Review of Waitakere City Council's Cleaner Production Printing Project

Prepared for
Waitakere City Council

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Acknowledgments

Waste Not would like to thank all the printers and former Waitakere City Printing Project participants who cooperated in this review. Thanks also to Melissa Arseneault for providing valuable information regarding the project process and development.

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Contents

1 Introduction

The following report reviews and assesses the effectiveness of Waitakere City Council's cleaner production (CP) printing industry project, undertaken from 1996 to 1999.

The Waitakere City Council's CP printing industry project (referred to in this review as the WCCPP) resulted in the development of various resources for lithographic printers, including 'Cleaner Production Strategies for Lithographic Printers', 'Guidelines for Green Print Purchasing', and the Printing Product Information Group (PPIG). The PPIG, in collaboration with the Occupational Safety and Health Service (OSH), the Ministry for the Environment, Printing Industries NZ, and the NZ Engineering, Printing and Manufacturing Union developed the recently produced 'Health, Safety and Environment Guide for Printing and Related Industries'.

A further result of the original project was selection of a number of preferred printers for Waitakere City Council, based on assessment of their CP and environmental practices. There are currently eight preferred printers and one waiting for confirmation of their preferred status. All nine printers participated in the project review. Four printers external to Waitakere City also participated in the review to provide an indication of the level of external printers' CP and environmental practices.

The objectives of this review were to:

1. Review and document the process and time-line of the WCCPP in order to provide a template of industry project development for future industry CP initiatives

2. Assess the progress of Waitakere City Council's preferred printers CP practices since completion of the printing industry project

3. Assess the level of environmental practices of Waitakere City Council's preferred printers compared to printers outside of Waitakere City

4. Identify specific methods used by lithographic printers to reduce the toxicity of workplaces, especially hazardous substance reduction or substitute

2 Methodology

2.1 Project timeline

Existing WCCPP documentation was examined in order to produce the project timeline. Former project participants, including printers, PPIG coordinator Melissa Arseneault, PPIG member Gary Trottman, and WCCPP multi-disciplinary team member Lesley Stone were also consulted to verify project process details.

2.2 Assessment of Preferred Printers and toxicity issues

The eight current preferred printers (five original, and three added since the project) and an additional printer waiting to confirm preferred status were interviewed with respect to their CP and environmental practices, mitigation methods for workplace toxicity, improvements since their original assessment, and general feedback on the project. As with the original assessments, site visits were also undertaken. In addition, a list of "benchmarks" was identified based on the original assessments of each Preferred Printer, and their progress on each item was determined.

The same interview and site visit procedure (excluding verification of "benchmarks") was repeated for four printers external to Waitakere City and the WCCPP. Confidentiality agreements were signed between Waste Not and the four printers in order to protect their identities for trade competition reasons, therefore each printer is referred to by code (A, B, C, or D). Each external printer was provided with a CP assessment in exchange for providing the required information.

The CP and environmental performance of Preferred Printers was compared to that of external printers. Overall results of the comparison are tabulated and graphically presented, with specific issues discussed in greater detail in sections 5 and 6.

It should be noted that, due to the small sample size, data gathered from the four external printers is not necessarily representative of the printing industry at large. Additional anecdotal evidence gathered from printers and associated organisations and businesses suggests that the CP practices of the selected external printers are relatively indicative of the majority of off-set printers. However, the fact that of 13 external printers contacted only four agreed to participate may indicate a greater awareness of CP and environmental issues on the part of the four participants.

3 WCCPP timeline

The following table presents the process timeline of the WCCPP, as determined from existing project documentation and discussion with project participants. Rachel Brown – Project Manager Cleaner Production for Waitakere City Council during the WCCPP – was instrumental in initiating the project at Council level, and developing it into an industry-wide project.

Sections in italics indicate events/items that occurred outside the WCCPP, but are related or suggest the wider impact of the WCCPP.

Year	Month	Date	Event/item	Participants
1996	July		The proposal to undertake a Waitakere City Council printing project was presented by city Council staff at an Eco-office team meeting. The initial focus appeared to be green print concerns of Council.	Waitakere City Council (WCC) "Eco-Council" team (specific team members were not mentioned, however it is assumed that Rachel Brown was a participant)
1996	*August*		*The Print and Film Processing Industry began work on its own industry-focussed Waste Management Best Practice Guide, and notified Waitakere City Council.*	*Works Environmental, Watercare*
1996	*September*		*Wellington City Council and the MfE prepared a draft of Cleaner Production Guidelines for the Printing and Publishing industries.*	*MfE, Wellington City Council*
1996	November	01-Nov-96	Stage 1 of the WCCPP was initiated. Three stages were proposed: 1) Gathering of baseline information and networking, 2) Cleaner production: options and guidelines, 3) Education and training. A consultant was contracted to assist with project development.	WCC, Melissa Arseneault (Grassroots consultancy)
1996	November	04-Nov-96	WCCPP meeting to discuss project structure, funding, scope, objectives, timeframe, and milestones. The concept of CP audits for a selected group of printers was developed. Another consultant was contracted to assist with surveys and data collection.	M. Arsenault, R. Brown, James Andrews (Industry and Environment Ltd)
1996	December	03-Dec-96	A phone survey of WCC printers was conducted to establish current processes, practices and material	WCC - R. Brown, J. Andrews

			usage.	
1996	December		WCC started to form a multi-disciplinary team for the WCCPP by identifying and contacting relevant stakeholders, such as OSH and printing industry organisations.	M. Arseneault, R. Brown
1997	January		WCCPP questionnaire conducted to gain further understanding of WCC printers' operations and CP practices.	R. Brown, James Andrews, and M. Arseneault
1997	February	24-Feb-97	WCCPP CP study proposal drafted	James Andrews
1997	March		An investigation of the CP practices of 3 WCC printers was initiated to provide information for the WCCPP.	WCC - R. Brown, M. Arseneault
1997	March	20-Mar-97	Eco-Council team meeting to discuss means of improving Council's environmental performance and the WCCPP.	M. Arseneault, R. Brown, Margaret Devlin, Anna Davison, et al
1997	March	24-Mar-97	First meeting of the WCCPP multi-disciplinary team to outline aims and objectives of the WCCPP.	R. Brown, M. Arseneault, J. Andrews, Lesley Stone, Stephanie Armstrong, Mark Bourne, et al.
1997	March	26-Mar-97	WCCPP meeting (WCC and consultants) to discuss project progress, CP study, role of multi-disciplinary team, and focus of project.	M. Arsenault, R. Brown, James Andrews, Lesley Stone
1997	March	27-Mar-97	The investigation of 3 WCC printers proceeded with meetings with the printers' management and a request for waste audit information.	J. Andrews
1997	April	03-Apr-97	Eco-Council team meeting to discuss WCCPP, in particular the preparation of Print Guidelines for WCC.	WCC – Jo Jalfron, Penny Spring, R. Brown
1997	May		CP work began with 2 WCC printers for the WCCPP.	Norcross Printing Consultancy and Longley Printing Co. Ltd.
1997	May	01-May-97	WCCPP meeting (WCC, OSH and consultants) to discuss WCCPP progress and the role of OSH.	M. Arsenault, R. Brown, Garry Trottman (OSH)
1997	May	06-May-97	WCCPP meeting (WCC and consultants) to discuss results of discussions with OSH and WCCPP progress.	M. Arsenault, R. Brown, James Andrews
1997	*May*	*09-May-97*	*Pride in Print Awards held in Rotorua*	*(details uncertain)*
1997	June	09-Jun-97	Meeting of the West Auckland Print Association to discuss the WCC Print Purchasing Guidelines,	M. Arsenault, R. Brown, James Andrews, and representatives from: Abbey Press, Apollo Press, AOTS

			WCCPP, and CP audit results to date.	Graphics, Jolley, Longley, Ready Press Print, Tass Print, and Pioneer Print
1997	July	03-Jul-97	The WCCPP "working group" was established and held an inaugural meeting to discuss an appropriate name for the group, objectives of the group, and WCCPP progress. The PPIG was established to work in partnership with the printing industry and associated organisations (ie: the WCCPP multi-disciplinary team). The PPIG aimed to gain an understanding of and disseminate information to lithographic printers on issues relating to health, safety, environmental and regulatory requirements.	M. Arseneault, Stephanie Armstrong, Dan Stevens, Garry Trottman
1997	August	20-Aug-97	WCCPP "working group" meeting during which the group was renamed as the Print Product Information Group (PPIG).	M. Arseneault, Stephanie Armstrong, Dan Stevens, Garry Trottman
1997	October		Environmental policies prepared by Norcross, Geerlings, and Moore printers	
1997	October	17-Oct-97	PPIG meeting	M. Arseneault, Stephanie Armstrong, Dan Stevens, Garry Trottman
1998	February		PPIG meeting	M. Arseneault, Stephanie Armstrong, Dan Stevens, Garry Trottman
1998	*March*		*Printing Seminar* *(details uncertain)*	*Wellington City C*
1998	March	03-Mar-98	The WCC Print Purchasing Guidelines were promoted via media releases.	WCC – R. Brown
1998	April		Launch of the WCC Green Print Purchasing guide	WCC
1998	April	02-Apr-98	WCC held an appreciation event for its five Preferred Printers, and mayoral certificates awarded.	WCC, Jolley Printing, Geerlings Printing, Pioneer Print Ltd, Rocon Printing Co. Ltd, and Norcross Printing Consultancy.
1998	June		Workshop	PPIG, WCC printers, M. Arseneault
1998	June	26-Jun-98	Meeting to organise the Printing Conference	M. Arseneault, R. Brown, Viv?
1998	*September*	*22-Sep-98*	*Healthy Workplaces and Environments Conference held in Hamilton*	*OSH, NZEPMU, Printing Industries of Auckland, PPIG, ARC, WCC, Hamilton City Council, Printing Publishing Education Trust Board*

1998	September	23-Sep-98	Healthy Workplaces and Environments Conference held in Auckland 23rd-24th September, 1998	OSH, NZEPMU, Printing Industries of Auckland, PPIG, ARC, WCC, Hamilton CC, PPP&ETB
1998	October	29-Oct-98	Deed Printing received CP advice after a waste audit by WCC	WCC - R. Brown
1999	February	03-Feb-99	A summary of the activities of the PPIG was produced	PPIG members: Gary Trottman, M. Arseneault, Dan Stevens, Mike Ward, and Ted O'Brien
1999	September	07-Sep-99	Printing Trade Networking Function: Healthy Workplaces and Environments	PPIG, WCC, AEBN

4 Summary of printers' interview data

4.1 General questions relating to type of operation

All the printing businesses interviewed operated off-set printing presses, with several businesses operating additional foiling, rubber stamp making, and direct imaging equipment. The majority of both preferred printers and external printers used sheet-fed presses (89% and 75% respectively), with the minority using reel-fed presses.

The printers were categorised as small (less than 10 employees), medium (10 – 30 employees) or large (more than 30 employees). 44% of preferred printers and 25% of the external printers fell into the large size category. 33% of preferred printers and 50% of the external printers fell into the medium size category. 22% of preferred printers and 25% of the external printers fell into the small size category.

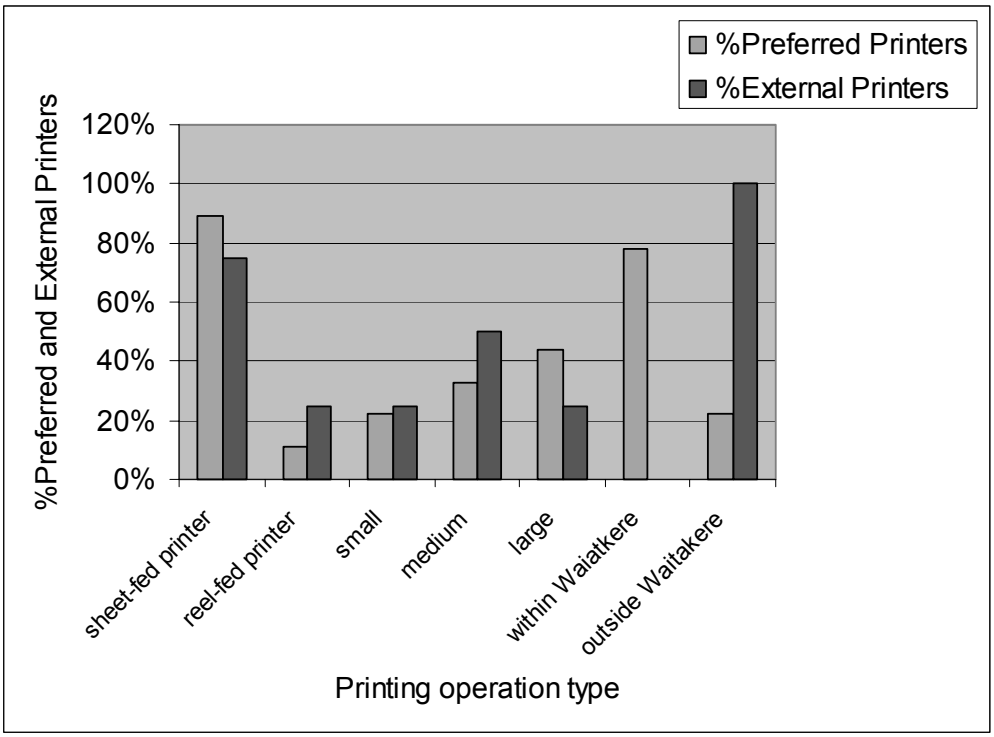
All the external printers and 22% of the preferred printers are located outside Waitakere City boundaries. PR8 considered itself to be on the edge of Waitakere City boundary, however the premises fall within Auckland City zoning, and has therefore been considered as "outside Waitakere City". It should be noted that Waitakere City Council's purchasing policy includes a preference for local businesses, and that this policy is extended to neighbouring areas to Waitakere City where the staff are predominantly Waitakere City residents.

The above information is summarised in Table 1 and Graph 1, below.

Table 1: Results of printing operation general questions

Type of printing:				
Operation	# Preferred Printers "yes"	% Preferred Printers (n=9)	# External Printers "yes"	% External Printers (n=4)
Offset, sheet-fed printer	8	89%	3	75%
Offset, reel-fed printer	1	11%	1	25%
Other	0	0	0	0%
Size of operation:				
Small (<10 staff)	2	22%	1	25%
Medium (10-30 staff)	3	33%	2	50%
Large (>30 staff)	4	44%	1	25%
Location of operation:				
Within Waitakere City	7	78%	0	0%
Outside Waitakere City	2	22%	4	100%

Graph 1: Comparison of printing operations



4.2 Management practices

Eight of the nine preferred printers and none of the external printers had an environmental policy. Occupational health and safety policies are held by 67% of preferred printers and all of the external printers. Only one of the printers interviewed (a preferred printer) had consents for discharge to water, land, or air, and they believed that their consent was in fact unnecessary. Currently, printers are not required to be consented except in unusual circumstances. However, Auckland Regional Council is gradually implementing a proposed plan to require printing businesses covering more than 5,000 m^2 (a "high risk industry") to apply for consents.

The majority of preferred printers (78%) undertook some form of staff training in waste minimisation, but none of the external printers did. 22% of preferred printers and none of the external printers performed waste or environmental audits. Most of the printers (67% of preferred printers and 75% of external printers) had a materials inventory system in place, which ranged from hand-written forms to computer databases.

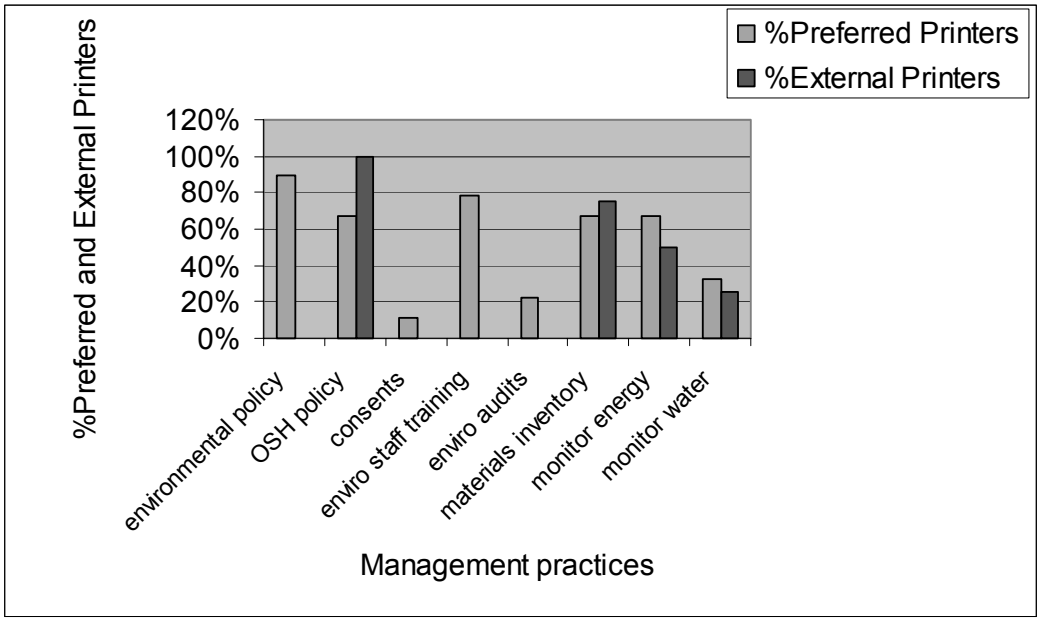
67% of preferred printers and 50% of external printers were monitoring energy use, generally through comparisons of monthly power bills. 33% of preferred printers and 25% of external printers were monitoring water use.

Results of management practices questions are summarised in Table 2 and Graph 2, below.

Table 2: Results of management practices questions

Management practices:				
Practice	# Preferred Printers "yes"	% Preferred Printers (n=9)	# External Printers "yes"	% External Printers (n=4)
Environmental policy	8	89%	0	0%
Occupational, Health and Safety policy	6	67%	4	100%
Consents for discharge to water, land, or air	1	11%	0	0%
Formal staff training in waste minimisation	7	78%	0	0%
Waste or environmental audits	2	22%	0	0%
Materials inventory system	6	67%	3	75%
Monitor energy use	6	67%	2	50%
Monitor water use	3	33%	1	25%

Graph 2: Comparison of printers' management practices



4.3 Product changes:

All preferred printers, and all but one of the external printers, were able to modify design specifications of print jobs to reduce material usage (refer to Table 3, below). This was predominantly achieved through discussions with clients. The printer who was not able to make design modifications did not have direct contact with clients - all jobs were procured through a design house.

Table 3: Results of design modification question

Practice	# Preferred Printers "yes"	% Preferred Printers (n=9)	# External Printers "yes"	% External Printers (n=4)
Design specifications modified to reduce material usage	9	100%	3	75%

4.4 Operational improvements (and material storage and handling):

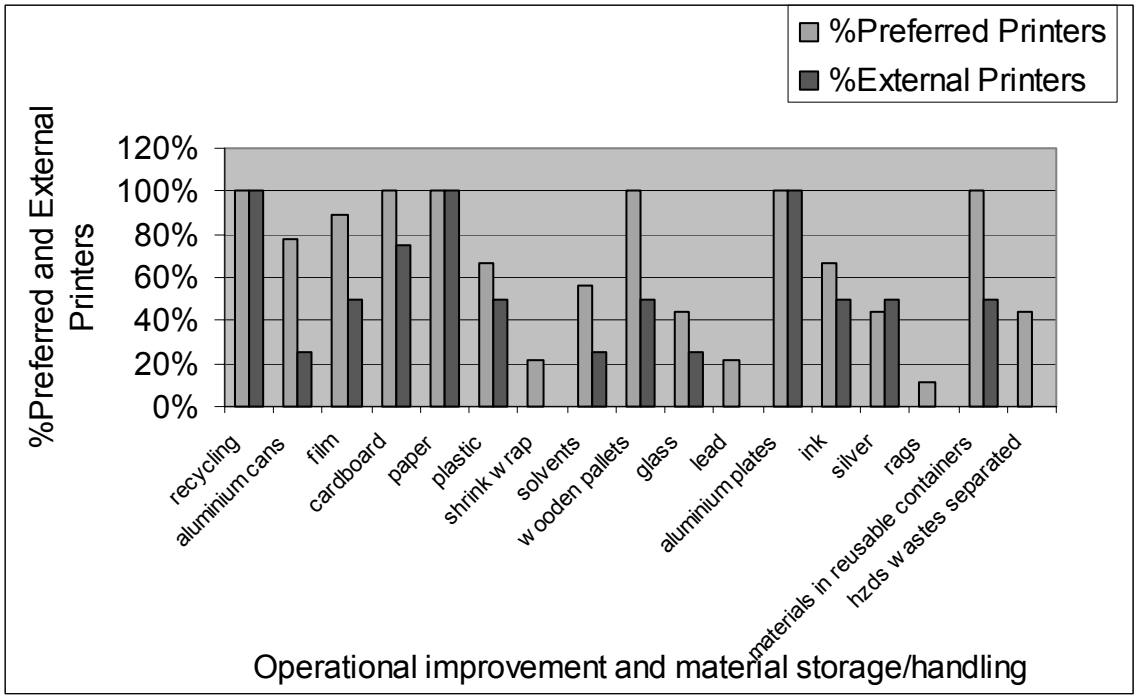
All printers engaged to some degree in source separation of wastes for recycling and reuse. All printers separated paper waste for recycling, and all but one external printer also recycled cardboard. All printers recycled aluminium plates. 56% of preferred printers and 25% of external printers recycled solvents. 67% of

preferred printers and 50% of external printers recycled ink into black ink. Only 2 printers – both preferred printers – used lead in their workshops, and both recycled scrap lead. All preferred printers and 50% of external printers diverted wooden pallets from landfill by either leaving them on the kerbside for firewood collectors or sending them back to suppliers. If the printer handled film, then it was returned to clients after use, and if they used silver, then it was recycled. Recycling of aluminium cans, plastic bottles, and glass was predominantly through Council kerbside collection services, and these materials were not associated with the actual printing process. Only two preferred printers recycled shrink wrap, and only one preferred printers recycled rags. 100% of preferred printers and 50% of external printers stored materials in reusable containers. 44% of preferred printers and no external printers separated hazardous wastes from non-hazardous wastes. All figures are presented in Table 4 and Graph 3, below.

Table 4: Results of operation improvements and material storage and handling questions

Practice	# Preferred Printers "yes"	% Preferred Printers (n=9)	# External Printers "yes"	% External Printers (n=4)
Waste separated for recycling or return to supplier:	9	100%	4	100%
Aluminium cans	7	78%	1	25%
Film	8	89%	2	50%
Cardboard	9	100%	3	75%
Paper	9	100%	4	100%
Plastic	6	67%	2	50%
Shrink wrap	2	22%	0	0%
Solvents	5	56%	1	25%
Wooden pallets	9	100%	2	50%
Glass	4	44%	1	25%
Lead	2	22%	0	0%
Aluminium plates	9	100%	4	100%
Ink	6	67%	2	50%
Silver	4	44%	2	50%
Rags	1	11%	0	0%
Materials stored in reusable containers	9	100%	2	50%
Non-hazardous wastes segregated from hazardous wastes	4	44%	0	0%

Graph 3: Comparison of printers' operational improvements and material storage and handling



4.5 Input changes

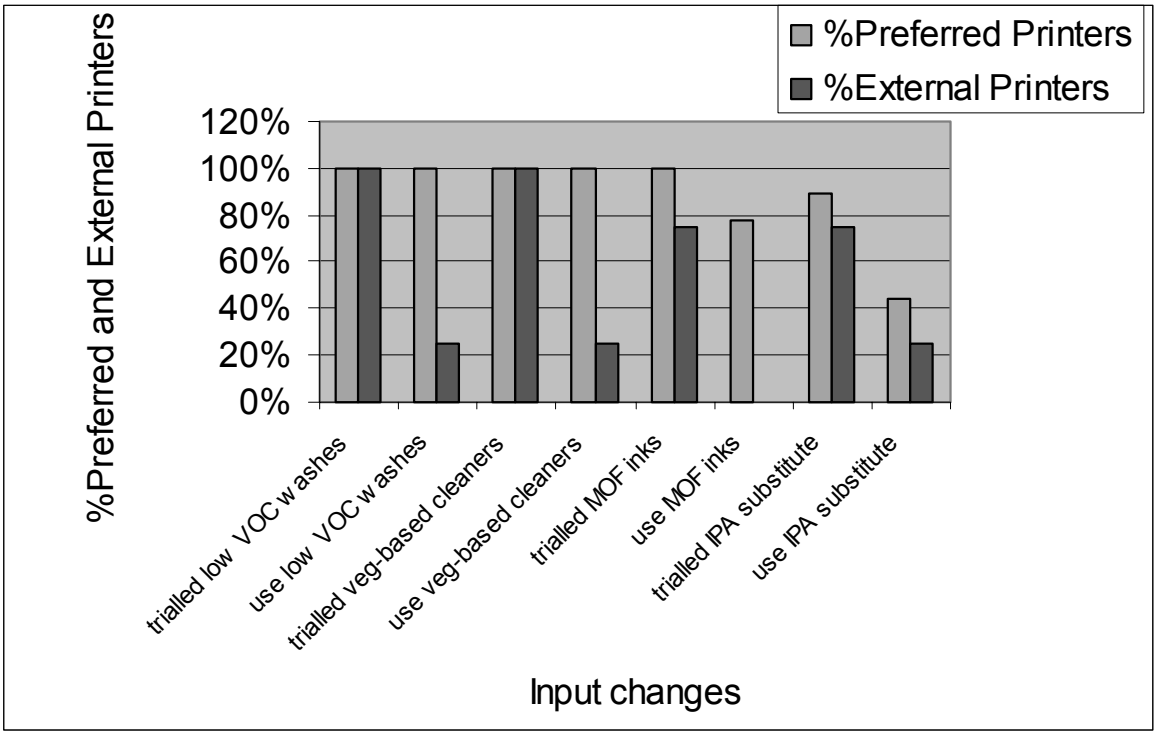
The majority of both preferred and external printers had trialled low VOC (volatile organic compounds) washes/cleaners, vegetable-based cleaners, mineral oil free inks, and an IPA (isopropyl alcohol) substitute. All the preferred printers had trialled low VOC washes/cleaners, vegetable-based cleaners, and mineral oil free inks, and 89% had trialled an IPA substitute. 100% of external printers had trialled low VOC washes/cleaners and vegetable-based cleaners, while 75% of external printers had trialled mineral oil free inks and an IPA substitute. All the preferred printers were currently using low VOC and vegetable-based washes/cleaners, 78% were using mineral oil free inks, and only 44% were applying an IPA substitute. 25% of external printers were currently using low VOC and vegetable based washes/cleaners and an IPA substitute. None of the external printers were using mineral oil free inks. Results of the input changes questions are summarised in Table 5 and Graph 4, below.

Table 5: Results of input changes questions

Practice	# Preferred Printers "yes"	% Preferred Printers (n=9)	# External Printers "yes"	% External Printers (n=4)
Trialled low VOC washes / cleaners	9	100%	4	100%
(Currently use)	(9)	(100%)	(1)	(25)
Trialled vegetable-based cleaners	9	100%	4	100%
(Currently use)	(9)	(100%)	(1)	(25)
Trialled mineral oil free (MOF) inks	9	100%	3	75%
(Currently use MOF on > 50% print jobs*)	(7)	(78%)	(0)	(0)
Trialled IPA substitute	8	89%	3	75%
(Currently use)	(4)	(44%)	(1)	(25)

*All Preferred Printers used MOF inks on print jobs for Waitakere City Council, if requested by Council.

Graph 4: Comparison of printers' input changes



The printers who had trialled and/or were using low VOC and vegetable-based washes/cleaners were using citrus-based products (such as "Varn"). A citrus-based deglazer was also popular. The majority of washes used were also water-miscible, regardless of their VOC content.

Vegetable inks were being sourced from Toyo, Inks and Graphics, Flint, and Sikata ink suppliers, and were predominantly soy-oil based.

Relatively few of the printers had adopted an IPA substitute, however most had reduced IPA content to 3-5%.

4.6 Hazardous substances/toxicity

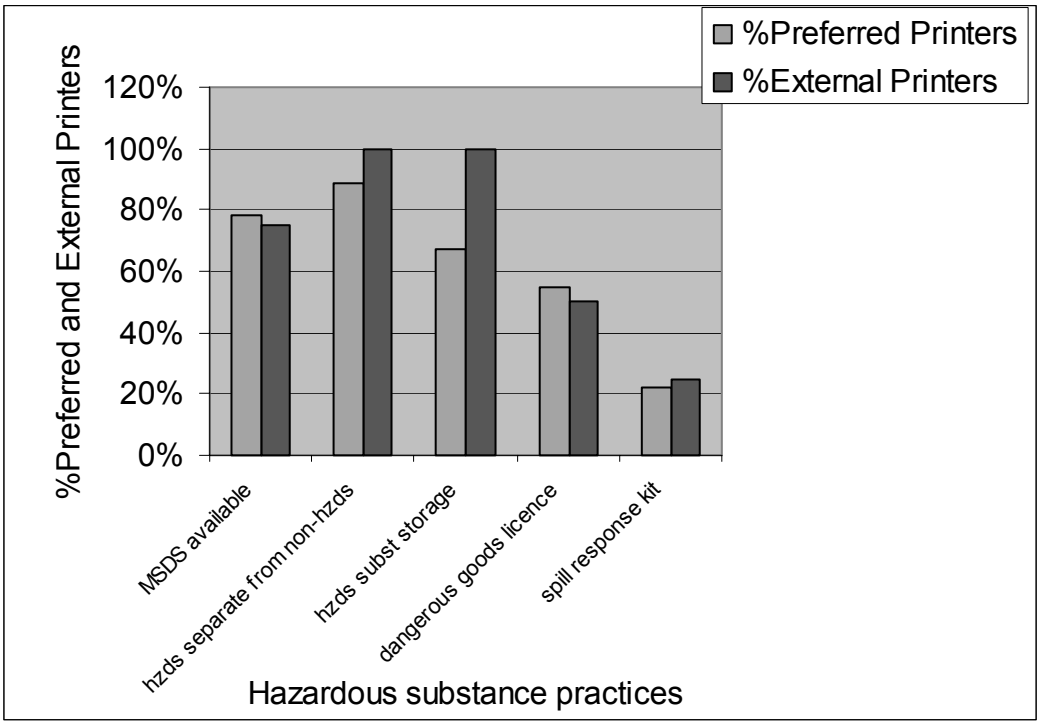
MSDS (Material Data Safety Sheets) were available and accessible at 78% of preferred printers and 75% of external printers. 89% of preferred printers and 100% of external printers stored hazardous substances separately from non-hazardous substances. 67% of preferred printers and 100% of external printers had a hazardous substance storage area or cabinet[1]. Two of the preferred printers did not have sufficient quantities of hazardous material (i.e. 15 litres of class 3A) to require a hazardous storage area. 55% of preferred printers and 50% of external printers had obtained a dangerous goods licence. 22% of preferred printers and 25% of external printers had a spill response kit on site, although the two preferred printers had very basic spill kits, comprising buckets of sand. Results are summarised in Table 6 and Graph 5, below.

Table 6: Results of hazardous substances and toxicity questions

Practice	# Preferred Printers "yes"	% Preferred Printers (n=9)	# External Printers "yes"	% External Printers (n=4)
MSDS available and accessible	7	78%	3	75%
Hazardous substances are stored separately from non-hazardous	8	89%	4	100%
Hazardous substance storage area / cabinet	6	67%	4	100%
Dangerous goods licence	5	55%	2	50%
Spill response kit	2	22%	1	25%

[1] Current regulations for hazardous substance storage (national law under the Dangerous Goods Act) are as follows: if less then 15-L of class 3A is stored, no dangerous goods license and no storage facility is required; 15-L – 100-L of class 3A requires a dangerous goods license and an approved storage cabinet; more than 100-L of class 3A requires a license and a dedicated, approved store room.

Graph 5: Comparison of printers' hazardous substance practices



All printers were applying standard practices to reduce exposure to workplace toxicity, such as supplying various types of gloves, goggles, and earplugs for staff. Goggles were generally stored in the hazardous substance area. Ventilation was a recognised health and safety issue for all printers, however not all had installed proper systems, as evidenced by the relatively strong solvent smell noted at some sites.

5 Evaluation of preferred printers

5.1 Individual assessments

Each preferred printer is assessed on the accomplishment of their benchmark criteria, identified during the original assessments, and on their overall CP and environmental performance. Preferred printers are referred to by code (PR1 to PR9) in order to maintain anonymity in this report.

5.1.1 PR1

PR1 has made a concerted effort to improve CP practices and meet the requirements for Waitakere City Council's preferred printer status. The main drivers for participating in the WCCPP were environmental concerns and

maintaining preferred printer status. Participation in the WCCPP has resulted in positive changes to the company, particularly in terms of materials recycled and reduced waste disposal.

Since the original CP assessment, PR1 has implemented an environmental policy and continued to improve its environmental performance. Staff are trained in the correct use and handling of chemicals, all products are properly labelled, photo development process wastes are sent to Nuplex Chemicals for recycling, and silver is recycled from used developer. Only vegetable-based inks, citrus-based washes and cleansers are used, and IPA has been eliminated from the presses. Recyclable materials, including shrink wrap, are separated. PR1 was one of the few printers to use lidded bins for used rags, and to separate hazardous wastes from non-hazardous (even though solvents and mineral oil inks were not used on site!). Used ink tins and rags are collected separately by "Right Price Bins", however it is believed that this contractor does not treat the wastes as hazardous, but simply dumps them at the landfill. PR1 has one 240-L wheelie bin of waste collected each week.

Correct types of gloves are provided to staff, however during the site visit the MSDS could not be located (due to a recent change of premises). Regular waste and/or environmental audits are not currently being conducted.

Information is provided to clients on greener print options, such as recycled content paper, however only approximately 10% of jobs are printed on recycled paper (50% - 100% recycled content). Only vegetable-based inks are used, and excess inks are recycled into black ink by Inks and Graphics.

5.1.2 PR2

PR2 participated in the original WCCPP, however did not want to become a preferred printer. At the time of the original assessment, the company felt that they could not consciously allow themselves to become a preferred printer while their CP practices were not entirely "green". Since then, PR2 has steadily improved its environmental practices and would now like to be considered for preferred status. The company has applied several innovative initiatives to reducing waste on-site.

PR2 has an environmental policy, and trains staff in CP procedures. Materials are separated for recycling, and the waste skip only contained plastic wrap and waxed paper on inspection. Paper off-cuts are used to produce note-pads, which are given to clients. Boxes are re-used to deliver jobs, with a sticker saying: "Please excuse my appearance but I am a recycled carton whose life is being extended as far as possible". Ink residue is scraped into a drum and periodically collected by United Environmental for hazardous waste disposal (1-2 times a year). Excess inks are suggested to clients as a cheaper alternative for one-off jobs. Jobs printed on recycled paper (mostly Ambassador brand, 50% recycled content) are about 25-30% of all work. PR2 maintains a manual materials inventory system.

PR2 has made a number of input changes to reduce workplace toxicity. Solvent-based wash-ups have been replaced with a water-miscible "safety wash"; IPA substitutes have not been successful, however the IPA content of fountain mix is down to 3%; citrus deglazer is used; and all but one regular customer has been switched to vegetable-based inks. Staff are provided with a selection of gloves

and goggles, and MSDS are kept in a folder in the dangerous goods store. A basic (ie: bucket of sand) spill kit is located in the workshop.

To reduce water usage, PR2 has fitted flush saves on toilets, put a dishwasher in the staff kitchen, and set up a system whereby water from the press dehumidifiers is reused for the off-set damping system.

5.1.3 PR3

Staff well-being, environmental concerns, and business considerations were the key drivers for PR3's participation in the WCCPP. Major benefits of the project included improved workplace conditions and improved CP practices in the old-established family business. Rubber-stamp production is another activity of the company.

PR3 does not have an environmental policy. Health, safety, and environment training for staff is accomplished through an OSH workbook, developed by the business. Staff are provided with appropriate safety gear, and MSDS are located in the hazardous substance storage area. The hazardous storage area is neither enclosed nor fireproof, and consists of an alcove area next to the toilet.

A trade-waste backwash water system has been fitted to the sewer. Citrus and gum-based washes/cleaners are used, and IPA has been eliminated from the presses. Solvents are still used for rubber stamp production, and a solvent ventilation system has been fitted. United Environmental Ltd collects used solvent for recycling.

Paper, cardboard, and aluminium plates are recycled, however the current paper recycling contractor does not accept heavily inked or coloured paper. A Council kerbside recycling bin is used for plastic, metal, and glass drink containers. Recycled content paper is used for around 1% of jobs. Vegetable-based inks are used for approximately 5% of jobs. On-site materials storage is relatively disorganised and untidy.

5.1.4 PR4

PR4 joined the WCCPP in order to reduce landfill waste and for OSH and environmental reasons. Major benefits from the project include reduced energy use, less waste to landfill, reduced emissions, and a friendlier, safer work environment. Costs for energy and waste disposal have decreased thanks to the project.

PR4 has an environmental policy. Staff are trained in CP practices. All jobs are printed using vegetable-based inks, and around 10% are printed on recycled content paper.

The company has reduced workplace toxicity by ensuring that 90% of cleaning products are water-miscible, and by replacing VOC products. Hazardous materials are stored in a hazardous storage room, and MSDS are available. IPA has been reduced, but not substituted, and ventilation systems have been installed. Used rag bins have not been covered.

Most recyclable materials are source-separated. Waste ink, rags, and tins are collected for hazardous disposal by Medi-chem, who also recycle the used

solvents. Film, shrink wrap, and non-recyclable paper are placed in the waste skip.

5.1.5 PR5

The main drivers for PR5's participation in the WCCPP were improved health and safety for staff and better environmental practices. PR5 has made considerable changes to management practices, product inputs, material handling and storage, and waste disposal, and has given "green print" talks for the AEBN and other organisations.

PR5 has an environmental policy, and conducts staff training to meet the targets of the policy. Options such as recycled paper are discussed with clients, and 10% of jobs are produced on recycled paper stock. Only vegetable-based inks are used on-site (PR5 was using vegetable-based inks prior to the WCCPP). Water-miscible, citrus-based washes (from "Varn") have replaced solvent washes and deglazers, and an IPA substitute is used. However, a small amount of IPA is still used in some presses.

All recyclable materials are source-separated, including ink tins. Ink skins are returned to the manufacturer for disposal (note: Flint collects ink from clients and sends to Medi-chem for hazardous disposal). Rags, waxed ream wrappers, and plastic wrap are sent to landfill.

MSDS are located in two areas on-site, and staff are provided with appropriate safety equipment. There are two hazardous substance stores.

5.1.6 PR6

The original assessment for PR6 could not be located, therefore benchmark initiatives are not available for comparison to current practices. PR6 participated in Council's cleaner production programme in the hope of attracting work from Waitakere City Council, however the Council jobs have not suited PR6's business. The WCCPP resulted in improved waste management efficiency for the company, particularly cost savings through reduced disposal, and improved environmental awareness.

PR6 has an environmental policy. Staff are trained in CP and OSH practices during an initial induction period, which is reinforced with notices and a health and safety officer.

PR6 has reduced workplace toxicity by sealing used rag bins, installing full air conditioning, and using low VOC washes. IPA has been reduced, but not substituted. 90% of jobs use vegetable-based inks. Hazardous substances are stored in a locked storage room, with MSDS attached to the door. Used rags and ink tins are collected separately for hazardous disposal, and used solvents are recycled.

Recyclable materials are source-separated; film, shrink wrap, and non-recyclables are placed in the waste skip. Some ink is recycled into black ink. Around 12% of jobs are printed on recycled content paper.

5.1.7 PR7

PR7 joined the WCCPP in order to further pursue an existing interest in environmental improvement, and to protect its business relationship with Waitakere City Council. The WCCPP fitted well with the corporate ethic of PR7's multinational owner, and benefited the company by increasing staff motivation and bringing a higher profile to the green print issue.

PR7 has an environmental policy, and applies it as a management tool. A number of key performance indicators, particularly relating to waste generation, are measured and reported regularly. Consultants have worked with the company to minimise its stormwater runoff from the site, and to ensure the cleanest water possible. Staff are formally trained in CP practices through instruction briefings, a printed guide, and regular OSH meetings. Individual departments undertake monthly environmental and waste audits.

To reduce workplace toxicity, PR7 installed an automated Building Maintenance System, which controls air humidity and air quality. Used rags are collected in counter-balanced, lidded bins. Tinter is now rarely used on-site, and pre-tinted paper is bought-in. Vegetable-based inks are used exclusively apart from small amounts of magnetic ink. A mixture of vegetable-based cleaners and solvent cleaners/washes are used on the presses, however the company tries to select the least toxic product possible. IPA has been reduced, not substituted.

Recyclable materials are source-separated. Some rags are recycled, and the remainder are collected with used ink tins by Medi-chem for hazardous disposal. Medi-chem also collects used solvent for recycling. Some excess printing ink is recycled into black for in-house use.

5.1.8 PR8

PR8 agreed to participate in Council's CP printing programme in order to ensure they were on top of environmental issues. The company has been ISO 9001 certified since 1994, and has been involved in the development of various environmentally friendly printing products with DSC (formerly Landrost) chemical manufacturers.

PR8 has not established an environmental policy. The company conducts regular waste and environmental audits as part of its ISO 9001 certification process. Clients are provided with "green" options such as recycled paper and vegetable-based inks, and 10-15% of jobs are produced on recycled paper. Vegetable-based inks are being increasingly used for jobs, but mineral-oil inks are still the predominant ink type used.

To reduce workplace toxicity, PR8 has installed air conditioning, roller-doors for better ventilation, and supplies staff with appropriate gloves and goggles. MSDS are readily accessible, and a basic spill kit (ie: a bucket of sand) is located in the workshop area. The company has a hazardous substance store. Citrus wash and "Safer Glaze" have replaced solvent-based products, and white spirits were replaced with less hazardous "White Spirits Fast". IPA substitute is used on one press, and PR8 is working with DSC to develop a fountain mix (and IPA) replacement.

A Council kerbside bin is used to recycle metal cans, plastic and glass bottles. Paper, cardboard, film, silver, and aluminium plates are separated for recycling.

Wooden pallets are returned to suppliers. Used ink tins, rags, and plastic wrap are placed in the rubbish skip, which is cleared twice a week. On inspection, the skip contained a quantity of recyclable cardboard and paper.

5.1.9 PR9

PR9 joined Council's CP printing programme in order to address environmental concerns and to establish business with Waitakere City Council.

As a result of the project, PR9 prepared an environmental policy. PR9 now uses mostly vegetable-based inks, and some vegetable-based cleaners. Two presses are using water-miscible washes, however the rest are still using solvent-based washes. 4% IPA is used in fountain mix.

The former hazardous store room is now being used for other purposes, and hazardous substances were stored on shelves in the workshop at the time of inspection. MSDS and proper safety equipment was not available. Lids have not been placed on used rag bins.

Recycled paper is not presented to clients as an option due to the 10-15% higher cost. However, 10-15% of jobs are produced on recycled paper stock. Materials are recycled, although recyclable paper and cardboard were evident in the waste skip. Ink skins are returned to the supplier for disposal.

Table 7: Summary of preferred printers' major CP practices benchmarks

Major benchmark	PR1	PR2	PR3	PR4	PR5	PR6	PR7	PR8	PR9
Environmental policy	✔	✔		✔	✔	✔	✔		✔
Correct storage of hazardous substances	✔	✔		✔	✔	✔	✔	✔	
Correct separation and disposal of hazardous wastes	✔a.	✔b.		✔	✔		✔		
Effective separation of recyclable materials	✔	✔	✔	✔	✔	✔	✔	✔c.	
Vegetable-based inks used for majority of jobs	✔	✔		✔	✔	✔	✔		✔
IPA substituted	✔		✔		✔			✔d.	
IPA reduced to 3-5%	N/A	✔	N/A	✔	✔	✔	✔	N/A	✔
Low VOC washes/cleaners	✔	✔	✔	✔	✔	✔	✔e.	✔	

Overall good site condition (tidy, good ventilation, etc)	✔	✔		✔	✔	✔	✔	✔	
% jobs on recycled content (≥ 50% recycled fibre)	10%	25%	1%	10%	10%	12%	10%	10%	10%

a. PR1 has contracted Right Price Bins on the assumption that they are correctly disposing of hazardous materials.

b. PR2 separate waste ink for special disposal, but not used rags or tins.

c. PR8 had good systems in place, however recyclable paper and cardboard was still entering the waste skip.

d. PR8 uses an IPA substitute on one of their presses.

e. PR7 uses a combination of solvent washes and vegetable-based washes/cleaners.

5.2 Comparison of preferred printers to external printers

A number of comparisons can be made between preferred and external printers' health, safety, and environmental practices.

Table 2, above, provides a comparison between the CP management practices of the two groups. In general, preferred printers appeared to excel in environmental practices, such as policies and waste minimisation training for staff, whereas external printers tended to have superior OSH practices and materials inventory systems.

In terms of product or design modifications to reduce waste, all but one printer indicated that this was now a common industry practice: paper and ink wastage impacts profit, therefore it is minimised at the design phase. One printer could not control product modifications since all designs came direct from a design house.

Table 4, above, indicates that both groups of printers were involved to some degree in source separation of materials for recycling. In nearly all types of material, preferred printers exceeded external printers in recycling activity. Preferred and external printers participated equally in paper and aluminium plate recycling. Preferred printers were more likely to store materials in reusable containers, although on closer investigation it appears as though the printers do not know for certain whether the containers collected are in fact reused by the suppliers. Preferred printers were also more likely to separate hazardous from non-hazardous wastes than external printers.

In terms of input changes – particularly reduced use of toxic materials – preferred printers clearly exceeded initiatives of external printers, as shown in Table 5, above. The level of participation in trials of low VOC and/or vegetable-based washes, mineral oil free inks, and IPA substitute was comparable between the two groups. However, adoption of these products was very limited amongst external printers, whereas a high percentage of preferred printers had made input changes.

Table 6, above, provides a comparison of hazardous substance and toxicity initiatives. In general, external printers are comparable to or exceed the preferred printers in their management of workplace toxicity. Both groups had a similar level of initiative with respect to MSDS availability, dangerous goods licences, and spill response kits. External printers were more likely to store hazardous materials in hazardous storage rooms or cabinets, separated from non-hazardous materials. However, one external printer had a quantity of hazardous material drums stored beside the designated cabinet, and another was using an old fridge as a hazardous store – neither of these practices is appropriate.

Tables 7 and 8 provide a comparison of the more specific CP practices of the two groups of printers, particularly "green" print practices. Clearly, the preferred printers exceed the external printers in nearly all categories. The external printers interviewed all had exceptionally tidy, odour-free sites, even though they tended to still use solvents and IPA. Two of the preferred printers' sites were comparatively untidy and had strong solvent smells.

Establishment of an environmental policy and the use of vegetable-based inks and recycled paper for jobs provided a clear distinction between preferred and

external printers. All but two preferred printers had an environmental policy, and no external printer did. The majority of preferred printers used mostly vegetable-based inks and produced at least 10% of jobs on recycled content paper, whereas external printers produced 0-5% of jobs on recycled paper and did not use vegetable-based inks.

Table 8: Summary of external printers' indicative CP initiatives

Indicative initiatives	**Printer A**	**Printer B**	**Printer C**	**Printer D**
Environmental policy				
Correct storage of hazardous substances	✔	✔	✔	
Correct separation and disposal of hazardous wastes				
Effective separation of recyclable materials				
Vegetable-based inks used for majority of jobs				
IPA substituted		✔		
IPA reduced to 3-5%	✔	N/A		✔
Low VOC washes/cleaners				✔
Overall good site condition (tidy, good ventilation, etc)	✔a.	✔	✔	✔
% jobs on recycled content (≥ 50% recycled fibre)	5%	0%b.	0%	0%

a. Printer A had a clean, tidy site, however the ventilation system was not effective

b. Printer B uses predominantly carbonless paper, which is an eco-friendly European brand

6 Discussion

The original aim of the WCCPP was "to work in partnership with the West Auckland Printing Industry and associated organisations to improve the environmental performance of lithographic printers within Waitakere City". The review of the WCCPP, and in particular the assessment of Preferred Printers, indicates that this goal has largely been achieved. If the small sample of external printers can be considered as indicative of the printing industry at large, then Waitakere City Council's Preferred Printers are generally ahead of the game in terms of environmental practices. The review has also highlighted a number of issues, which may be of value to further work with the printing industry, as well as to other CP industry projects. [Note: The term "lithographic printer" is essentially now obsolete, and the more up-to-date term is "off-set printer".]

6.1 Health, safety, and Cleaner Production practices

Certain CP practices – such as reducing paper off-cut wastage and ink wastage at the product design stage, and running jobs from lighter to darker colours to reduce the number of press clean-ups – are now commonly applied in the printing industry. OSH requirements, particularly provision of appropriate worker safety equipment, are adhered to throughout the industry.

Printers are trades-people and crafts-people, therefore any change to their daily practices, which they feel impacts on the quality of their craft, is difficult to enforce. This is particularly true of safety equipment: many press operators appear to judge machine performance in part by sound (and are therefore reluctant to wear ear protection), and managers tended to provide a range of glove types to suit the different tactile requirements of the various tasks. A general observation made by printers was that the younger apprentices, particularly those who had done initial training at a technical institute, were more likely to diligently use the safety equipment provided than older trades-people.

Interestingly, all external printers had an Occupational Health and Safety policy, compared to only 67% of preferred printers.

The Health, Safety and Environment Guide for Printing and Related Industries – developed as a direct result of the WCCPP – has been well-received by both preferred and external printers. The guide is seen as a useful resource, and the majority of printers interviewed were familiar with the document.

6.2 Input changes

Vegetable-based inks and washes/cleaners were also felt to impact on quality in many instances. If initial trials were unsuccessful, printers were generally reluctant to try again. Several printers had found that different makes of presses responded differently to inks sourced from Asia, Europe, or New Zealand, and would use different ink brands on the different presses. As more vegetable-based inks become available in New Zealand, printers may now have more successful trials. One printer suggested that vegetable-based washes/cleaners were only effective when used with vegetable-based inks, which if true may account for some of the difficulties encountered by businesses.

The use of recycled content paper was felt to be a consumer issue, rather than a printing industry issue. Many printers were reluctant to propose recycled paper to clients, given that it is 10-15% more expensive, and clients generally want the most cost-effective option. In this case, education of green print options needs to be directed at the public (or perhaps initially at Councils) rather than the printers, who are all aware of and able to access a range of recycled paper products. Only one printer indicated that the range of recycled paper products stocked by their supplier was decreasing.

Generally, preferred printers exceeded external printers in terms of improving environmental performance through input changes. All preferred printers had switched to low VOC and vegetable-based washes/cleaners, and the majority were using predominantly mineral oil-free inks, compared to 0-25% of external printers. Preferred printers were producing around 10% of jobs on recycled content paper, versus 0-5% of external printers' jobs.

Encouraging printers to participate in industry organisations where they can exchange product information is important if greener print practices are to become common. Several Waitakere-based printers suggested that a former local printing organisation could be reinstated, with initial leadership from the Council. Among the anticipated benefits would be a forum for smaller companies to collaborate on collecting and storing materials, such as shrink-wrap and hazardous items, for recycling or disposal.

6.3 Hazardous substance storage and handling

The changing regulations regarding consent requirements and hazardous substance storage and disposal have left many printers confused. Although most printers belong to one or more industry organisations, there does not seem to be a clear dissemination of information on these topics (probably due to national-oriented organisations and regional-based regulations and resources). Waitakere City Council may want to consider sending a brief letter to local printers explaining the current regulations governing consents for discharge to air, land, and water, and hazardous substance storage and disposal.

Interesting to note that the external printers generally appear to be more conscious of proper storage and handling of hazardous substances than preferred printers. This may be due to preferred printers placing more emphasis on environmental and CP practices.

6.4 Printers' concerns

All of the preferred printers originally joined the WCCPP in order to maximise their business relationship with Waitakere City Council. Several were upset that participation in the project had not resulted in more Council printing contracts being awarded to them, and expressed concern that non-preferred printers external to Waitakere City were being awarded contracts. It was also felt that the Council was ordering a considerable amount of printing from non-preferred businesses on virgin paper using mineral-oil inks. A number of external printers also commented on this issue, citing examples of jobs awarded by Waitakere City Council to external printers on virgin paper with mineral- oil inks. The Council should perhaps consider calculating the percentage of printing jobs awarded to preferred printers, in order to verify these anecdotal claims and monitor the preferred status. It should be noted that the printers have expressed their

perception of the issue, which is presented above, and that it is not within the scope of this review to explore Council's perception and point of view.

Essentially, the printers viewed the preferred status as a means of increasing the number of contracts received from the Council. Future industry projects should clearly delineate what a preferred status entails, and ensure that any implied promise or business agreement can be fully supported by the Council's own management structure. Several preferred printers expressed interest in attending a meeting with Council and all preferred printers to discuss the preferred status, standards, and contractual issues.

7 Conclusion

The WCCPP has had a positive and long-term impact on the CP and environmental practices of its preferred printers. Not all preferred printers have met the benchmarks presented in their initial WCCPP assessments, and several are lagging behind their peers in terms of adopting greener product inputs and improving workplace safety. However, the majority appear to be ahead of the industry in terms of improved environmental performance.

Recommendations for future CP industry projects include greater clarification of any preferential status granted as part of the project, closer monitoring of the actual CP improvements made by participating businesses, and maintaining a single point of contact for participating businesses (such as the Waitakere City Council's Project Manager Cleaner Production).

From the beginning of the review of the WCCPP, Waitakere City Council's cleaner production team indicated that they would follow-up issues identified in this report in regards to the level of environmental performance of the preferred printers and issues identified or concerns raised by the printers themselves. This report has highlighted that there are differences in the level of environmental performance by some preferred printers and that the printers have raised concerns about the apparent number of print jobs being conducted outside of Waitakere City by non-preferred printers. These issues have been lodged with Waitakere City Council's cleaner production team.