From: MARTIN Stephen (Powerlink)
Sent: Friday, 28 July 2006 10:01 AM

Subject: RE: Productivity Commission hearings [SEC= UNCLASSIFIED]

Dear Mr Murtough

Thank you for the opportunity to make a submission to the commission yesterday. Attached is an electronic copy of a waste audit conducted by Powerlink Queensland earlier this year, which was tabled at our joint public submission with ENA yesterday. Powerlink is working through the action items as resources are available to address them and agree with the Commissioner that it provides an example that industry can act responsibly with limited government intervention.

I also appreciate the Commissioner's suggestion that certain standards and strategies to address waste streams should be investigated further by Powerlink Queensland and its industry partners.

Regards,

Stephen Martin
Environmental Compliance Group
Powerlink Queensland

Powerlink Queensland

Environmental Compliance

Waste Audit and Minimisation Study

February 2006

Report

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1. Introduction

One of the primary objectives of Powerlink's Waste Management Plan is to manage waste according to the waste management hierarchy. This includes minimising waste generated by Powerlink's own operations. In order to ascertain Powerlink's current waste management practices, selected operations that are site specific to the Virginia site have been requested to identify and quantify, where possible, all known programs or procedures relevant to waste management, waste streams and destinations including existing resource recovery systems.

Waste generated from a typical line construction project has also been identified.

This report details the methodology and outcomes of the audit, with recommended actions for the development of an approach to waste minimisation.

2. Scope of Project

2.1 Approach

Powerlink Environmental Compliance undertook the following tasks to achieve the project objectives:

1. Preparation of waste audit checklist.
2. Electronic distribution of questions/checklist to identified staff.
3. Follow up interviews with identified staff.
4. Analysis of results to identify existing waste management practices and potential waste minimisation strategies.
5. Documentation of recommended strategies and preparation of audit report.

3. Methodology

Task 1: Waste Audit Questionnaire and Interview

Specific audit questions and a checklist were prepared for distribution to each of the identified waste producing sections within Powerliink.

Specific issues addressed in the checklist were:

- Identification of major waste streams.
- Identification of current waste handling practices.
- Destination of waste materials.
- Provision of available data on waste quantities.

After the electronic questionnaire had been administered, a follow up interview was undertaken to identify further issues and discuss current waste management practices in detail.

Task 2: Collation and Analysis of Results

Upon receival of the results of the questions/checklist a spreadsheet was developed to extract key information for preparation of recommended strategies.

Task 3: Report Preparation

Based on the analysis of the results, preparation of this report to establish Powerlink's current waste management position. The report outlines the major findings of the study, makes recommendations regarding potential waste minimisation/reduction programs as well as ongoing sustainable waste management strategies with a view to achieving a best practice future waste management position.

4. Waste Audit Questionnaire

4.1 Format of Questionnaire

The waste audit questionnaire comprised two parts:

- Part 1 - Identifying the appropriate Powerlink group/department responding to the questionnaire; the name of the respondent; and
- Part 2 - Identifying waste streams, handling procedures, estimates of quantities, which are disposed, and recycled/reused, and estimates of amounts purchased (where possible).

The interview conducted after the questionnaire provided information on detailed waste management practices, and potentially provided access to waste dockets obtained from waste disposal contractors.

4.2 Distribution

The waste audit questionnaire was electronically distributed on 17 January 2006 to a total of 9 Powerlink staff, as nominated by the Manager Environmental Compliance. The following waste producing sections were targeted:

• Waste Oil - substations	• **Len McCall**
• Waste Oil - Oil Lab	• **Cherie Gilbert**
• Electrical equipment	• **Nev Christiansen**
• Fleet Vehicle Waste	• **Keith Negus**
• Construction waste	• **Luke Bowden**
• Kitchen Waste	• **Michelle Hilford**
• Office Waste	• **Denis Whaley**
• Packaging Waste	• **Nev Christiansen**
• Industrial waste	• **Nev Christiansen**
• Trade waste	• **Denis Whaley**
• Waste Water	• **Denis Whaley**
• Garden Waste	• **Denis Whaley**

Over the course of the subsequent weeks, the questionnaires were completed and returned via email. Clarification or further information was sought via follow-up interview upon receipt of the completed questionnaire.

4.3 Summary of Overall Response

All targeted Powerlink staff questioned during the audit attempted to quantify waste streams generated within their group. Any information not obtained initially through the electronic response was later obtained through the interview process.

5. Waste Totals

A spreadsheet containing available statistics on quantities of waste disposed under waste contracts from the Virginia Powerlink site during the 2005 calendar year was reviewed (note that all Cleanaway data is relevant for the period 01/01/2004 - 04/01/2006). The spreadsheet lists each of the activities undertaken at the Virginia site and monthly or yearly waste totals. Table 1 below summarises waste volumes identified at Powerlink over the 2005 calendar year.

Table 1 -Identifed Waste Volumes at Powerlink during 2005

Waste	**Volume**
Hard waste (Cleanaway)	1322 m^3
Green waste (Cleanaway)	183 m^3
Paper waste (Visy)	12.597 tonnes (August to December)
Paper waste (Cleanaway)	292.50 m^3
Commingled recyclables (Visy)	1.353 tonnes (September to December)
Tyres (Supplier)	240 tyres
Cooking fats and oils (Associated Oils)	3900 Litres
Oil Lab (BCD)	3860 Litres
Waste Oil	116, 999 Litres

Whilst the figures provide some insight into major contributors to overall waste generation, figures are quoted using estimated volumes and assume the bins are full when disposed. A better way to obtain waste totals would be by weight rather than volume but this data is unavailable at this stage.

As such, the data has limited application to the current investigation into existing waste minimisation practices across Powerlink as a whole. However, it is recognised that the overall waste disposal totals provides some scope for setting benchmarks against which future waste reduction measures can be assessed.

These waste streams and all other identified waste streams can be found in Section 6 below.

6. Identified Waste Streams and Current Handling Practices

Review of the responses indicated that information was given on wastes that are generated in both office-based and operational/works-based environments. The following section outlines the major waste streams identified by respondents and examples of current handling practices.

6.1 Office-Based Wastes

6.1.1 Paper and paper products

Paper is used in printers, photocopiers and fax machines in the Virginia office and is perceived to constitute a large proportion of the waste generated. Waste glossy paper and cardboard boxes are also produced in some office environments but to a lesser extent, similarly for newspapers.

Some examples of reuse and recycling of waste paper and paper products were cited (i.e. placing paper in recycling bins/boxes).

Cleanaway services the system upon request. A customer waste statistic summary was sent to Powerlink to obtain data on the frequency of services.

At the Virginia site, a 4.5m bin is designated for paper and paper product disposal. The frequencies of services for the period 01-01-2004 to 04-01-2006 were 65 accumulating a total waste volume of 292.50m^3 at $1750.06 clearing cost.

Powerlink has in place paper recycled with Visy. Small cardboard boxes are located at each desk for the purpose of paper recycling, that the cleaners empty into the larger Visy bins each evening.

Volumes of paper being recycled are listed in Table 2 below and can be seen in Figure 1 below. Volumes of paper being recycled have been recorded since august 2005. Monthly reports from Visy will now be emailed to Powerlink.

Table 2 - Paper recycling volumes collect by VISY

Month	**Volume (tonnes)**
August 2005	2.599
September 2005	2.458
October 2005	3.092
November 2005	2.838
December 2005	1.61
January 2006	2.38

Powerlink Recycled Paper

Figure 1 - Powerlink Virginia paper volumes recycled by VISY

6.1.2 Toner Cartridges

Toner cartridges from printers and photocopiers were identified as an office waste, which appears to be collected for recycling/refilling in most instances.

6.1.3 Disposable Cups

Whilst some service groups appear to make an effort to use ceramic/glass mugs and cups, it is evident that disposable plastic cups are still used by staff, particularly in where a spring water fountain or similar is present.

6.1.4 Food/Drink Packaging and Implements

Food packaging is generated in the Powerlink Virginia office, particularly cartons, plastic bottles, cans or other recyclable packaging and is disposed in the recycling bins provided on site by Powerlink. It is understood that limited facilities for recycling food is available.

Paper towel, stirrers, and tea/coffee and sugar sachets are in use and contribute to general kitchen waste.

It is evident that bottle and cans are often disposed to general waste bins.

6.1.5 Sanitary waste/disposal

All sanitary waste is disposed to ISS washroom services. The service collects any sanitary waste, empty air freshener containers (replaces these with new ones) and other disposable items. The facility is serviced once a month. Generally 14 air fresheners are disposed each time and sanitary disposal varies between 22 and 28 each time.

6.1.6 General Waste

Cleanaway collects any general waste accumulated at the Virginia site daily. The frequencies of services for the period 01-01-2004 to 04-01-2006 were 410 accumulating a total waste volume of 1845m^3 at $19013.85 clearing cost.

6.1.7 Office Furniture and Equipment

The respondent from Powerlink's network business indicated that the following wastes are produced:

- Six chairs (approx.) are disposed per year. Chairs are usually repaired due to a 5-year warranty.
- Reuse all old office furniture stock. It is seldom that items are discarded. In areas that are setup for a special purpose, furniture is hired rather than purchased.

6.2 Cafeteria Waste

6.2.1 Food preparation and/or utensil washing wastes

The catering company Everest operates the cafeteria located at the Virginia site. Waste from day to day operations include packaging (plastics, tin cans, cartons), fats and oils, food waste, and other general wastes generated onsite. A summary of where these waste of disposed to is included below:

- Green waste goes into gurgler under the sink
- Any waste that cannot go down the gurgler is disposed in commingled waste bins provided by Powerlink.
- Cardboard is placed in Powerlink recycling bins
- Plastics placed in Powerlink recycling bins
- 'Associated Oil' collects oil every 2 weeks (150L max each pick up)

6.2.2 Food Waste

Food waste is systematically disposed to general commingled waste bins due to a lack of facilities or procedure for an alternative waste management approach.

6.2.3 Bottles and Cans

The cafeteria sells bottled and canned soft drinks, juices and milk cartons. Some of these would ultimately end up in the designated recycling bins. The volumes of these items purchased each week are listed below. Most of these wastes would end up in commingled waste or recycled waste on the Virginia site.

- Cans - 192 per week
- Plastic bottles - 216 per week
- Milk cartons - 200 per week

Powerlink has in place commingled can and bottle recycled facilities that are collected by Visy. Volumes of commingled recyclables collected by Visy can be seen in Table 3 and **Figure 2.**

Table 3 - Can and bottle recycling volumes

Month	**Volume (tonnes)**
September 2005	0.123
October 2005	0.18
November 2005	1.01
December 2005	0.04
January 2006	0.04

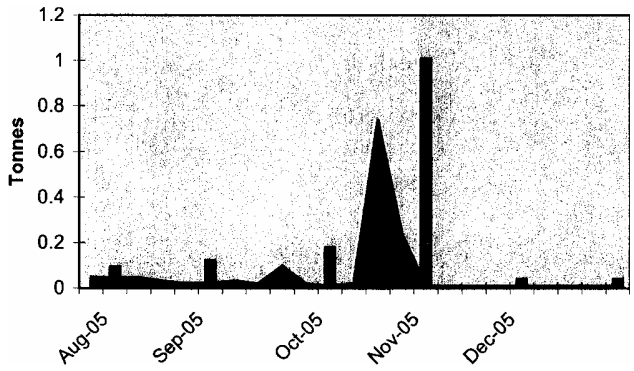

Figure 2 - Powerlink Virginia commingled cans and plastic bottle recycled volumes

6.3 Operational/Works-Based Wastes

6.3.1 Cardboard and Packaging Plastic

Waste cardboard boxes are generated throughout most sections within Powerlink Virginia. It is understood that cardboard is generally placed in commingled waste bins.

Respondents also indicated that plastic packaging is a major waste stream resulting from the delivery of bulk goods and it is understood that it is not recycled.

6.3.2 Green Waste

Green waste is generated as a result of maintaining the lawns and gardens surrounding the Powerlink Virginia office.

The waste is placed in a $3m^3$ designated bin where it is serviced on request by Cleanaway. The frequencies of services for the period 01-01-2004 to 04-01-2006 were 61, accumulating a total green waste volume of $183m^3$ at $1851.00 clearing cost.

6.3.3 Hard Waste

Hard waste produced at Powerlink is disposed of into a $23m^3$ skip and an $11m^3$ skip. The bin caters for all general rubbish. This could include packing timber, broken furniture, old insulators, empty boxes, bottles etc. There were large quantities of cardboard evident in the hard waste skips.

The frequencies of services for the $23m^3$ bin during the period 01-01-2004 to 04-01-2006 were 57, accumulating a total waste volume of 1311 m^3 at $7832.37.00 clearing cost.

Figure 3 - Hard Waste stored in $23m^3$ bin prior to disposal

Figure 4 - Hard waste disposal

The $11m^3$ bin was serviced once by Cleanaway during 01-01-2004 to 04-01-2006 and accumulated a total waste volume of 11 m^3 at $142.31 clearing cost. The bin is mainly filled with old cable wheels and unusable stock lines from fieldwork.

6.3.4 Scrap Metal Bin

The scrap metal bin is used for any metal material that is generated on site and that is returned to Virginia from construction or maintenance projects. The types of materials found in the bin could include

conductors, nuts and bolts, metal chairs, soft drink cans, wire and anything of metal scrap nature. The bin is disposed to Sims metal upon request.

A scrap copper bin is also present at the Virginia site. This bin is shared (in conjunction with the scrap metal bin) with Ergon Energy and is emptied on request by Sims Metal.

Figure 5 - Scrap Metal stored in Sims metal bin prior to disposal

Figure 6 - Scrap metal disposal

6.3.5 Vehicle Fleet Wastes

The respondent from Powerlink fleet indicated that the following wastes are produced:

- Batteries - old mercury batteries are usually taken by the battery supplier at no fee, approximately 3/month. The frequency depends on the failure rate of the batteries and the extent of the vehicle usage.
- Tyres - when replaced the old tyres are usually taken by the tyre supplier (Goodyear, Beaurepaires and Bridgestone). Approximately 20 tyres are replaced each month at a cost of $6 per tyre. Maintenance of tyre pressures and following manufacturers service recommendations minimises the premature replacement of tyres. Change to higher specification tyre where tyre failures occur in field activities.
- Vehicle Washing and cleaning - there are two wash down bays on the Powerlink Virginia site. Approximately 10 cars per week are washed and waste is distributed to sewage after Safewaste treatment. Mitigation is occurring to reduce the volume of water used per wash as per City Council water restrictions.

6.3.6 Waste Oil

6.3.6.1 Transformer Waste Oil

When transformers, switchgear etc are replaced, the remaining oil left in the equipment becomes waste. Additionally, any oil that is old and no longer effective at insulating the switchgear becomes waste. These

oil wastes are generated at various substations that are deposited by Network Field Services at Virginia in 200L drums for disposal.

The dirty oil (PCB contaminated) is disposed in drums to BCD technology Narangba. Approximately four empty oil drums are kept in storage to be used for distilling, cycling processes and for general use. All other remaining empty drums (44 gallon) are disposed to Sims metal. For the period 27/06/2005 to 10/10/2005 116, 999 L of various waste oil streams were disposed of from the Virginia site.

Figure 7 - Waste oil stored in 44 gallon drums at Virginia

Table 4 - The quantity of oil disposed for the period 27106/2005 to 1011012005.

Oil waste type	**Qty (L)**
Treatment and disposal of PCB waste oil	75, 475 L
Treatment and disposal of PCB waste oil and Isoocatane	100 L
Treatment and disposal of waste acetonitrile and Ethanol	245 L
Treatment and disposal of PCB waste Mineral oil, Toluene and ethanol	100 L
Treatment and disposal of PCB waste and transformer Oil	860 L
Treatment and disposal of waste oil, toluene and ethanol	200 L
Treatment and disposal of PCB waste Sep-pak Cartridges	3L
Treatment and disposal of PCB waste Oil and Hydranal	8L
Treatment and disposal of PCB waste Tetrahydrofuran	7.5 L
Treatment and disposal of PCB waste Chlorohexadine	17.5 L

Treatment and disposal of PCB waste Transformer Poles	9063 L
Treatment and disposal of PCB waste Transformer	30920 L
Total	**116, 999 L**

Wooden Crates

Wooden crates are used as platforms to store the waste oil in 44-gallon drums. There is a basin underneath the wooden crates that captures any spillage from the drums. The wooden crates can be reused but if in excess the treated wood is disposed in commingled waste bins.

6.3.6.2 Oil Laboratory Wastes

The Powerlink Oil Lab indicated the following:

- 4 (approx) x 200L oil drums disposed to BCD every 2.5-3 months
- 8-10 (approx) x 20L containers disposed to BCD every 2.5-3 months
- Once oil sample is taken for PCB it is stored for approximately 6 months in 50ml, 100ml, and 500ml containers.
- Generally 15L/month of PCB waste is disposed to BCD.
- The samples are left to drain back into original oil drum. As Laboratory glassware is generally pyrex and thus cannot be recycled, items are washed and disposed to general commingled waste bins.

Figure 8 - PCB contaminated oil samples

Figure 9 - PCB contaminated oil samples

6.3.7 Trade Waste

Trade waste is generated from the washdown pad at Virginia. The facility is designed to capture any solids and contaminated water from the washdown process. The polluted water is distributed to sewage and Zappaway empties the remaining sludge that accumulates in the sump below the facility.

The facility is serviced when the sump is full. On one occasion when the facility was broken (11/2003), Zappaway snorkelled sludge out on three occasions in one week. The washdown currently operates correctly and the sludge removal does not happen as frequently.

The facility was last emptied in October 2004. Zappaway since has not serviced the sump, however, an automatic system developed by Safewaste empties the sump regularly through a pumping processes.

Figure 10 - Virginia site wash down bay

Figure 11 -Wash down drain showing stormwater outlet, diversion valve and waste outlet

6.3.8 Waste Electrical Equipment

Electrical equipment is used frequently at substations or on other various construction and maintenance sites. Any equipment that is broken as a result of excessive use or other prohibiting factors is brought to the Virginia site for repair. The equipment is red tagged (effectively out of order) if it is generally too expensive to repair or if it simply cannot be repaired or reused.

Electrical equipment that is disposed in the commingled waste bins includes: drills, grinders, ladders, climbing gear, and calibration instruments (meggers, flukes, metres).

6.3.9 Other Wastes

Sulphur Hexafluoride (SF^6) Gas is used to insulate switchgear at various substations. Generally any SF^6 gas is reclaimed on site using liquid nitrogen to separate any impurities. All empty gas bottles and any old gas are returned to the supplier (eg. BOC Gas).

Figure 12 - Gas Storage/disposal at Virginia. According to the Powerlink representative, the green base/brown collar bottles are full and waiting to be put into the yellow storage areas; the grey bottles are likely to be empty and normally house Nitrogen; and, the blue bottles house Argon.

6.3.10 Construction Wastes

Table 5 below outlines the typical wastes produced during the construction of a typical Powerlink Lines project. No single construction project was targeted during this audit and volumes of waste will vary for different projects.

Table 5 - Typical waste streams from a Powerlink Lines Project

Project Phase	Waste Stream	Quantities	Company / Cost	Recycle/Reuse
Cleaning	Green waste – timber, foliage, root balls, mulch	Depends on vegetation communities, typically an open eucalypt forest might generate ~1000m^3 of biomass / span	Clearing contractors is responsible for the disposal of green waste under the direction of Powerlink Management. Can be an expensive exercise if the vegetation is earmarked for mulching purposes, i.e. - $60 000.00 / span (price includes access track and tower pad construction)	Majority of green waste is recycled in the form of useable timber or mulch.
	Spent fuel and oil containers from general machinery maintenance	Minor quantity, fill ~1m^3 skip bin / 25 spans	Clearing contractor responsible, cost is negligible depending on local council tip costs	May recycle empty fuel drums for storage use

	Domestic Waste - general litter	1m^3 skip bin / 2 weeks	Cost is borne by the clearing contractor. May use skip or wheelie bins. ~\$80/m^3	Deposited at "council approved land fill site"
	Nuts, bolts, clamps used for fencing	Minor quantity	Cost is borne by the contractor. Cost is negligible.	Reused for other jobs
	Spoil from fencing	0.3m^3 / gate	Cost is borne by the contractor. Cost is negligible.	Rehabilitated on site, unless otherwise directed
Foundations	Waste concrete	0.3m^3 / tower	Cost is borne by the contractor. ~\$100/ foundation	Buried in sump and rehabilitated on site, unless otherwise directed
	Steel off cuts from Rio cages	~5kg / tower	Cost is borne by the contractor. Cost is negligible.	Recycled as scrap steel.
	Domestic waste-general litter	Minor quantity fill ~1 m^3 skip bin / 2 weeks	Cost is borne by the contractor. May use skip or wheelie bins.~\$80/m^3	Deposited at "council approved land fill site"
	Plastic rollers used for Rio cage placement	~10 / tower	Cost is borne by the contractor. Cost is negligible.	Some rollers are recycled, otherwise majority are deposited at "council approved land fill site"
	Spent welding rods	~20/tower	Cost is borne by the contractor. Cost is negligible.	Deposited at "council approved land fill site"
	Spent fuel and oil containers from general machinery maintenance	Minor quantity, fill ~1m^3 skip bin / 20 spans	Cost is negligible. Costs depending local council tip costs	May recycle empty fuel drums for storage use
	Viz-screen plastic	~2 m^2 / tower	Cost is borne by the contractor. Cost is negligible.	Deposited at "council approved land fill site"
	Spoil	60m^3 / tower site	Rehabilitated on site costs ~\$2000.00 / tower site or removal from site	All spoil reused
	Explosives waste	Minor quantities	Cost is borne by the	Deposited at

			contractor. Cost is negligible.	"council approved land fill site"
	Teeth off augers	~20 teeth / tower site	Cost is borne by the contractor.	Recycled as scrap steel.
	Concrete curing oils and containers	Minor quantities	Cost is borne by the contractor. Cost is negligible.	Recycled for other jobs or disposed as regulated waste
	Tyres used for boring machine transportation	50 tyres / project	Disposal $3.00/tyre	Deposited at "council approved land fill site"
Tower erection	Packaging / strapping	5 x open wooden crates /tower. 1m^3 strapping / tower.	Cost is borne by the contractor.	Wood is recycled. Strapping deposited at "council approved land fill site"
	Nuts, bolts and washers, Hessian bags, boxes steel	Minor quantities	Cost is borne by the contractor.	Majority is reused for other projects
	Wood-chocks	Minor quantities	Cost is borne by the contractor.	Reused / recycled
	Domestic waste - general litter	Minor quantity – fill ~1m^3 skip bin /week	Cost is borne by the contractor. May use skip or wheelie bins. ~$80/$m^3$	Deposited at "council approved land fill site"
Stringing	Packaging, including plastic wrapping, wooden crates, wooden boxes & strapping tape	1m^3 bin / tower site	Cost is borne by the contractor. May use skip or wheelie bins. ~$80/$m^3$	Wooden crates and boxes are recycled
	Conductor off-cuts	20m /span	Cost is borne by the contractor.	Recycled as scrap steel.
	Domestic waste-general litter	Minor quantity – fill ~1m^3 skip bin / week	Cost is borne by the contractor. May use skip or wheelie bins. ~$80/$m^3$	Deposited at "council approved land fill site"
	Lagging on conductor drums, polystyrene packaging & rope	1M^3 bin / tower site	Cost is borne by the contractor. May use skip or wheelie bins. ~$80/$m^3$	Some rope maybe recycled.

Figure 13 - Construction Waste at Virginia

7. Implementation, Monitoring and Commitment to Existing Waste Management Practices

Overall, it is recognised that the majority of the targeted groups have implemented recycling/reuse practices for particular waste streams in both office-based and operations/works-based environments. Participation in existing recycling and reuse practices is not monitored, nor have any specific waste reduction targets or performance indicators been established.

The audit identified that waste paper, green waste, metals and oils are being effectively recycled however areas that may need improvement include recycling of bottles and cans, packaging and construction based wastes. It was also evident during the audit that excess quantities of cardboard were located in the general hard waste bin.

It is not known the quantities of these materials that are being disposed of in general waste.

Identified potential barriers to the effectiveness of existing recycling practices included: inadequate facilities for collection/stockpiling of recyclable materials, bins/areas for recyclables are not clearly marked or easily accessible, a lack of formal procedures or training in waste minimisation practices, the persistence of items which cannot be recycled or reused and consequently promote waste generation, and no encouragement or incentives to reduce waste generation.

Trade waste procedures could be implemented that focus on minimising any wastewater generated from the vehicle wash down. A water recycling system could be implement on site that would reduce any excess water use considering current level two water restrictions.

Opportunities also exist to use recycled paper in the office for printing/photocopying.

8. Summary of Powerlink's Current Waste Management Position

In summary, the responses received from Powerlink Staff and associated information indicates that Powerlink's current waste management position is as follows:

- Recycling/reuse practices for particular waste streams in both office-based and operations/works-based environments exist;
- Apart from waste management procedures in service groups which are governed by environmental authorities (waste tracking), waste minimisation practices are largely informal and undocumented;
- Participation in existing recycling and reuse practices is heavily dependent on self-management and is generally not monitored, nor have any specific waste reduction targets or performance indicators been established.

9. Towards Sustainable Management of Powerlink's Waste

9.1 Introduction

Sustainable waste management is a goal of Powerlink QLD and the Queensland EPA. The EPA has adopted the waste hierarchy to conceptually prioritise its preferences to waste management practices. In line with this, Powerlink also adopted the waste hierarchy in the development of it's own Waste Management Plan.

An inversion of the waste management hierarchy is depicted in the figure below, which changes the focus of strategies to prioritise resource conservation programs (through waste avoidance) over resource recovery (reuse, recycling and energy recovery) and resource depleting (disposal) programs. The waste hierarchy guides the decisions relating to waste management however environmental, technological, economic or social considerations may result in practices being adopted in a different order, providing there is no increased risk to the environment.

In terms of the options outlined in this report, the hierarchy has been simplified to the following:

- Avoiding (and reducing) the creation of waste
- Reusing materials
- Recycling where possible
- Buying recycled-content products.

9.2 The Process

Minimising waste also has the flow-on effect of improving efficiency, conserving energy, extending the life of equipment and improving staff morale and productivity. The steps outlined below provide a process by which an office environment can minimise their waste generation.

Step 1 - Committing to the Program
Waste minimisation involves changes in daily habits to reduce the consumption of resources and the production of waste. Gaining commitment from key stakeholders within Powerlink is essential to a successful program. The commissioning of this project demonstrates that Powerlink is committed to moving towards sustainable waste management practices.

Step 2 - Conducting a Waste Assessment
Conducting an assessment to classify and quantify waste as well as the supplies bought and used will determine appropriate benchmarks for improvements as well as priority wastes for reducing, reusing and recycling. In addition to this study, there may be value in conducting bin audits from selected offices or areas to determine composition of the waste stream and if it differs across operations.

Step 3 - Developing a Waste Reduction Action Plan
Allocating responsibilities and setting targets ensures a coordinated approach to waste reduction and recycling so that the changes are practical, achievable and sustainable in the long term. This plan should be a key outcome of this project.

Step 4 - Communicating the Plan
Getting people involved as well as regular reminders to staff about new procedures are essential for changing people's waste habits and creating a successful program.

Step 5 - Monitoring & Reviewing Your Progress
It is important to regularly check progress and highlight how people's actions are making a difference. This assists in keeping participants motivated to achieve the waste minimisation targets.

Step 6 - Continuous Improvement
The implementation of sustainable waste management practices is an ongoing undertaking designed to encourage long-term, cultural change in your organisation. Once Powerlink has achieved its targets, new targets should be set to build upon the waste minimisation successes to date.

10. Options for Specific Waste Streams

Based on the responses of Powerlink staff, the following sections provide a range of available options for Powerlink to consider for specific waste streams. This has been conceptually divided into office based wastes and specific operational wastes.

The intention of the provision of these options is for key Powerlink stakeholders to review and consult with relevant Powerlink members to determine which of these is most appropriate and applicable. Undertaking the consultation process within Powerlink will assist in creating ownership of the issue and setting achievable targets.

10.1 Office Based Wastes

Office based waste have been divided into the following subcategories:

- Office paper
- Beverage containers
- Food and food packaging
- Toner use
- Stationery
- Other office products
- Office furniture and equipment
- Waste to landfill

Options for each of these subcategories are provided in the table below. The options have been further broken down according to the waste hierarchy and have been listed in terms of options for reduction, reuse and recycling. Disposal options have not been included here as this is the ultimate destination of most office based waste streams at present, with the exceptions discussed in Section 6.

10.2 Operational/Works Based Wastes

These wastes have been divided into the following categories:

- Green waste
- Waste oil
- Waste electrical equipment
- Vehicle maintenance wastes
- Cardboard and packaging
- Trade Waste

Options for each of these subcategories are provided in the table below. The options have been further broken down according to the waste hierarchy and have been listed in terms of options for reduction, reuse and recycling.

Table 6 - Options for Office-Based Waste Minimisation Actions

Waste Stream	Possible Action
Office Paper	***Reduce***
	1 Introduce purchase policy requirement that all new copier and printer technology has double-side capability
	2 "Audit" current copier and printer technology to determine which machines are capable of double siding.
	3 Implement a "think before you print" policy eg • Make sure staff use "print preview" option in MS Office applications • Use 'shrink to fit' option to use paper adequately • Select 'draft quality' printouts to use less toner
	4 Have all staff set their computer printing defaults to minimise paper use and waste eg • Double sided printing (at least for draft documents) • Multiple pages per sheet for draft documents (eg 2 pages per sheet) • Minimise margins
	5 Training staff to edit documents electronically rather than in hard copy
	6 Maximise use of electronic circulation for documents
	7 Put instructions above photocopiers to minimise mistakes
	8 Introduce a 'no printing policy' for emails
	9 Receive and send faxes electronically
	10 Evaluate hard copy distribution lists to ensure only those that actually use the information are on the list.
	11 Monitor and report paper usage on regular basis (eg reams per person and total usage)
	12 Further promote the use of electronic mail for distribution of minutes, memos and notes
	Reuse
	13 Place box in photocopy room or next to printers for misprinted paper so it can be reused.
	14 Provide containers for the collection of single sided paper for reuse beside copiers and printers
	15 Encourage use of double sided printing from photocopier and re-use of one-sided paper.
	16 Reuse single sided paper as writing pads
	Recycle
	17 Adopt a 'buy recycled' policy for office paper throughout the organisation (or at least set a minimum recycled content in paper to be purchased)
	18 Increase the number and formally promote use of recycle bins and/or boxes (including advice on what can and cannot be recycled)

Waste Stream	Possible Action
Beverage Containers	***Reduce***
	19 Eliminate non-recyclable drinking containers by replacing disposable cups and drink bottles with reusable ones.
	20 Replace all spring water fountains with permanent water filter systems, to reduce plastic water bottle use and disposable plastic cup use.
	Reuse
	21 As above use reusable beverage containers
	22 Ensure that any bulk spring water fountain bottles are returned for reuse to appropriate supplier.
	Recycle
	23 If elimination of disposable containers not possible, ensure that recyclable ones are used and that recycling facilities are available
Food and Food Packaging	***Reduce***
	24 Use crockery and metal cutlery rather than disposables (including "paddle pop" wooden stirring sticks)
	25 Introduce a purchasing policy for beverage supplies - sugar, milk, tea and coffee etc. - to only purchase in bulk and preferably in reusable containers. Avoid any single serves such as individually wrapped teabags and sugar sachets.
	26 Encourage staff to eliminate non-recyclable or non-compostable food packaging
	Reuse
	27 Introduce a compost or worm farm for staff food waste and compostable food packaging
	28 Have food waste collected by a commercial composter
	Recycle
	29 Provide recycling bins for plastic, glass, and other containers to be collected by a recycling contractor. Staff would be required to rinse any such containers to avoid contamination as dictated by the particular contractor.
	30 Choose recycled content packaging or packaging that you will be able to recycle. For bulk purchases
Toner Use	***Reduce***

Waste Stream	Possible Action
	31 Select 'draft quality' printouts where appropriate to use less toner
	Recycle
	32 Recycle all toner cartridges
Stationery	***Reduce***
	33 Encourage staff to share and circulate copies of reports rather than issuing separate copies.
	Reuse
	34 Set-up a stationery 'reuse centre' or 'exchange spot' for unwanted stationery.
	35 When archiving documents in ring binders, remove all paperwork and transfer to manila folders and reuse ring binders for new documentation.
	36 Reuse cardboard cartons.
	37 Refill pens and tape dispensers.
	38 Reuse envelopes and look for design features that support reuse - for example resealable envelopes, or space for multiple addresses.
	39 Reuse file indexes. (eg post it notes)
Office Furniture and Equipment	***Reduce***
	40 Introduce purchase policy requirement that all new copier and printer technology has double-side capability
	41 Introduce electronic fax receival and sending.
	42 "Audit" current copier and printer technology to determine which machines are capable of double siding.
	43 Review purchasing policy for major equipment purchases to include a life cycle assessment
	Reuse
	44 Investigate opportunities to return old equipment to supplier (for reuse or recycling) potential including leasing of equipment only.
	Recycle
	45 Auction old computers and office furniture to staff or public
	46 Donate old computers and office furniture to charity, schools or Recycleland
Other Office products	***Reduce***
	47 Investigate other options for paper towel use in kitchen and bathrooms
	Reuse
	48 Reuse and recycle old computers, furniture and mobile phones
	Recycle
	49 Purchase recycled content paper towels if suitable product is available
	50 Auction off / sell old computers/office furniture to staff

Waste Stream	Possible Action
Communication/ Education	51 Use posters in areas where decisions are made about resource use or waste - eg at bins in kitchen, near printers and photocopiers
	52 Develop a communications plan to limit hardcopy/paper communication
	53 Set up an email address or database for staff suggestions and ideas regarding waste management and ensure it is checked all suggestions are at least reviewed
Waste to landfill	***Reduce***
	54 Remove office waste bins from desks

Table 6-Options for Operations/Works-Based Waste Minimisation Actions

Waste Stream	Possible Action
Cardboard and Packaging Plastic	***Reduce***
	1 Investigate opportunities with suppliers for returnable and reusable packaging materials (i.e. plastic crates). There could be particular opportunities with publishers/suppliers of books for library and other major suppliers.
	Reuse
	2 Allow staff to utilise cardboard boxes for reuse.
	Recycle
	3 Ensure that recycling facilities are available for all suitable materials and formalise procedure
Vehicle Maintenance Wastes	***Recycle***
	4 Formalise procedures/policy for current and future recycling
Waste Electrical Equipment	***Recycle***
	5 Ensure that recycling facilities are available for all suitable materials and formalise procedure
Waste Oil	***Recycle***
	6 Ensure that recycling facilities are available for all suitable materials and formalise procedure
Trade Waste	***Reduce***
	7 Fit wash down with trigger nozzles and rectify leaks to reduce any excess water usage.
	8 Investigate areas for further improvement and encourage staff training and awareness programs regarding the facility's operations.
	9 Replace water with manual operations eg use of brooms, vacuums, blowers
	Reuse
	10 Reclaim and reuse any water from the wash down process.
	Recycle
	11 Implement a water recycling facility on site