

STRATEGIC ISSUES REPORT

Audit Of Current And Emerging Environmental Issues In The Print, Packaging And Visual Communications Industry

Background

The environmental area is increasingly coming to deal with complex issues and all tiers of government are becoming engaged in some form of regulation. Local, State and Commonwealth governments are all pursuing their environmental objectives with varying degree of vigor.

Printing Industries Association of Australia (*Printing Industries*) recently conducted an audit of emerging environmental issues impacting or likely to impact on the printing and related industries. Regional manager contacted their respective state based environment authorities and agencies and sought from them feedback concerning both current and impending issues that may come to impact on the printing and associated industries in the near future.

The issues identified during the audit were both varied in impact, complexity and range, and covered issues such as the discharge of chemical substances to compliance with regulatory measures such as the National Pollutant Inventory and the National Packaging Covenant, to emerging issues and concepts such as eco-labelling and extended producer responsibility and all the related responsibilities that are associated with product stewardship.

The issues paper identifies four broad areas where pressure for improvements in environmental performance is emanating from. They include:

- ◆ Recycling initiatives;
- ◆ Extended producer responsibility;
- ◆ Greening of supply chain; and
- ◆ Government initiated programs

The attached issues paper sets out the full range of issues identified by the environmental audit process. The issues paper examines the likely impact of various environmental measures and proposals on the printing industry and predicts the likelihood of their introduction and implementation, as well as anticipated timeframes for implementing the various environmental measures and proposals.

Printing Industries has become the driving force of this environmental initiative and is seeking to bring together other key industry stakeholders to discuss, examine and manage the emerging environmental issues.

Printing Industries believes that one way of securing successful outcomes in the environment area is through industry coordination and cooperation since many environmental issues tend to impact on more than one sector or segment of the printing industry.

In terms of proposed strategies, the following are highlighted for industry discussion, approval, and implementation.

Proposed strategies to enhance the effectiveness of the printing and associated industries concerning the management of environmental issues:

- ◆ Industry publicity and educational/environmental managements resources
- ◆ Unified industry lobbying activities
- ◆ Industry analysis and monitoring of emerging issues
- ◆ Establishment of an environmental secretariat
- ◆ Establishment of an industry environment forum
- ◆ Establishment of industry environment awards



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Printing Industries has played a proactive role in terms of environmental issues publishing a policy on environmental issues, producing publications such as the Green Printer and the Environment Management Manual which aim to educate the industry on responsible environmental practices. The Association is also a signatory to a number of broader Commonwealth Government initiated national initiatives such as the National Packaging Covenant and the Greenhouse Challenge.

The environmental area is increasingly coming to deal with complex issues and all tiers of government are becoming engaged in some form of regulation. Local, State and Commonwealth governments are all pursuing their environmental objectives with varying degree of vigor.

While participants in the printing and related industries need to be good corporate citizens and engage in responsible commercial behavior that help to minimise any detrimental impacts on the natural environment, the industry has the potential to commercially benefit from responsible environmental practices.

Initiatives in the Greenhouse Challenge area can not only help cut back carbon emissions to the atmosphere but can result in annual savings to companies through lower energy bills.

Cutting back on the amount of plastic shopping bags used by consumers results in gains to the paper making industries which produce paper bags.

Eliminating excessive waste whether in the form of paper, inks and chemicals, or other consumables results in direct savings to the bottom line of companies operating in the printing and related industries. These savings are important and would be welcome by many given the current tight margins faced by many industry operators.

Investing in non solvent based alternatives such as soy or vegetable based inks would help position printers in a more ideal situation to successfully bid for government related work and satisfy the tender requirements of such contracts which are increasingly insisting on responsible environmental outcomes. Using non solvent based alternatives may also help printers lower their exposure to potential OHS issues and liability.

Priority Issues for the Industry

Recycling

Seen as an important element of any strategy that aims to reduce overall waste generation. Recycling can cover material used and produced at different phases of the value chain. Ranging from industry inputs or raw materials to finished products such as advertising material and newspaper inserts.

Another area of concern in recent times has been packaging products where the protective packaging of products has resulted in litter problems. The National Packaging Covenant is a policy instrument that is currently being used to help achieve both recycling and optimal resource conservation objectives in the area of packaging.

Extended producer responsibility

Also known as product stewardship sees the producers of products become responsible for the ultimate disposal/recovery of the product in a post consumer environment. Packaging waste has been identified by environmental authorities as a key waste stream that must be reduced otherwise tough regulations could be applied to help reduce the waste flow to landfill. The concept of product stewardship if universally applied does provide a benefit for local products over imports and can be used by responsible authorities as an industry assistance tool.

Greening of supply chain

Pressure is mounting on government and government agencies to give preference in government related contracts and work to suppliers who meet minimum environmental performance standards. Government procurement is thus being used to achieve environmental objectives and has the potential to be used as an industry assistance tool. Eco-labelling of products and environmental certification are related concepts.

Government initiated programs

To help deliver better environmental outcomes and performance, governments are increasingly encouraging industry participants to become signatories to government initiated programs.

Printing Industries is currently a signatory to the Greenhouse Challenge and the National Packaging Covenant and encourages industry members to follow its' example and become signatories as well. The benefit of high participation of industry participants in voluntary schemes such as the National Packaging Covenant is that resulting outcomes if deemed beneficial and acceptable by environmental authorities and regulators help to prevent the introduction of mandatory schemes which often can be divorced from commercial reality.

Doing nothing is not a viable option

Given the increasing importance of environmental issues, doing nothing is not a practical option for our industry. As stated previously, good environmental performance often is associated with improvements to the bottom line and greater returns on invested funds or assets.

The other inherent advantage of being proactive in the environmental area is that voluntary schemes and programs that culminate in environmental gains and benefits are almost always preferable to mandatory schemes imposed by governments which can be excessively bureaucratic resulting in high compliance costs which often would negate any benefits flowing from the desired initiative.

Printing Industries and other industry or sectoral based representative bodies can not afford to be operating in a reactive mode. Industry participants themselves have a vested interest to become proactive on issues dealing with the environment.

Doing nothing poses the greatest danger for the future commercial viability of the industry. Suppose environmental authorities encourage greater use of the electronic media and reduce the amount of printed matter with the belief that such an approach would help reduce waste and paper related litter. Suppose newspaper inserts are banned resulting in fewer or no inserts and the introduction of an alternative way of distributing newspapers.

There is also the danger that developers of alternative technologies to paper based print communications such as those based on electronic media outputs, may successfully lobby governments to receive subsidies or grants to help develop their products which would replace paper based communications and deliver utopian style environmental outcomes. Or governments may be tempted to place levies on products such as packaging that they deem to be resulting in excessive waste.

Proposed Strategies

Publicity and educational related activities

If there are examples of good industry environmental practices or outcomes then industry stakeholders need to publicise it at every appropriate opportunity. For example the Australian newspaper industry leads the world in terms of newspaper recycling.

The industry representative bodies need to continue to produce and publish environmental based publications that are industry specific in nature and which are updated on a regular basis to ensure both currency and relevancy for users.

Lobbying activities

It is rare for an environmental issue to impact only on one sector or a segment of the industry value chain. Often environmental measures tend to have a broad industry impact, it is

therefore imperative that the industry speaks with a unified voice on environmental issues and concerns.

The various industry representative bodies need to coordinate their lobbying activities as a unified lobbying campaign is likely to result in superior outcomes compared to uncoordinated and fragmented lobbying efforts.

Analysis

It is also important that proper processes are set up to analyse emerging environmental issues. Assessing the potential impact of a proposed environmental regulation, measure or issue on the industry and helping preparing supportive material for is a necessary function of any subsequent industry lobbying efforts.

Establishment of an environment secretariat

The environmental issues facing the printing and associated industries are both diverse and complex and often require the attention of expert personnel. The issues need to be constantly monitored and evaluated regarding their potential impact with the findings subsequently disseminated to various industry stakeholders.

It would be appropriate to establish an environment secretariat position to undertake the tasks outlined above and to publish a regular industry newsletter covering emerging environmental issues both domestically and internationally.

Establishment of an industry environment forum (IEF)

IEF would comprise of key industry stakeholders that would meet on a regular basis perhaps quarterly to discuss impending environmental issues relevant to the industry. The IEF could be administered by the proposed industry environment secretariat.

Environment awards

Another industry initiative could involve the establishment of annual environment awards to reward and recognise the environmental performances of industry participants. The awards could be organized by the proposed IEF and could have different categories based on company size.

The environment awards could be part of a broader National Print Awards.

Audit of Emerging Environmental Issues

Issue	Proposing agency	Description of issue	Likely impact on printing industry	Likelihood of Implementation	Expected timeframe of implementation	Region
Prohibited discharge into the sewerage system	Environment ACT	Ensuring that substances such as solvents and other chemicals used in printing related activities are not illegally discharged to the sewerage system	Moderate to High	High	Current	ACT and National
Compliance with the National Pollutant Inventory	Environment ACT		Low	High	Current	ACT and National
Commitment to the ACT no waste by 2005	Environment ACT	Program for recycling for the ACT region	Moderate to High	High	2005	ACT
Recycling of advertising catalogues	Environment Protection Agency	Need to encourage the active recycling of advertising material no longer required by households. EPA wants retailers to insert the PLEASE RECYCLE logo and message in all advertising catalogues and flyers.	May encourage electronic distribution of some material Possible introduction of levy if voluntary measures are perceived to be ineffective.	High	Immediate next 12 months	SA and National
Code of practice for local and community based newspapers	Environment Protection Agency	There have been instances where community newspapers, the advertising inserts they contain and/or the protective packaging has resulted in litter problems.	Possible code of practice may result in fewer newspaper inserts and different way of distributing community based newspapers	Medium to high	Within the next 12-24 months	SA and National
Waste	Environmental Protection Authority	Disposal of liquid waste Waste Water	Total Industry Avoid production recycle waste water	Occurring Occurring	Progressive Progressive	SA and National

Noise	Environmental Protection Authority	Noise Pollution – equipment	Companies with older equipment may need to update			SA
Environment	Office of Sustainability Green Business Unit	Packaging including plastic bags	Financial Impact on Business Penalties	Highly Likely	Say 2 years	SA and National
Greening of supply chain	State Supply Commission (also increasing numbers of Local Governments)	Commitment through State Sustainability Strategy to prefer suppliers who meet minimum environmental performance criteria	A growing competitive advantage to environmentally superior printers supplying to State & Local Governments	High	1-5 years (for more info contact Ms Lian Borlace, Director Strategic Policy, State Supply Commission Ph 9222 5700)	WA and National
Greening of supply chain	Gradually being taken on by large firms under pressure from shareholders (ethical investment)	Corporations (eg Westpac, Ford, Yalumba, Nokia) are committing to Sustainable Development which is increasingly being passed on to their suppliers in the form of imposing minimum environmental performance preferences.	A growing competitive advantage to environmentally superior printers supplying to selected large corporations	Moderate	Gradual increase – may become significant within 3-7 years?	WA and National
Occupational health and safety (via Len Gordon of Worksafe WA)	Range (eg EPA, Water and Rivers, Public Health)	Industrial toxic chemical hazards often affect workplace health and environmental health simultaneously (close link). WA closely follows European trends. Trend is to increase waste controls worldwide.	Sudden “Crises” linked (eg Brookdale, Bellevue) controls implemented at short notice; plus gradual trend of increasing waste controls	Low in short term, moderate in medium term, and high in longer term.	Gradual increase – may become significant within 3-7 years?	WA and National

Extend Kerbside Recycling	WA Jurisdictional Recycling Group	Looking at implementing strategies to help increase the uptake of kerbside recycling efforts beyond metropolitan Perth including issues such as developing markets for recycled materials such as paper, glass and plastics.	Paper waste is on one of the main areas that form part of the recycling strategy	Low to moderate in short term but once barriers such as costs associated with long distances are overcome likely to be medium to high in the long terms	Gradual implementation Over the next 5 years	WA
National Packaging Covenant	Department of Environmental Protection, KABC, Western Australian Government	As a signatory to the Covenant, WA Government remains committed to working with stakeholders to ensure optimal resource conservation and recovery in household consumer packaging Implementation of recycled goods government purchasing policies. Initiatives such as "The Recycled Products Buying Guide" aimed at helping develop viable markets for recycled products	Packaging area is being targeted as it is seen to be a major contributor to the liter stream which then ends up being disposed to landfill. Issues such as product design, usage of substrates will increasingly become paramount.	High	Immediate/current	WA and National
Controlled waste regulations	Dept' of Environment	Onus on waste generator. Waste tracking	Greater liability	Commenced 1.7.03		WA
Controlled waste inventory	Dept of Environment	Developing a hazardous waste inventory	Depends on the range of materials that the industry uses that will be identified as hazardous	Consultants speaking with industry.	No dates provided	WA
Extended Producer Responsibility Priority List	NSW EPA	Puts certain industry sectors based on post consumer wastes on notice that if waste to landfill rates is not reduced tough regulations could be applied. Packaging waste is on the list.	Printers of packaging may be faced with impacts from application of any regulation. This is on top of the National Packaging Covenant.	Moderate	Within 2 years	NSW and National

Dangerous Goods changes	WorkCover	WorkCover is reviewing the DG Act with the adoption of the National Standard for Storage and Handling of Workplace DG. The National Standard is already operating in Vic & Qld. Requires the undertaking of risk assessments on all DGs including separation distances and ignition sources.	Printers who store and handle dangerous goods will have additional training and risk assessment requirements imposed on them to comply with the standard.	High	About 12 months	NSW
Dangerous Goods changes	Australian Standards	AS 1940 storage and handling of flammable liquids is being reviewed. Substantial improvements to bunding, fire fighting, waste management and roofing of stores are in the draft.	Printers who store flammable dangerous goods may need to consider how well they comply with the draft. Under the National Standard employers must obtain an equivalent level of risk management. This may mean retrofitting of risk management devices and new more restrictive procedures to reduce risk appropriately.	High	About 18 months	National
NSW Greenhouse Gas Abatement Scheme	NSW Ministry of Energy and Utilities	A levy of \$10.50 per each tonne CO2 equivalent emitted over 2002 per capita emissions on electricity. Industry has the chance to claim credits back if they meet the complex and tough accounting requirements. It is expected to add about 0.5% to the cost of electricity in 2007.	Will increase electricity bills.	Is in place	From 2007 on	NSW

At Commonwealth level interest in the following environmental issues:

- government procurement policies stipulating environmental issues
- packaging covenant
- emerging concept of product stewardship
- market based pricing mechanisms to control and regulate waste stream
- greenhouse challenge
- eco-labelling of products
- environmental certification

Typical Environmental Issues Faced By Commercial Printers*

The commercial printing industry is of the largest and most geographically diverse manufacturing industries. The Australian printing industry has some 5,000 printing companies employing more than 100,000 people. Most establishments are small; some 85% employ fewer than 20 people, and only about 4 per cent employ more than 100 employees.

Printers mass produce printed communication by utilizing a variety of printing presses and processes that apply ink to materials such as paper, books, magazines, newspapers, brochures, labels, plastics, metals, textiles and ceramics. Printing techniques fall into five categories, lithography, letterpress, screen-printing, flexography and gravure, which vary in their use of material, image quality, print run time and final product.

Lithography printing combines water or alcohol-based fountain solutions with petroleum-based inks on a printing plate or cylinder. Lithography is used for printing books, artwork and periodicals.

Gravure printing transfers an image to material using an electro-mechanically or chemically engraved copper cylinder. Solvent-based inks are applied to the cylinder, the cylinder is wiped and the image is transferred to the material or substrate. Gravure printing is mainly used for large press runs for catalogues, magazines and color newspaper advertising supplements.

Flexography uses an acid- or alkaline-etched metal plate to make an engraved printing mold. Then, a flexible plastic or rubber plate is formed from the metal mold and placed on a cylinder. This process uses both solvent- and water-based inks, and is good for printing on plastics and metals, and on soft materials such as cardboard and paper packaging.

Letterpress uses a process similar to flexography and was historically used for printing newspapers.

Screen Printing uses a mesh screen of fabric stretched over a frame as the printing plate. A special resistive coating is applied onto the screen to fill up the areas that are not needed. When ink is added, it penetrates the unfilled mesh areas and is transferred to the material. Commercial applications include posters, billboards, displays, stickers, signs, flags, T-shirts and packaging.

Generally, printing operations involve four steps:

- 1. Composition and typesetting of text and artwork**
- 2. Imaging:** During the imaging process electronic or photographic images, often known as photographic negatives or positives, are created. A photonegative is created using photochemicals, while a photopositive is created using mechanical or chemical methods (acid or alkaline etching).
- 3. Printing:** Printing applies ink to a press plate and transfers the image to a material such as paper, plastic or metal.

- 4. Finishing:** After printing, the inks are dried and the printed material is treated with a variety of materials depending on the end use. Finishing may include cutting, folding and binding to produce the final product.

Hazardous Materials Are Part of Daily Printing Operations

Use and generation of potentially hazardous materials is part of daily printing operations. Distinct environmental concerns are associated with specific printing applications, equipment and chemicals utilized by printing operations. All processes share a common trait; they generate some level of hazardous waste. In addition to ink components, the majority of toxic chemicals, mostly petroleum-based, are used in press cleaning and blanket washes. Readily available and affordable, these chemicals remove ink and evaporate quickly for minimal press downtime and greater efficiency and profitability. However, they present serious environmental risks. Petroleum-based cleaners contain more than 60% VOCs, which contribute to the creation of smog. Also, these substances are comprised of a complex blend of hydrocarbons derived from crude oil that contain hazardous attributes, which make them flammable, toxic, corrosive and/or explosive.

Procedures to Minimize Pollution Risk

Hazardous materials used and generated in the printing industry are regulated by various laws.

Printers track their hazardous waste and store it in properly labeled and secured accumulation units. On-site storage tanks cannot be leaky or rusty and must be in an area with adequate ventilation and drainage. After some period of time, printers send hazardous waste off-site for treatment, storage and/or disposal. Transportation should be by a registered hazardous waste transporter. Prior to transport, the hazardous waste must be packaged, labeled and accompanied by a manifest that identifies land disposal restrictions, and notifications and certifications.

Waste Management is a Cost of Business

For commercial printers, waste management is a cost of doing business just like water, gas and electricity. Throughout the entire printing process, waste management costs can be minimized with proper planning, quality control and pollution prevention. Routinely checking equipment for operating efficiency, training employees to notice malfunctions and practice proper chemical handling and prudent inventory control are some good housekeeping practices that can help achieve compliance and reduce waste. Other steps like monitoring photo-processing baths can extend the life of chemicals, reduce waste and save money. Alternative inking systems and effective ink management can help to reduce risk of exposure and waste as well.

Viable Biological Alternatives

New technologies, new laws and increased environmental awareness are ushering in the use of plant-based materials such as corn, soybeans, beets, wheat, alfalfa and grasses. Plant matter-based materials for press cleaning, blanket washes and inks can be used to reduce pollution, improve worker safety and save money.

Biochemicals offer low toxicity and high biodegradability, which may improve worker safety, reduce disposal and liability costs. Their use can also help to avoid a significant amount of the "upstream" pollution generated from the extraction and processing of crude oil into chemicals.

Defining the Exposure

Potential Environmental Exposures:

- On-site mishandling and improper disposal, storage and transportation of hazardous inks, solvents and other hazardous waste
- Improper management of ink mixtures that can contain chemicals such as barium and lead
- Dangerous mixtures of liquid solvent wastes from press cleaning
- Neglect in identifying, labelling and recording hazardous materials
- Negligence in tracking the volume of generated hazardous waste and wastewater
- Leaking or rusting aboveground bulk liquid storage tanks
- Inadequate ventilation or drainage in the storage tank areas
- Treatment and disposal of potentially hazardous waste at off-site treatment facilities
- Incomplete or incorrect information on container manifests can result in improper management: incinerating waste that shouldn't be incinerated, blending incompatible wastes, etc.
- Unknown historical use of the property
- Insufficient freeboard in wastewater lagoons
- Past spills of inks and solvents into floor drains
- On-site wastewater lagoons
- Improperly managed Underground Storage Tanks (USTs) and associated pipes
- Underground Storage Tanks that were removed/abandoned for unknown reasons
- Poor housekeeping practices

Environmental Contaminants:

General:

- Ink waste contains chemicals such as chromium, barium and lead and may be contaminated with cleaning solvents such as trichloroethylene, methylene and chloride
- Wastes from cleaning printing equipment include spent organic solvents such as trichloroethylene, methylene chloride, carbon tetrachloride, acetone and methanol
- Wastes from developing negatives and prints include photochemical solutions from fixers, rinse water and alkaline or acid process baths
- Plate processing wastes include acid plate etching chemicals for metallic generated lithographic plates, and perchloroethylene and butynol for flexographic photopolymer plates
- Other wastes include unused inks, solvents and chemicals such as acetone, benzene, dibutyl and ethyl acetate
- Petroleum- and water-based inks
- Adhesives

- Fountain solutions
- Photochemicals, developers and fixers
- Acid and alkaline etching solutions

Raw Materials, Intermediate Products, Final Products and Waste Products:

Volatile Organic Compounds (VOCs):

- Acetone, carbon disulfide, ethanol and methanol
- Methyl isobutyl ketone, xylene and benzene
- Cyclohexane, isopropyl alcohol and methyl ethyl ketone (MEK)
- Toluene and toluene diisocyanate

Halogenated Solvents:

- Tetrachloroethene (PCE)
- 1,1,1-Trichloroethane (TCA)
- 1,1,2-trichloroethane
- Chlorobenzene
- Trichloroethene (TCE)
- Methylene chloride
- Trifluoroethane

Metals:

- Chromium, lead and barium (from waste ink)
- Silver (from photochemical imaging)

Others:

- Sodium thiosulfate

As an industry, printers are at great risk from environmental exposure because potentially hazardous materials or waste, such as petroleum-based inks and VOC's, are deeply entrenched in daily operations.

*** The material above (Typical Environmental Issues Faced by Commercial Printers) has been sourced from AIG Environmental in the United States for the purpose of outlining the range of environmental issues faced by contemporary commercial printers.**

Appendix 1: Implementation of Proposed Strategic Framework

