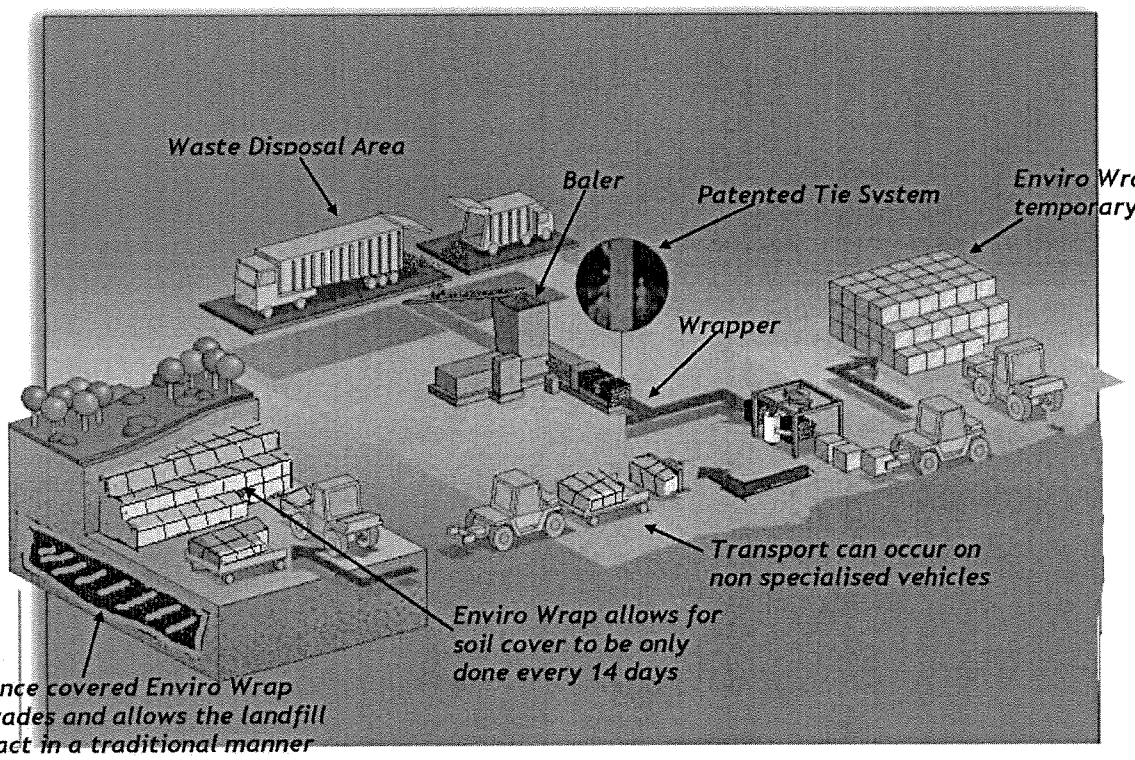
A balefill without a degradable wrap was seen to be a similar operation to a conventional landfill with some advantages in the sheltered receivable area and initial treatment of waste before delivery to the landfill site. Unwrapped baled waste was not fully treated leaving exposed areas that required further treatment or covering at the landfill site generally with soil. **The lift height would remain the same as conventional landfill regulations** (varies 2m - 2.4m) before a 300mm to 350mm soil floor would be required.

New OXO-DEGRADABLE plastic stretch wrap technology (http://www.epi-global.com/en/products/landfill/ew_intro.htm) has been tested and developed to encapsulate the bale temporarily and sequentially degrades in the heat of a landfill environment. This creates a normal landfill environment which has potentially highlighted significant advantages economically, socially and environmentally. Bale technology has also been through many years of reform and improvements thanks to material recovery facilities.

The "wrapped balefill process" includes the automatic square baling of waste in a controlled environment using an oxo-degradable landfill bale wrap. Wrapped and temporarily treated bales are then transported to the landfill working face by flat deck trucks and fork lifted into place. There is no exposed work face therefore proposed that the lift heights for the waste can be up to 10 meters high before the requirement of the 300 mm soil floor layer. Due to the temporarily treated bales there would be no working face or batter 150mm soil cover requirements.

Compared to other new technologies within the industry, the baling option offers the waste industry an alternative treatment that is very cost effective and comparatively affordable compared to other alternative waste treatment options that are presently available. In fact for an investment between $2m-$10m depending on the waste stream size you can have a fully functional bale processing plant and baleful in operation

The Turn Key Solution



NOTE: This system can be placed at transfer stations or resource recovery facilities it does not need to be at the landfill

Below is a sample analysis showing the cost effectiveness of the use of a wrapped balefill compared to traditional land filling. **It shows that it is virtually cost neutral but ensures that over 90% of the landfill is filled with waste.**

Revenue & Airspace Analysis

Normal Landfill Soil Analysis		Total revenue of Cell	Total cost per cell	Gross Margin per cell
M3 of airspace consumed by floor cover per cell	54,381		see below	
Total Refuse tonnes that can be placed in cell	20,619	$ 1,443,313.73	$ 1,087,425.81	$355,888

Enviro® Wrap Baling Analysis		Total revenue of Cell	Total cost per cell	Gross Margin per cell
M3 of airspace consumed by floor cover per cell	1,920		see below	
Total Refuse tonnes that can be placed in cell	47,957	$ 3,357,002.04	$ 2,663,627.80	$693,374

Actual Air Space analysis EW vs Landfilled per Cell			% of Cell consumed by Soil
Airspace saved by using Enviro® Wrap per Cell	Landfilled	54,381 m3	70.8%
	Enviro® Wrap	1,920 m3	2.5%
	Total	52,461 m3	

Revenue Value saved using Enviro® Wrap per Cell		per Cell
	Enviro® Wrap	$693,374
	Unwrapped	$355,888
Total Revenue Value Saved Using Enviro® Wrap per Cell		$337,486

Operational Cost Analysis

Comparison of Costs per Day					$	$ per tonne
	Operating Costs	$ 3,173.74	$ 41.26			
Landfilled	Void Costs	$ 883.15	$ 11.48			
	Net Movents	$ -	$ -			
	Trucking Costs	$ -	$ -			
Total Value of Operational Costs per Day Normal Landfill					$4,056.89	$52.74
Balefilled	Operating Costs	$ 631.10	$ 8.20			
	Void Costs	$ 13.09	$ 0.20			
				$ 644.19	$	8.40
	Facility Costs	$ 1,873.39	$ 28.65			
Tonnes	Enviro® Wrap Costs	$ 864.59	$ 11.24			
17,000	Strapping Costs	$ 207.36	$ 2.70			
	Trucking Costs	$ 350.00	$ 4.55	$ 3,295.35	$	47.14
Total Value of Operational Costs per Day Using Enviro® Wrap					$3,939.54	$55.54
Total Savings of Operational Costs Using Enviro® Wrap per Day/tonne					$117.36	(-$2.80)

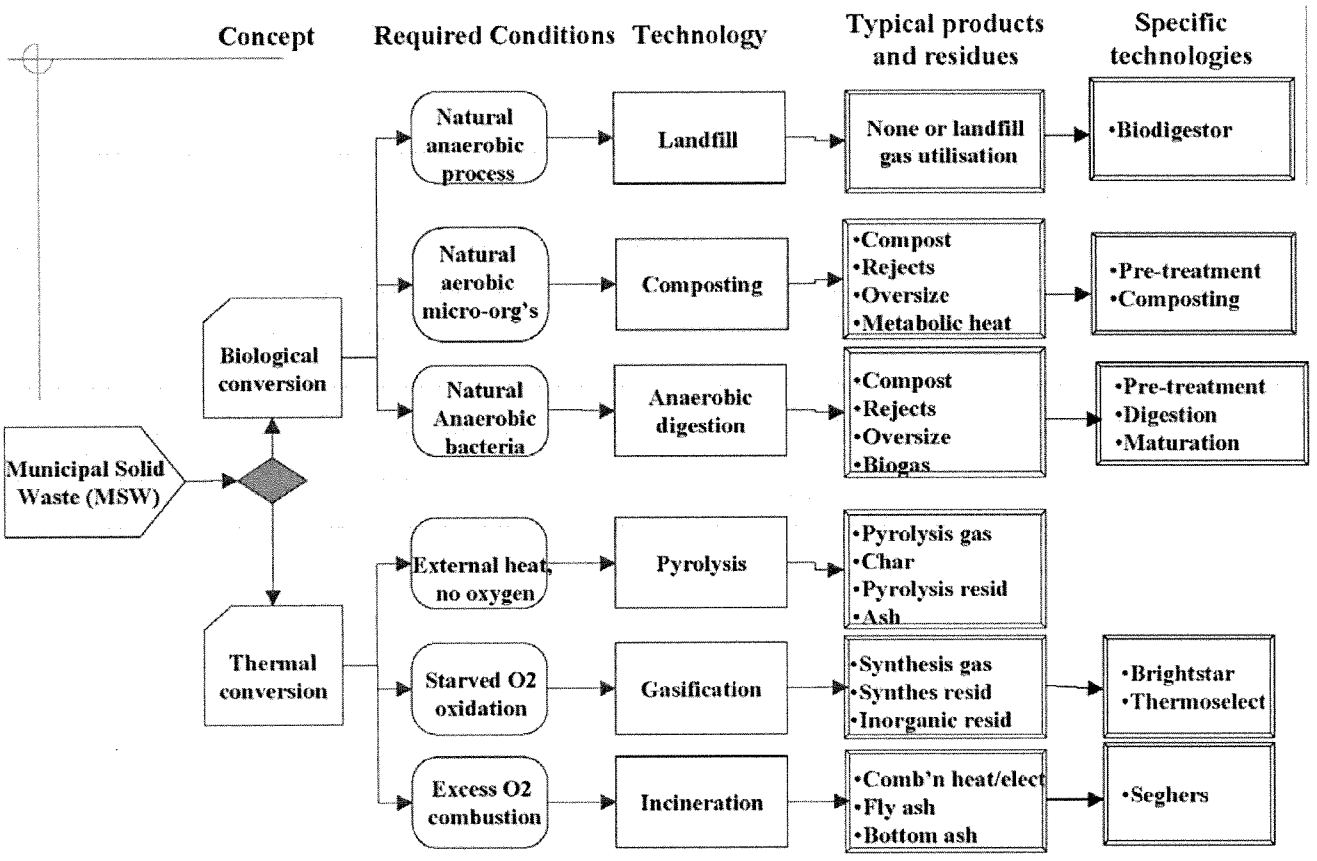
Plus savings in roading useage, airspace utilization, gas extraction construction,
Odour control, bird and litter controll leachate controll stormwater controls,

Alternative Waste Treatment (AWT) Plants

In the last few years Australia has embarked on developing and implementing a number of AWT plants around Australia. These have come at a significant cost and in some instances have been a total failure. Not only do the AWT plants cost a significant amount of money to set up, operationally, to process a ton of waste can be anywhere upwards of $100 per ton which in a lot of instances is more than double of the current processing costs of traditional land filling.

On top of this the by products that come out of AWT plants vary from 30-50% that is still required to taken to the landfill. Also a question that is still being asked by the industry at large has been "Is there a sustainable market for the products that are produced by these AWT plants".

Below is a diagrammatic representation of a number of different AWT plants.



Conclusion

In summary it is our opinion that with very little effort a significant amount of landfill space can be conserved.

Some suggestions to aid in conserving landfill space with taking into account the information provided above

- Due to the large costs involved in diverting waste from landfills maybe look at a way to ensure that the whole landfill industry attempts to convert to at least using ADC's rather than soil to satisfy their EPA requirement. This would assist in saving a significant amount of WASTED SPACE within the industry.
- Alternatively introduce a process within the EPA legislation where a universal assessment criteria is used to assess ADC's on their merits. This would assist the councils when applying for the use of ADC's at their landfills. Eg. A standardised forms, management procedures to be used in conjunction with ADC's etc
- Create some grant/funds that can be made available for councils to help in the implementation of baling technology.

Having never made a submission of this type before we hope the above has been helpful in your inquiry into Municipal Waste Management in NSW. If we can be of any further assistance to you or if you require further information on any of the above information please do not hesitate to contact us on the below details.

Yours Faithfully,

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Elizabeth Phegan - Inquiry into Municipal Waste Management in NSW

From: "Melany Palmer" <melany@newwaste.com.au>
To: <pubworks@parliament.nsw.gov.au>
Date: 13/04/2006 8:32 AM
Subject: Inquiry into Municipal Waste Management in NSW

Attention: Carolynne James

Hi Carolynne,

Please find attached New Waste Solutions submission for the above inquiry.

If we can of any further assistance please do not hesitate to contact us.

Yours faithfully,

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