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Information, power and environmental justice in Botany: The role of community information systems

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ABSTRACT

In the environmental conflict that surrounds the sighting of hazardous waste facilities there is usually a volatile mix of disparities in power, expertise and information access as well as differing views on risk, which are all played out amidst commercial arrangements and environmental justice concerns. In recent times, the volatility of this mix has been further compounded by the growing climate of public concern and distrust surrounding scientific developments and technology. While there is no 'quick fix' to the complex conflict that this entails, community information systems (CISs) based on participatory models can help address the outstanding issues of capacity, information access, power inequities and environmental justice. CISs are an effective response to the five crucial elements of a toxic dispute, that is, the dialogue, capacity building, information access, evaluation of hazards and risk, and expertise. This paper will review the role of community accessible information systems in the dispute in Botany over the management and destruction of Orica Australia's stockpile of the persistent organic pollutant, hexachlorobenzene (HCB). It will focus on the role of CIS in responding to the challenges for expert information delivery, and in addressing the disparity of informational power within the toxic dispute.

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1. Introduction

This paper concerns a long running dispute over a stockpile of hexachlorobenzene (HCB) waste held by chemicals company Orica, at its site within the Botany community in southeastern Sydney[1]. It gives focus to the management of public information about the controversy, and the work of a Community Participation and Review Committee (CPRC) established to advise on HCB management. Reich (1991) in his review of toxic disputes comments that those affected by chemical and technologic conflict suddenly become involved in another world of problems, conflicts, and institutions. While they may just want to return to their previous existence, faced with both an unwanted technology, and as in the case of the community members of the HCB CPRC a sense of responsibility towards the wider community, they actively participate in the dispute process in the hope of an environmentally sound and just resolution.

The CPRC community participants faced significant challenges. The impacts of information and resource disparities, typical of toxic disputes involving local residents, were clearly evident (Lloyd-Smith and Bell, 2003, p. 20), as were the inevitable arguments over experts, risk, resources and conflict of interest. Much of the HCB conflict focused on the following five crucial elements (Bubna-Litic and Lloyd-Smith, 2004, p. 264) common to toxic disputes: (1) the dialogue (consultation process); (2) capacity building; (3) right to know/information access; (4) evaluation of hazards and risk; (5) experts and expertise.

To achieve an equitable and environmentally just resolution, these five elements need to be addressed. The first two 'process' elements, dialogue and capacity building, focus on a course of action to promote effective communication within the dispute. Through capacity building, communities develop the skills to effectively participate in negotiating or campaigning for environmentally just resolutions. The other three elements represent value themes that permeate all aspects and stages of the toxic dispute. It is these elements on which the processes of dialogue and capacity building must focus. The competing forces of resources, commercial and institutional power, and environmental justice influence all five elements. Unless the community has both a process for dialogue and the capacity (financial, geographic, and technical) to participate, then the important issues of information access, the incorporation of expert advice, and evaluation of risk cannot be addressed. In the face of imposed industrial and chemical risks, effective community participation and empowerment provide the key to the resolution of intractable toxics disputes and the achievement of environmental justice (Lloyd-Smith and Bell, 2003, p. 22).

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[1] HCB is classified as a persistent organic pollutant (POP) under the *Stockholm Convention on Persistent Organic Pollutants*, 2001. In 1996 the Orica stockpile was thought to consist of 8000 tonnes. The reported amount has grown to over 14,000 tonnes in 2006 and an export application has been submitted for 22,000 tonnes.

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2. Information access and capacity building – an international focus

The community's need for access to information on toxic chemicals was clearly recognised in Principle 10 of the Rio Declaration from the United Nations Conference on Environment and Development (UNCED). Agenda 21 of UNCED acknowledged that it is in the public interest for the community to be informed, to exercise their right to understand, to make informed choices and to participate in informed decision-making. This was confirmed in 2000, when Forum III of the Intergovernmental Forum on Chemical Safety (IFCS) held in Bahia, Brazil, released the 'Bahia Declaration on Chemical Safety.' It reaffirmed that an informed public is vital for effective chemical management and called on all governments to:

- increase access to information in chemical safety;
- recognise the community's right to know about chemicals in the environment; and
- recognise the community's right to participate meaningfully in decisions about chemical safety that affect them.

Hazardous waste processes need to accept the right of all participants to relevant information, in a suitable language and format. However, the UN Earthwatch program acknowledged that:

> Unless the community has the capacity to receive the information, to interpret it, and to incorporate it into the decision-making process, the amount and quality of information provided is irrelevant.[2]

Capacity building has an essential role in all toxic disputes, for without it the lay participants involved are easily disenfranchised. When participants in a dispute "don't even know the questions to ask,"[3] there can be little hope of achieving an informed environmentally sustainable outcome or equitable resolution. In most disputes, community capacity building is given little thought and, if it does happen at all, it is usually late in the process. Yet, it is both unreasonable and naïve to expect an informed debate regarding complex, technical chemical risk issues without providing adequate resources and time for capacity building. The need to build the capacity within the community to address the challenges of rapid environmental change and to resolve the ensuing and inevitable environmental conflicts has been identified as an environmental priority for the new century (Allen, 2000).

Capacity development is a process by which "individuals, groups, organisations, institutions and societies develop abilities (individually and collectively) to perform functions, solve problems and set and achieve objectives" (Ballantyne et al., 2000). With its roots in the relationship between the development donor organisations and aid recipients, the concept of 'capacity building' goes well beyond conventional ideas of education and training. It is more aligned to transformative practice in dispute resolution, which aims to support the community in its dialogue and relationships with government and industry and sustain a standard of public discourse that empowers people to articulate their needs and interests (Dukes, 2004). By building capacity, it is possible to moderate powerlessness and alienation, equalise some of the power disparities and support more equitable participation among dispute participants.

Capacity building recognises that participants are partners in information activities and not just customers. To be effective, capacity building needs to reflect the specific needs of the dispute participants and requires parties to work together as partners, jointly identifying the issues, tackling the problems, and sharing responsibility for the results.

It has been acknowledged internationally that capacity building for environmentally sustainable chemical management must include all interested parties, especially the community sector (IFCS, 1996). The Terms of Reference for the international Capacity Building Network (IFCS, 2000) developed by the United Nation's Institute for Training and Research (UNITAR) recognised that NGOs and the community were integral to the success of capacity building initiatives for chemical life cycle management. Their critical role in the design and the implementation of the capacity building activities helps ensure programs are appropriate and effective.

The need for public information access and capacity building is also recognised in the *Stockholm Convention on Persistent Organic Pollutants* (POPs), 2001. Articles 9, 10 and 12 address the need for information access, education material, training, technical assistance and capacity building for the effective implementation of the Stockholm Convention.

Article 10 requires Parties to provide the public with all available POPs information and to keep information up to date. It also requires training for workers, scientists, educators and technical and managerial personnel, while providing educational material and public awareness programmes for the most vulnerable groups. Article 9 on information exchange while providing protection for commercial business information ensures that information on health and safety of humans and the environment cannot be kept confidential. Article 12 requires the provision of technical assistance to developing country Parties and Parties with economies in transition, to strengthen their capacity to implement the Convention's obligations.[4]

The Australian government has accepted the need for capacity building for developing countries in chemical management, reflecting this in its support and funding of Regional Capacity building Centres in China and Thailand to assist in the implementation of the *Basel Convention on the Control of Transboundary Movements of Hazardous Waste and their Disposal, 1989*.[5] However, at the time of writing, Australian governments have not implemented capacity building programs for its own citizens regarding hazardous waste or POPs issues.

Capacity building can take many forms with many different approaches. These may focus on advocacy or computer skills, improved information access or the development or identification of relevant expertise. One way to build capacity among participants in toxic disputes is to develop a learning environment in which a cooperative information collection and consolidation process can take place (Allen et al., 1998, pp. 51–59).

3. Cooperative information consolidation (CIC) and community information systems (CISs)

This was the approach taken by NGO researchers in the HCB dispute in Botany. In an attempt to address the inequities of

[2] See UN System-Wide Earthwatch: Earth Watch and Agenda 21, Information for Decision-Making, UNEP. Available at <http://www.earthwatch.unep.net/>.

[3] Personal communication, Interview with Nancy Hillier, President, Botany Environmental Watch (Botany, 12 June 1998).

[4] Similar acknowledgements of the need for community participation and right to know are included in the Strategic Approach to International Chemical Management (SAICM) adopted by the International Conference on Chemicals Management (ICCM) on 6 February 2006 in Dubai, United Arab Emirates. SAICM was developed by a multi-stakeholder and multi-sectoral Preparatory Committee and supports the 2020 goal agreed at the 2002 Johannesburg World Summit on Sustainable Development of ensuring that, by the year 2020, chemicals are produced and used in ways that minimize significant adverse impacts on the environment and human health. Available at <http://www.chem.unep.ch/saicm/> (accessed 26 June 2007).

[5] *The Basel Convention on the Control of Transboundary Movements of Hazardous Waste and their Disposal (1989)*. ILM 28, p. 657. Available at <http://www.basel.int/> (accessed 26 June 2007).

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information access, capacity and expertise experienced by the CPRC and the wider community, the HCB community information system (CIS) was developed. It used a structured systems analysis approach incorporating a cooperative information consolidation (CIC) process. This aimed to increase the residents' capacity by ensuring credible information regarding all aspects of HCB and its destruction was provided to community members of the CPRC; matched with the capacity to use and disseminate it.

The systems analysis approach required clear problem definition. While it was apparent that many aspects of the HCB consultation process were lacking, not least a lack of trust between CPRC community members and the company, the fundamental problem of lack of access to information and expertise was identified early in the HCB process.[6] Repeatedly in CPRC meetings, community stakeholders expressed the need for access to full information regarding the company's ability to adequately respond to adverse incidents, as well as the CPRC's capacity and expertise to assess all the risks involved.

Yet, the delivery of expert information in the HCB dispute was not only a technical and educational challenge; it involved power dynamics heavily influenced by commercial and legislative factors. For example, there were claims by the waste holder and the State EPA that related risk assessments concerning Orica's groundwater plumes could not be released due to commercial confidentiality. This was a pertinent example of Acland's 'informational power' (Acland, 1990, p. 86) where informational power is defined as being that derived from having access to information that is not freely available to all or having expertise in a particular area.

The principles of participatory action research formed a useful tool to address the inequity of informational power and guided the development of the HCB community information systems. These principles are grounded in practical action, incorporating participants' knowledge and aimed at solving immediate problems.

The main characteristics (Baskerville, 1999) of this approach appropriate to information system development are as follows:

- the action and change orientation;
- the problem focus;
- the 'organic' process involving systematic and iterative stages; and
- the collaboration among participants.

The process of participatory action research encompasses a diagnostic stage involving a joint collaborative analysis of the situation by participants (user studies and user needs assessment), followed by the therapeutic stage involving collaborative change whose effects are then studied (prototype development and assessment) (Baskerville and Wood-Harper, 1996, p. 237). The process then becomes one of diagnosing, action planning, action taking, evaluating and specifying learning.

One example of this approach is the Integrated Systems for Knowledge Management (ISKM) (Allen et al., 1998). ISKM is a learning-based approach that helps communities access, design, develop, manage and refine technical information within a larger context of shared understanding. The focus is to consolidate fragmented local and scientific knowledge together into a single, accessible focal point. Facilitated community dialogue can then structure the available knowledge and information to provide decision support for the participants. This model was well suited for adaptation for information consolidation in toxic disputes as the participatory nature of the approach emphasises processes, which in themselves can reduce the level of conflict surrounding environmental disputes.

The problem definition as described by the HCB participants, especially the lack of access to information and expertise, led to the initiation of an information systems analysis, design and development cycle incorporating a cooperative information consolidation process (CIC).

The CIC represents the progression from the identification of the problem to consolidation of information in a community information system (CIS) repository to aid informed decision-making in environmental disputes. Through a structured 'user needs' assessment including personal interviews and surveys, participants were provided with opportunities to reflect on the information requirements of the dispute and their own personal data and decision-making needs.

The process of CIC was guided by:

- principles of social equity and environmental sustainability;
- inclusiveness and involvement;
- commitment to sharing data and information;
- respect and inclusion of all forms of knowledge;
- an understanding of the history of the dispute; and
- an acknowledgements of power disparities.

The basic CIC steps are as follows:

Step 1. Review the history of the dispute and identify the components of the issue.
Step 2. Conduct preliminary problem identification.
Step 3. Identify other interests or stakeholders to the dispute.
Step 4. Clearly define the protocols of the CIC process.
Step 5. Carry out a literature review of similar issues and disputes.
Step 6. Conduct a user needs assessment by surveying key regulators, industry, residents and NGOs and list all identified concerns.
Step 7. Confirm problem identification and establish the aims and objectives of the CIS.
Step 8. List the dispute components as a series of questions needing explanation, which form the data sets for the CIS repository.
Step 9. Jointly work through the CIS questions, prioritising and also identifying contentious issues that may require special attention.
Step 10. Identify data gaps and restricted information, and a process to address them.
Step 11. Identify need for expert advice and a process to address it.
Step 12. Jointly identify key documents and data sets specific to the dispute issues and negotiate their inclusion into the CIS repository.
Step 13. Consolidate the information into an agreed CIS repository focusing on ease of data management, retrieval and dissemination.

The consolidation of information into the HCB CIS required its own systems design and development cycle incorporating the following steps:

- review of similar information systems;
- user study/user needs assessment;
- design specifications;
- demonstration, prototyping and testing;
- development;
- production;

[6] This was acknowledged at the first meeting of the CPRC by the acting Chair, Professor Ian Rae, see minutes of the meeting of the Community Participation and Review Committee for HCB Scheduled Waste, 10th April, 1997, Botany Town Hall at 5 pm. A copy of CPRC minutes are available at <http://www.oztoxics.org>.

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- distribution; and
- evaluation.[7]

From the problem identification, the dispute analysis and the user needs assessment, the information components of the HCB CIS were identified. These were compiled into categories that represented logical components and answered specific questions. The following information components were prioritised as the main information units and represented both chapter headings of the HCB CIS and main menu components.

1. HCB waste issue – what is the HCB issue all about; where did the waste come from, what are its effects?
2. The Botany site – where is it happening; how close is this to me, my child's school?
3. Stakeholders – who is involved, who should I contact and who is responsible?
4. The cleanup – what are the options for destruction/disposal, and how do I get involved?
5. Maps and diagrams – what does it look like and show me a map/aerial photo, images.
6. Reference library – where do I go for more detailed or technical information; what is happening overseas and what have others done about similar problems?
7. Instruction manual/index – how do I use this system and how do I show others?

Each of these major information components was further broken down into logical subcomponents addressing the concerns and queries of the community participants. These are presented in Table 1.

The CIC process led to the consolidation of data and relevant information in an accessible and user-friendly CIS repository. The reiterative development process incorporated ongoing modifications and changes, reflecting the feedback from the CPRC participants and other users. The CIC process acted as an important capacity building activity for participants, focusing them on the information needs required for sound decision-making. The involvement of the waste holder and the provision of industry information served to expand the information base on which the community based their decision-making. However, the HCB CIS also demonstrated that involvement in the process of CIC influenced how participants viewed the final repository in regards to its credibility and acceptance. Personal experience with the information consolidation process proved to be an important factor in ensuring the acceptance of the resulting CIS and its content.

Based on the experience gained in the HCB CIS, the criteria for a well functioning and effective CIS repository should include:

- designed in response to the users' needs;
- developed from clearly established aims and objectives;
- prototyped to test acceptance of the data structure, content, layout, retrieval, navigation and menu functionality;
- capable of storing large amounts of data with flexibility to incorporate changes in information requirements;
- built from a data collection plan with all data sets jointly accepted through a CIC process;
- inclusive of different levels of complexity of information;
- easy to retrieve data by key word search, menu links and cross-referencing;
- in one clearly identifiable and easily accessible system incorporating all relevant data and documents;
- reviewed regularly with ongoing modifications, where appropriate; and
- attention given to resources and time allocation for maintenance and upgrades.

The final HCB CIS was provided in Adobe Acrobat format as a CD for residents, in HTML format as a website for the wider community and as printouts at the local library for those without computer skills.

The HCB CIS was assessed through a formal questionnaire and personal interviews using the criterions of fairness, efficiency, stability and wisdom (Susskind and Cruikshank, 1987, p. 80) as measured by the perception and satisfaction of the participants. The questionnaire included equal numbers of 'tangible' and 'transformative' questions. 'Tangible' questions attempted to assess design, delivery and accessibility, while 'transformative' questions examined how the information had impacted on the respondents and whether it affected their confidence in their ability to deal with the HCB issue and other future environmental disputes. With one exception, all respondents including residents, representatives of industry, governments, academics and NGO's, viewed the HCB CIS as an effective capacity building tool that provided useful information, delivered in a user-friendly format, which informed and empowered participants. The community member who failed to assess the HCB CIS as effective had not been a participant in the CIC process and therefore, viewed the system and information as biased in favour of the waste holder, Orica.

Both the CIC process and the resultant CIS provided the forum to address the crucial elements of information access, risk evaluation and expert advice, thereby building the capacity of participants and helping to address problem solving and environmental justice concerns.

While the HCB CIS could not address the inequity of financial resources and expertise, it did provide an information resource, which removed conflict over basic data.[8] The HCB CIS built capacity among the participants, widening their understanding of relevant risk issues and provided a respected source of expert information. It also helped address some of the power disparity. By providing a low cost CD to dispute newcomers and ensuring ready access to the information about the HCB issue, this removed the onus on the CPRC community members to repeatedly provide information and justification of the importance of the HCB destruction issue (Bubna-Litic and Lloyd-Smith, 2004, p. 287). The HCB CIS demonstrated that the cooperative development of such repositories can be relatively straightforward and inexpensive. The participatory action research provided many voluntary man hours, hence costs were limited to production and web hosting. The HCB CIS not only helped in the delivery of technical information to the community, aiding informed decision-making but also supported and empowered the community and addressed the basis of informational power disparities.

4. Power and environmental justice in Botany

Despite the cooperative development and acceptance of the HCB CIS, the incorporation of expert knowledge and the issue of risk remain contentious issues for the Botany community. The concept of environmental justice has also been paramount in the community's consideration of risks. The term 'environmental justice' refers to the distribution and impacts of environmental problems as well as the policy responses to address them (Lloyd-Smith and Bell, 2003, p. 14).

[7] While there are many variations to systems design and development cycles, this has been adapted from Wesley-Tanaskovic et al. (1992) and Wetherby (1998).

[8] At the public consultations meetings that followed the release of the EIS, both the company and the community members of the CPRC directed the audience to the HCB CIS as a source of 'independent' information.

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Table 1
Components HCB community information system

Level 1	Level 2	Level 3
HCB waste issue	The chemicals	Hexachlorobenzene Hexachlorobutadiene Hexachloroethane
	Chemical processes	How the chemicals are formed
	Destruction	Summaries of destruction options The Australian experience Detailed destruction technologies Comparison of main options
	Residues	Residues in water/groundwater plumes Residues in soil
	HCB destruction timelines HCB background history	
The Botany site	HCB location Site ownership Site environs Manufacturing history Emergency plans	
Stakeholders	Who owns Who regulates Who sets standards Community groups	NSWEPA–DUAP – Sydney water
	Local government	City of Botany bay City of Randwick
	Consultation	USEPA community relations Case study in problem solving Involvement in scheduled waste
	CPRC	Membership policy
The cleanup	Technology selection	Orica information release Appropriate technologies
	Planning process	
	Env. impact statement	EIS document index Executive summary Community submission EIS submissions
	Commission of inquiry Risk assessment Action plan Monitoring Record of decisions Emergency plans	Risk assessment discussion paper
Map and diagrams	Site location Site map HCB stores map Air photos Images Diagrams	Orica site plan Contaminated waste stores
Reference library	Library catalogue Anzecc management plan Background papers index Legislation/acts index	Listed documents Electronic documents Contaminated Land Management Act Environmentally Hazardous Chemicals Act Environment Planning and Assessment Act
	Orica reports index	Management plan updates Information releases Reports to NSW EPA
	Community participation	News letters Committee minutes Community documents
Instruction manual Index	The HCB system	

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While the United States of America (USA) has specific legislative requirements to help protect the interests of 'environmental justice communities of concern' (EJCOC),[9] Australian regulations do not. Under the US EPA definition, the local Botany community would most likely have been considered an EJCOC, due to its low average socio-economic status and the large population (45%) of migrants from non-English speaking countries.

Much of the Botany community's opposition to HCB destruction onsite could be linked to their experience of the waste holder and its pollution history. The residents believed that they already faced extensive pollution, and cited emissions data from the National Pollutant Inventory[10] to support this. While Orica claimed that the chosen technology was safe and any risks acceptable, residents' experiential knowledge gave testimony to a range of spills, fires, leaks and groundwater contamination from the Orica industrial facilities over past decades.

While much of the environmental justice focus was on distributive equality, other aspects were important including lack of real participation in decision-making, exclusion from the risk assessment process and access to experts. Resource power and expertise were clearly weighted against the CPRC community participants.

For example, community participants argued repeatedly for their own independent expert based on the model used in the US EPA Superfund Program, where Technical Assistance Grants are provided directly to resident groups to employ their own expertise.[11] This model was adopted by the Western Australian (WA) government to support communities affected by the Core Consultative Committee's (3C) siting process for a WA hazardous waste precinct.[12]

As detailed further by Healy (this issue) and Rae and Brown (this issue), the waste holder eventually provided funding for an external independent expert. However, in the adversarial nature of the dispute, clear separation between the expert and the company's funding was not achieved and the issue of a conflict of interest was raised.[13] The concerns were due in part, to the inability to provide a perception of an 'arm's length' between the independent expert and the waste holder, and in part to the manner in which the company interpreted and publicised the expert's advice (Rae and Brown, in this volume).

5. The risk dispute

Reich in his review of toxic disputes writes that power inevitably influences the acceptability of risk, "ultimately, the issue is not risk, but power; the power to impose risks on the many for the benefit of the few."(Reich, 1991, p. 281). Others (Irish, 1999) reflect a more common view of public risk disputes, presenting a sequence of 'naming' (identification of a grievance), 'blaming' (allocating blame for the risk imposition) and 'claiming' (claiming either compensation or the cessation of the risk/hazard). Whereas, many in the community simply view risk assessment as a powerful tool used by industry and government to dismiss community concerns (Lloyd-Smith, 2004).

The notion of acceptable risk, by its very nature incorporates a range of sociological parameters; who is it acceptable to and what factors influence acceptability? Yet, in regulatory science, the community has little input into decisions of acceptability. Despite the development of an Australian Risk Assessment Standards,[14] there has been little public debate about acceptable risk and there are no uniform standard levels of risk. Probabilistic determinations of 'acceptable risk' in Australian risk assessment models may vary from one in 10,000 to one in 1,000,000 according to the type of hazard and the regulatory authority involved (Langley, 2003, pp. 166–167).

Many issues impacted on the Botany community's perception of risk, including trust in the risk proponent; voluntary versus involuntary risk, familiarity and importantly, whether the risk was to be distributed equitably. In the community's assessment of the risk involved in Orica's choice of a technology, the issue of familiar versus unfamiliar risk played an important role.

Orica rejected the well tried, community and NGO supported technology, ECOLOGIC Gas Phase Chemical Reduction (GPCR) Process. Over the previous decade, this technology had effectively destroyed much of Australia's DDT and PCB waste. Instead, Orica chose a semi-incineration vitrification process called GeoMelt, which was untried in Australia on POPs waste. The community consultations that followed quickly degenerated into a public debate about which of the two technologies was likely to 'explode' first. This extraordinary situation 'sensitised' the local population and worked to reaffirm many of their perceptions of the waste holder and their history on the Botany site.

Disputes over chemical risk provide little opportunity for trust to be developed in either the proponent or the process and the Botany HCB case was no different. The affected community was excluded from the 'number crunching' of the risk analysis and from the process by which the risk decisions were made. Some have argued convincingly (Renn, 1998, p. 63) that people are not only concerned about the risks but also about the process by which the risk decisions are made, wanting both evidence of due process and the opportunity to be involved. As Irwin and Wynne argue the first step to improved understanding of the public's view of risk is recognising that the trustworthiness and credibility of the institutions concerned with the risk are "basic to people's definition of risk", to their uptake of knowledge, and that "this is reasonable, indeed unavoidable." (Irwin and Wynne, 1996; Renn, 1998)

Orica's formal risk assessment for the HCB GeoMelt facility was rejected by the community[15]. They argued there had been no involvement of the affected community in the risk assessment process as supported by the National enHealth Guidelines for Environmental Health Risk Assessment (enHealth, 2000). The risk assessment was not viewed as comprehensive as there was no adequate information on background levels of air contaminants and therefore, there had been no assessment of cumulative impacts

[9] See U.S. Executive Order (EO) 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations outlines the legal requirements to protect the interests of an Environmental Justice Community of Concern (EJCOC). An EJCOC is any aggregated or dispersed population that (a) is a low-income population based on the Bureau of the Census (BOC) Current Population reports, (b) is over 50% minority, or (c) contains a minority population percentage meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis.

[10] The National Pollutant Inventory is a government program which requires selected industry to report estimated emissions of 90 chemical compounds per annum. It is available at <http://www.npi.gov.au>.

[11] For a description of Technical Advisory Grants see U.S. Environmental Protection Agency Program Office of Emergency and Remedial Response (1992), at p. 79.

[12] For a description of the Core Consultative Committee process for the Siting of a Hazardous Waste Precinct, see <http://www.3C.org.au>.

[13] For example, this issue was raised by the representative of BEW at CPRC Meeting of the 16/5/2000 and by representatives of the Eastern Region Environment Watch at CPRC Meeting of the 6/8/2001.

[14] Standards Australia (1999). Australia/New Zealand Standard. Risk management. AS/NZS 4360:1999; and Standards Australia, Standards New Zealand (2000) Environmental risk management—principles and process. AS/NZS HB 203:2000 provides guidance for the Risk Assessment process.

[15] See Community Participation and Review Committee (CP&RC) submission by the Community members. Environmental Impact Statement – The Construction and Operation of a Proposed Hexachlorobenzene (HCB) Waste Destruction Facility at The Orica Site in Botany, Prepared on behalf of the community representatives on CP&RC by Mrs. Nancy Hillier Mr. Richard Smolenski, 3rd October 2001. Available at <www.oztoxics.org>.

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as set out in the Director General's requirements. Many documents cited in the risk assessment were not publicly available and the level of uncertainty and the inherent data gaps had not been adequately presented.[16] Most importantly, the risk assessment was based on emissions that the trials of the chosen technology, GeoMelt had not demonstrated that it could meet; in particular, dioxin emission levels.

Subsequently, the New South Wales Commission of Inquiry (COI) found that the GeoMelt technology was acceptable, yet, the siting of the facility at Botany was not. Directed by the COI, Orica set about finding a site in regional NSW, but with the clear rejection of the technology by the Botany community, this failed. The waste holder then applied to export the HCB stockpile to Germany for incineration. In response, communities across the four regions of Germany where the waste is to be incinerated joined with international and Australian NGOs to oppose the export.[17] At the time of writing the future of Orica's export plan remains in doubt, since, although the Australian government gave its approval for export, German authorities have declared the proposed shipments illegal, prompting new negotiations between Orica and European facilities and governments, and a legal appeal.

6. Conclusion

The HCB dispute has cost the community, industry and government dearly in resources, credibility and lost time. While effort was put into establishing a process for stakeholder dialogue, in the view of residents, this failed due to many factors including the considerable imbalance of power in this dispute, obvious in the failure of the proponent to offer real involvement in the decision-making process. Insufficient effort was made by government or industry to address this crucial issue, hence the ability of stakeholders to equitably address the five essential elements of a toxic dispute was severely limited.

However, the unresourced efforts of NGOs to establish capacity building initiatives in the form of the HCB CIS did address some of the information disparities, and strengthened the local community's ability and confidence to address the technical issues involved. This is evident in both the quality of their submissions and their understanding of the risk debate.

Community members of the CPRC and Botany residents had at their disposal a source of information that was undisputed by government, academics, industry or the waste holder itself. At least one of the elements of environmental justice had been addressed.

It could also be argued that the dispute process failed to reach a just and environmentally sound resolution due to a lack of an overall process for managing contentious hazardous waste issues. What has been learnt both in Botany and Western Australia is that hazardous waste destruction must sit within a larger management process to which all governments and stakeholders are committed. This must encompasses waste minimisation, sound management, ongoing monitoring as well as resourced community participation in decision-making in the selection of technologies, destruction site location and risk assessment.

As urban development encroaches upon old industrial areas, it may be unrealistic to argue for onsite destruction within highly populated suburbs. If this is the case, society must be involved in the establishment of waste management precincts which are government controlled but established through an open, transparent and inclusive process. These processes can be enhanced through capacity building initiatives including cooperative information consolidation and community information systems. The skills, confidence and understanding developed carry benefits well beyond resolving the individual dispute.

Cooperative and sound management of hazardous waste is not beyond our reach, it simply requires an honest commitment by all stakeholders; industry, government and the community to address the issues in an informed and equitable manner. To achieve this, resources must be available to ensure information access and capacity building initiatives, a fact well recognised by the international community.

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[16] For example, the uncertainty of the extrapolation to short-term exposure calculations in the light of the sensitising nature of the chemicals involved was not discussed and the reliance on only ERPG-2 and ERPG-3 for chlorine and hydrogen chloride, excluding all other chemical emissions, introduced a high level of uncertainty into the overall risk assessment.

[17] See Herten Progress Society available at <www.pro-herten.de>; Coalition against BAYER Dangers (Germany) available at <www.CBGnetwork.org>; KITE, Network for Lighter Steps on the Planet, Eutox Project, Rue Gal Capiaumont 26, 1040 Brussels, Belgium; also see NTN Objection to Orica Australia's Application to Export to Germany its Stockpile of the POPs Waste, Hexachlorobenzene and Associated Material for Incineration, January 2007. Available at <www.oztoxics.org/ntn>.

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