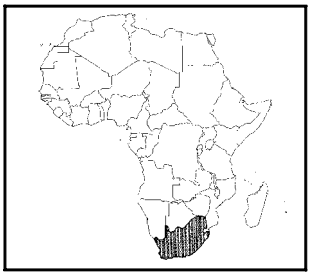


Towards community based indicators for monitoring quality of life and the impact of industry in south Durban

Robert Nurick and Victoria Johnson[1]

SUMMARY: *This paper presents the findings of research carried out in residential communities adjacent to petrochemical and chemical industries in Durban, South Africa during January-March 1997. The purpose of the research was to begin the process of developing community based indicators for monitoring and evaluating industrial performance. This was done using a range of participatory methods with men and women in community groups, and was a part of a wider set of Local Agenda 21 activities within the city.*

Robert Nurick has been a lecturer in environmental economics at the University of Sussex for the last six years and is now a consultant working on issues of environment and development in both North and South. He specialises in training materials, and economic analysis linking the local level to national and international policy issues.

Victoria Johnson has worked for many years on advocacy and policy work in NGOs, mainly covering issues of environment, poverty, gender and population. She has worked as a freelance researcher and consultant over the past five years and specialises in environmental training and issues of children's participation.

Both authors can be contacted at Development FOCUS, 1 Alexandra Villas, Brighton BN1

I. INTRODUCTION

SINCE THE END of apartheid, and the South African elections of 1994, community representatives and community groups in South Durban have become increasingly vocal in their opposition to industry management practices and to the levels of pollution that impact on their communities. There have been many demonstrations and much direct action against particular industries perceived as having a poor record in terms of pollution abatement and community relations.[2] There have been some victories resulting from community campaigns, notably the closure of a hazardous waste site in south Durban[3] and the establishment of a multi-stakeholder forum that resulted from demonstrations against the expansion of an oil refinery which President Mandela had come to open.[4]

In 1994, the city of Durban was accepted as a full member of the International Council for Local Environmental Initiatives (ICLEI) – an international organisation responsible for coordinating Local Agenda 21 (LA21). Consequently, Durban initiated an LA21 programme, as part of the model communities programme co-ordinated by the ICLEI.[5]

The broad goal of the LA21 programme in Durban is ".....the development of an environmental strategy and action plan for the Durban Metropolitan Area based on the principles of sustainable development and community participation".[6]

3RE; tel/fax: (44) 1273722336; emails: rnurick@devfocus.u-net.com and vjohnson@devfocus.u-net.com

***Acknowledgements:** This work was funded by the Centre for Social and Development Studies, University of Natal, Durban through a Jill Nattrass Visiting Fellowship awarded to Robert Nurick, for which he is extremely grateful. Sincere thanks to Mike Morris and all his staff at the centre for providing support, guidance and hospitality during Robert Nurick's stay at the university. The authors also wish to thank Umesh Bahadur, Mandla Cele, Bobby Peek, Cedric Pratt and Roshan Rhamdheen who set up the interviews with the community groups. Special thanks also to the members of the community groups who gave up their valuable time to participate in the group interviews. We would also like to thank Zarina Patel, Deborah Ewing and Eric Apelgren for their hospitality and support during the research. And to David Hallowes for his useful and constructive comments on an earlier draft of this paper.*

1. This work on community based indicators is part of a broader piece of work on environment and development issues in south Durban carried out by Robert Nurick. The research and writing for this paper was carried out equally by the two authors.

2. There have been several demonstrations by local residents campaigning against air pollution from the two oil refineries in the area. For example, on 17 November 1996, residents staged a protest outside the Sapref refinery training centre (Durban Daily News, 18/10/96) and other protests include threatened petrol boycotts of the Engen oil refinery by local residents (Southlands Sun, 19/4/96). Residents have also protested against the expansion of a Hoecsht Durban fibres

Specifically, the LA21 programme was initiated with the appointment of an environmental manager within the city council. Her job was to lobby councillors, council officials and civil society (through its various representatives) to ensure support for LA21 concepts and practice. An environmental branch within the Durban council was established in May 1995, comprising 2 professional officers and an environmental technician. In August 1994 Durban city council accepted the LA21 mandate as a corporate responsibility.[7]

The first major activity under the LA21 programme in Durban was the commissioning of a 'state of the environment and development study'.[8] The study commenced with a preliminary survey of environment and development issues in the metropolitan area, identifying 17 sectors for detailed study (sectors included: air, economy, water supply and sanitation). In addition three case studies were undertaken, of which one focused on south Durban (the southern industrial basin).[9] The results of these studies formed the basis of a report-back and prioritization workshop with community representatives and other stakeholders, to identify priorities and actions to be taken forward under the next phase of the LA21 programme.

The case study report on south Durban (cited in note 9) highlighted five "cornerstones" required for moving towards sustainable development for south Durban:

- the constitutional guarantee of a healthy environment and the legislation and regulation deriving from that guarantee;
- the Durban commitment to the principles of Local Agenda 21 (LA21);
- government industrial policy for sustainable development;
- action by industry for sustainable production; and
- access to information for participation in sustainable development.

As part of the second phase of the LA21 programme, a strategic environmental assessment (SEA) has been initiated by Durban council, with the aim of drawing up a policy or planning framework, that can provide a means of addressing the environmental implications of current development, and guidelines for future development.[10]

During the course of discussions between the authors of this paper and individuals and community representatives, it became clear that a major issue for communities affected by industrial activity was their involvement in the process and design of the Assessment. In particular, community representatives felt it was important that they were involved in defining the scope of the Assessment and the type of information that should be gathered as part of the study. As part of this process, identifying community based indicators of industrial performance and integrating them into the Assessment study was seen as a high priority. The findings presented in this paper make a contribution to beginning the process of defining such indicators.

Figure 1: Map of Umlazi

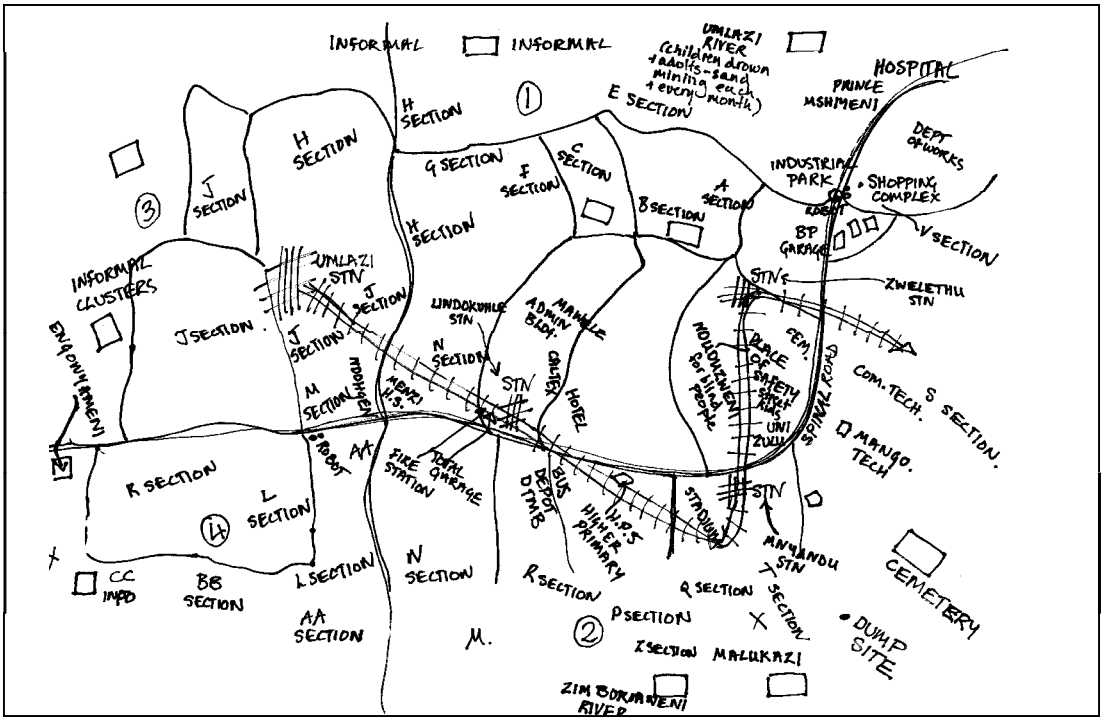
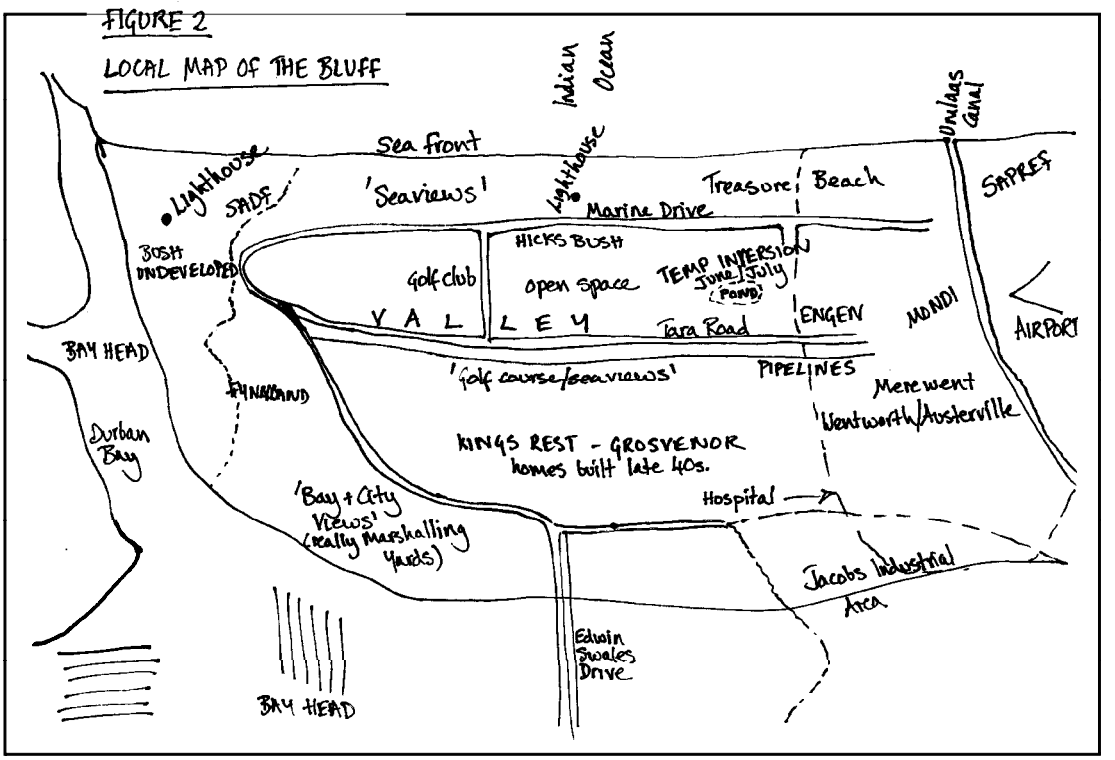


Figure 2: Map of the Bluff



polymer plant adjacent to residential areas (Southland Sun, 1/11/96).

3. The Minister for Water Affairs, Kader Asmal, ordered the closure of a hazardous waste site in Umlazi (Sunday Tribune, 25/8/96). This order represented the culmination of years of campaigning against the site since it was opened in 1987. The campaign was initiated by the Isipingo secondary school located 250 metres from the site. For a history of the campaign, see Ramjeeth, J., J.P. Naidoo, K. Padayachee, U.R. Bahadur, A. Reddy, A and A.K. Morarjee (1995), "Environmental concerns with regard to the 'waste-tech dump': an Isipingo secondary school perspective", Isipingo secondary school, Isipingo Beach, Durban.

4. President Nelson Mandela was invited to open the expansion of the Engen oil refinery in Wentworth on 26 March 1995. Outside the gates, local residents protested against pollution (Southlands Sun, 31/3/95). As a result, President Mandela returned to south Durban to meet local leaders and industry representatives (Southlands Sun, 7 April 1995). He ordered the establishment of a multi-stakeholder forum to address issues of environment and development in the south Durban area (see, Lombard and Associates (1995), "Group reports and proceedings of the south Durban multi-stakeholder environmental management meeting held in the Durban city Jubilee Hall on May 4, 1995", Lombard and Associates, Environment Protection and Waste Management Consultants, Link Hills.

5. Patel, Z. (1996), "Local Agenda 21 – MCP – Durban: phase 1 report", report prepared for the International Council for Local Environmental Initiatives, October.

6. Hindson, D., N. King and R. Peart (1996), *Durban's Tomorrow Today: Sustainable Development in the Durban Metropolitan Area,*

II. AIMS AND OBJECTIVES OF THE STUDY

THIS RESEARCH HAD four objectives:

- to start the process of identifying community based quality of life indicators and determine how industry related concerns are linked to these indicators;
- to specify the types of concerns that communities have regarding industrial activity and begin the process of identifying the indicators needed to monitor and evaluate industrial performance;
- to draw out the implications of the above findings for the Assessment in south Durban; and
- to highlight future work needed in south Durban on community based indicators.

III. METHODOLOGY AND PROCESS OF STUDY

RESIDENTIAL AREAS WERE selected from locations close to heavy industry. Many of these areas are inhabited by historically marginalized communities and, in the Group Areas Act, are assigned as "Indian": Isipingo and Merebank; "Coloured": Wentworth; and "Black": Umlazi. The Bluff, a "White" area under the apartheid system, was also included as it suffers from industrial air and noise pollution as well as having pipelines carrying chemical products running through the area. These locations vary in their proximity to industry (see Figures 1 and 2).

Contacts were made with individuals and community groups in the residential areas. In Isipingo, the Isipingo Environment Committee (IEC) and Isipingo School were approached; in Merebank, the Merebank Residents' Association (MRA) and, in Umlazi, the Umlazi Development Forum (UDF) were contacted; in Wentworth, the Wentworth Development Forum (WDF) and, in the Bluff, the Bluff Ratepayers Association (BRA) were contacted. These groups were approached for their views and assistance in identifying a group of local residents that would be prepared to spend up to two hours in a workshop - the aim being to begin the process of identifying indicators for monitoring and evaluating industrial activity. The only conditions were that there should be a gender balance within the groups and that group numbers should range from eight to 14, which was considered a viable number for the content of the workshop. For example, the Isipingo group comprised teachers, pupils and Isipingo residents. In Merebank, the group comprised youth members of the MRA as well as two elderly member of the MRA, and residents passing on the street. In Umlazi, the group comprised community development workers. In Wentworth, the group comprised mature men and women living in the 'barracks', a poor area of Wentworth. The Bluff group included residents from the area who were all in some way concerned with their local environment.

In each location, the groups drew maps of their area in rela-

Indicator Press, Durban, page 124.

7. Patel, Z. (undated), "Summary of Durban's Local Agenda 21 planning process: phase one" report prepared for the International Council for Local Environmental Initiatives.

8. See reference 6.

9. Wiley, D., C. Root, S. Peek and S. Ramurath (1996), "South industrial basin; case study report" in Hindson, D., N. King and R. Peart (1996), *Durban's Tomorrow Today: Sustainable Development in the Durban Metropolitan Area*, Indicator Press, Durban.

10. South Durban Sea (1997), *Information Bulletin No.1, March 1997*, South Durban Sea Project Team, PO Box 17001, Congella 4013, Durban.

tion to industry and identified the sub-areas and key features of importance to their communities. A time-line was also drawn to establish the historical sequence of events identified as important by the different groups (see Figures 3 and 4).

Using the community maps, the groups then went through a process of preference ranking of sub-areas and neighbouring areas to identify positive and negative aspects of living in different places - this technique highlights issues which can be used to develop quality of life indicators, including socio-economic and physical environment aspects. These issues were then ranked in terms of importance in the different communities (see Figures 5, 6 and 7).

Different industries local to each location were listed by the different groups and the positive and negative aspects of those industries discussed and listed. In some cases, the industries which were known particularly well by the group were scored on a scale of 1-3 (see Figure 8).

It must be made clear that it is not assumed that the individuals participating in the workshops are "representative", in the statistical sense, of the communities they come from. This was not the purpose of the study. The purpose was, rather, to systematically collect information from people in different communities in order to show the scope of indicators which can be developed in south Durban for the Assessment and Local Agenda 21 processes. This was seen as the start of a process of developing the indicators for quality of life and, more specifically, to monitor industry. This information is feeding into the SEA process, and it is hoped that the indicators developed here will be incorporated into the SEA. Community groups can use the information to support and add weight to their lobbying of local government to take their concerns into account.

IV. FINDINGS

THIS SECTION IS structured in the following way. First, a broad set of quality of life indicators is presented. These indicators are derived mainly from the community groups' identification and ranking of issues that help them determine the positive and negative attributes of residing in a particular area of their community. It will be shown that indicators of industrial impact (including a range of pollution factors) figure prominently in all group assessments. It will also be seen that the range of indicators was identified by all community groups (such as living conditions and access to local facilities) although the relative importance of each indicator varied by group. However, there are also important indicators that are specific to each group, such as the degree of political violence and the extent of "green spaces". Another revealing finding was the variation in relative importance of indicators within the five areas. One of the factors accounting for this variation was proximity to industrial plants.

This section then discusses the findings from the broad quality of life indicators, specifically those related to industrial im-

Figure 3: Timeline - Isipingo

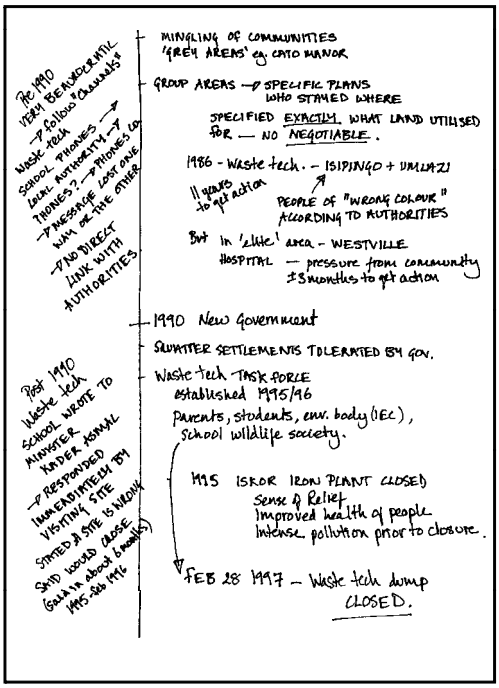


Figure 4: Timeline - Wentworth

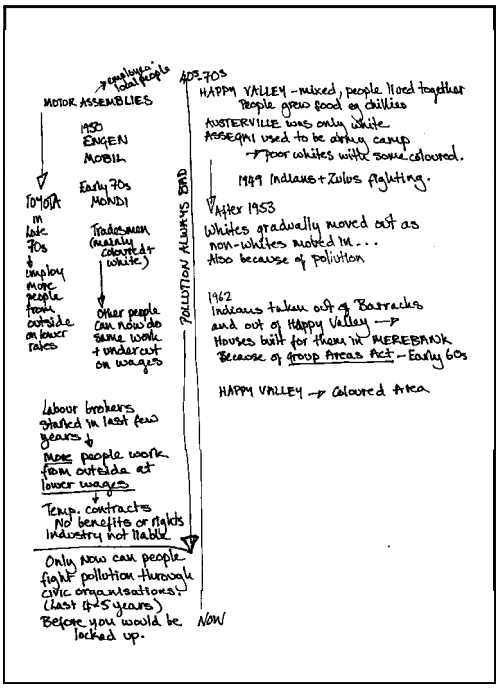
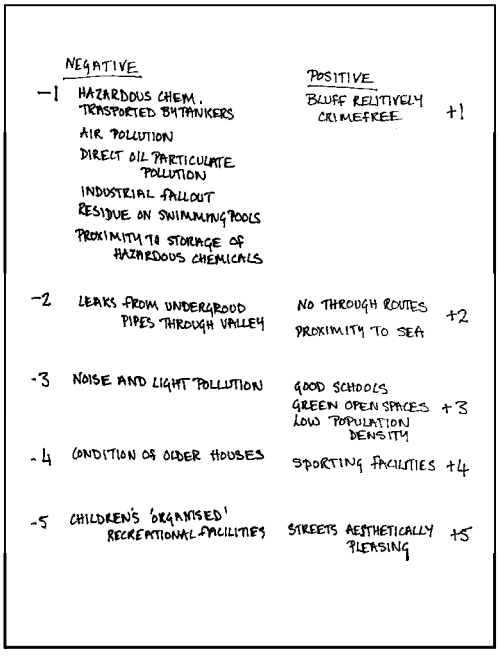
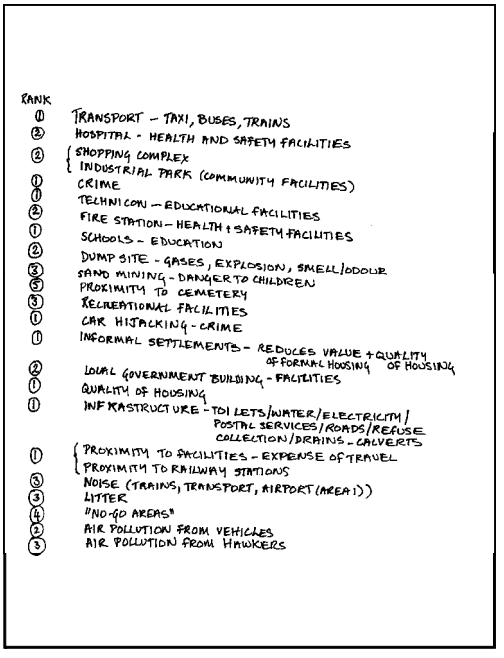


Figure 5: Indicators - Bluff



	NEGATIVE	POSITIVE	
-1	HAZARDOUS CHEM. TRANSPORTED BY TANKERS AIR POLLUTION DIRECT OIL PARTICULATE POLLUTION INDUSTRIAL FALLOUT RESIDUE ON SWIMMING POOLS PROXIMITY TO STORAGE OF HAZARDOUS CHEMICALS	BLUFF RELATIVELY CRIMEFREE	+1
-2	LEAKS FROM UNDERGROUND PIPES THROUGH VALLEY	NO THROUGH ROUTES PROXIMITY TO SEA	+2
-3	NOISE AND LIGHT POLLUTION	GOOD SCHOOLS GREEN OPEN SPACES LOW POPULATION DENSITY	+3
-4	CONDITION OF OLDER HOUSES	SPORTING FACILITIES	+4
-5	CHILDREN'S 'ORGANISED' RECREATIONAL FACILITIES	STREETS AESTHETICALLY PLEASING	+5

Figure 6: Indicators - Umlazi



RANK	
1	TRANSPORT - TAXI, BUSES, TRAINS
2	HOSPITAL - HEALTH AND SAFETY FACILITIES
2	SHOPPING COMPLEX INDUSTRIAL PARK (COMMUNITY FACILITIES)
1	CRIME
1	TECHNICON — EDUCATIONAL FACILITIES
2	FIRE STATION - HEALTH + SAFETY FACILITIES
1	SCHOOLS - EDUCATION
2	DUMP SITE - GASES, EXPLOSION, SMELL/ODOUR
3	SAND MINING - DANGER TO CHILDREN
5	PROXIMITY TO CEMETERY
3	RECREATIONAL FACILITIES
1	CAR HIJACKING - CRIME
1	INFORMAL SETTLEMENTS - REDUCES VALUE + QUALITY OF FORMAL HOUSING OF HOUSING
2	LOCAL GOVERNMENT BUILDING - FACILITIES
1	QUALITY OF HOUSING
1	INFRASTRUCTURE - TOILETS/WATER/ELECTRICITY/POSTAL SERVICES/ROADS/REFUSE COLLECTION/DRAINS - CALVERTS
1	PROXIMITY TO FACILITIES - EXPENSE OF TRAVEL PROXIMITY TO RAILWAY STATIONS
3	NOISE (TRAINS, TRANSPORT, AIRPORT (AREA1))
3	LITTER
4	"NO-GO AREAS"
2	AIR POLLUTION FROM VEHICLES
3	AIR POLLUTION FROM HAWKERS

pact. It links these with the results of the listings of positive and negative attributes of specific industries and thereby starts the process of constructing a community based specific set of indicators and a framework for monitoring and evaluating industrial activity.

The way in which issues related to quality of life and industry have changed over time is incorporated into the analysis. This draws on the time-lines and interviews conducted with the older members of the community groups.

a. Quality of Life Indicators in South Durban

The South Industrial Basin of Durban used to be a multi-racial area. In the 1950s, with the passing of the Group Areas Act, Whites were gradually moved out, Indians were moved into Merebank and Happy Valley became a Coloured area. In the Merebank area, the mixed community before the 1953 Group Areas Act was described as "close-knit" with a "nice atmosphere and peace with the neighbours". According to the residents, when people were moved, there was great "disappointment in the community". Much of the land in the South Industrial area was remembered for its farming, fishing, forests and green open spaces. Representatives from the Bluff community remembered when there was farming, white milkwood forests used for timber, boys hunting in the open bush and a local Indian fishing community. Representatives from Umlazi remember when there

Figure 7: Scoring against Indicators - Meerbank

1 = GOOD
10 = BAD

	NAVY ①	NAVY ②	CENTRAL	RIDGE	
FACILITIES	8	8	1	9	
AIR POLLUTION	8	4	5	10	
SMELL (SEWAGE)	1	1	9	9 (lower ridge)	
NOISE (INDUSTRY)	7-9	2	8	9/10	
NOISE (AIRPORT)	–	2	10	5	
ISOLATED	8	8	1	3	
FLOODING	8	10	1	7 (lower ridge)	
HEALTH (ASTHMA)	9	2-4	6	9-10	
BIRTH DEFECTS	2	2	2-3	5-8	
PROXIMITY TO INDUSTRY	10	3	2	10	
QUALITY OF HOUSES	7-8	4	5	LOWER 7-8	UPPER 1-2
DRUG ABUSE	10	3-5	4	10	5
SAFETY	5	10	1	8	2

were subsistence and commercial farmers and "Africans lived on the land". There was abundant fishing before the hazardous waste dump contaminated the river. In each area, the history of industrial development is recounted since the 1940s-50s and the changes in conditions and processes noted pre- and post-elections. It is against this background that we should understand the present concerns of the groups in different communities relating to their quality of life. Developing indicators in these areas of concern in people's lives will be crucial to monitoring the relative success and failure of local development policies and action.

Table 1 presents the concerns identified by the different community groups. These concerns have been grouped into categories of concern and should form the basis for developing a set of quality of life indicators for south Durban.

For each category, there is a diverse set of concerns that reflects the range of different dimensions within it and which can be used to help develop specific detailed indicators for it. Crime and safety concerns ranged from drug abuse and the threat to youth, together with the violence often associated with drug dealing on the streets, to women's concerns over safety to walk the streets free of the fear of rape and robbery, to concerns over no-go areas where political violence generates a climate of fear and danger.

Industrial impact held a wide range of concerns. Many types of pollution fall into this category, in particular air pollution and health fears over excessive SO_2 pollution from the burning of fossil fuels in boilers, furnaces and generators. Another promi-

Figure 8: Positive and Negative Aspects of Local Industries

SCORES 1=GOOD 10=BAD

EXAMPLES FROM ONE AREA

NAMES OF INDUSTRIES WITHELD

INDUSTRY	POSITIVE	NEGATIVE
OIL REFINERY A (10)	Training + education centre sponsorship for local fairs	Few local jobs Pollution - noise + smell Water pollution into canal Particulate oil pollution (improved over years) Train noise/ground vibration squatters on oil refinery land have been there for long time.
PAPER FACTORY (9)	Recycling projects in schools - provide paper - joint project sponsor community events/youth club local employment.	Noise, water pollution Air pollution (smell) PULP (improved over years) Trucks Train noise/shunting Ground vibration
OIL REFINERY B (6)	Sponsorship Local tours of plant	Pollution - smell Train noise/vibration ↓ pipe damage.
CHROME FACTORY (3)	Desire to improve plant Refiners in stacks → SO_2 decreases Tours of plant	Some smells Noise.
SUGAR PRODUCER (2-4)	Improvement of plant sponsorship communication with residents	Soot from boilers (improved) Not much local labour
CHEESE PROCESSOR (2)	Slight improvement in noise	No sponsorship or support to community projects Not much local labour Transport problems locally from freezer trucks.

Table 1: Quality of Life Concerns in South Durban

Category	Concerns
Crime & safety	Safety on the streets Drug supplying and abuse Car hijacking No-go areas
Industrial impact	Air, noise, light pollution Particulates Waste disposal Environmental risk Health impacts (asthma and skin complaints) Fragmentation of communities
Housing	Expense or rental Quality of housing and whether housing is in the form of informal settlements or whether there are informal settlements set up nearby Living conditions such as electricity supply, privacy for families and members of the family in the house, condition of roof, toilets
Local facilities	Shopping facilities, library, schools, local transport, hospital, taxi, bus and train services Clinics/hospitals, police station, post office, banks, community hall, bars, tote (betting office)
Recreational amenities	Children's public recreational facilities, family entertainment (e.g. sports facilities, tea shops) and proximity to the beach Adult recreational facilities, such as bars and tote, tended to be included in "facilities"
Conservation	Green open spaces Trees on streets
Community feel/ isolation	Isolation from other parts of community Isolation from facilities Interaction/ atmosphere in community

nent concern is that of disposal of waste of varying degrees of hazard. Much hazardous and extremely hazardous waste is generated in the petrochemical and chemical industries concentrated in south Durban and the past and current methods of waste disposal are of major concern to communities living nearby. Particulate pollution from industry stacks was also listed, in particular dust and oil deposits on buildings, washing hanging out to dry and swimming pools. Pollution concerns also include general odours emitted from industrial processes, noise pollution from industrial activity both day and night, and light pollution.

Environmental risk was also highlighted. This is associated with different parts of the industrial cycle, in particular the transportation and distribution of inputs and outputs. This area of concern relates to the risk of accidents such as explosions, spillage and leaks in all aspects of the production process, from transportation and storage of inputs to the production process

itself and the distribution of finished products.

Housing concerns covered a wide range of aspects, from house quality and condition, and women's privacy concerns associated with high densities and poorly designed housing, to wider concerns over the proximity of residential houses to undesirable sites such as informal settlements, and proximity to industrial plants and factories. Concern was also expressed over the excessively high rateable values of some properties given their poor state of repair and the lack of council services such as street cleaning and refuse collection.

Access to local facilities was listed as a prime concern throughout the research area. This category covers infrastructure such as local transport services and health posts (clinics and hospitals) and includes the very male concern of access to gambling shops and bars. Women specifically mentioned the importance of access to venues for family entertainment and tea shops which they grouped with recreational facilities or amenities. This category also included access to sports facilities, availability of children's playgrounds and proximity to the beach.

Conservation of the local ecology was seen as an important issue by some of the community groups. Concerns over coastal and aquatic ecosystems, wetlands and indigenous flora were highlighted. Trees in the street and parks accessible to residents were also included by groups from the Bluff.

The feeling of community or isolation came in many forms. For example, residents from some sections of a community may feel cut-off from other areas because of a major road intersecting their neighbourhood, as is the case in Merebank. People in residential areas located within industrial zones also feel a sense of isolation from the wider community.

Table 2 gives a summary of the key quality of life indicators identified by the community groups in all areas, and the relative importance attached to each.

Crime and safety were identified in all communities as issues of concern. However, in the Bluff, the lack of crime was high-

Table 2: Ranking of Quality of Life Concerns by Residential Area

	Bluff	Isipingo	Merebank	Umlazi	Wentworth
Primary ranked quality of life indicators	1./2./3. Industrial impact 1. Crime 2. Recreational amenities (esp. proximity to sea)	1. Crime & safety 1./2. Industrial impact 3. Local facilities	1./2. Industrial impact 3. Housing	1./2. Local facilities 1. Crime & safety 1. Housing 2./3. Industrial impact	1. Housing 2. Local facilities 3. Industrial impact
Other quality of life indicators	Local facilities Recreational amenities Conservation Low population density Housing No through traffic	Recreational amenities Housing	Local facilities Crime & safety Flooding	Recreational amenities No-go areas Political violence	Recreational amenities Crime Community feel

Some concerns tie in their ranked positions, and therefore are indicated by 1./2., 1./2./3., AND 2./3.

lighted as a positive feature of living in the area whereas in Wentworth, for example, crime rates varied throughout the area.

In areas with generally better housing and living conditions and lower crime rates, for example the Bluff and Merebank, pollution from industry was the community groups' top concern. Pollution was identified as the most immediate problem. For all groups in all areas, issues relating to pollution from industry always featured in the top half of the ranking of issues identified as affecting quality of life.

In the poorer areas of Umlazi and Wentworth, however, the most immediate problems were identified as crime, infrastructure, and housing and local facilities such as shops, banks and a post office. Pollution, although next in order of priority, was seen as needing solutions which would take longer, be more expensive and need the continued support of the civic organizations. The role of civic organizations is important here in enabling and empowering people to become involved in a process of monitoring local industry and the local environment. The local council should also recognize that immediate and basic concerns within communities relating to crime, housing and infrastructure have to be addressed alongside any measures to address pollution, and that addressing poverty is integral to a better environment in the South Industrial Basin.

There were variations within areas which were explored with the community groups by scoring the different areas identified on their local maps against the issues or indicators they had identified. For example, in Wentworth, crime was seen as a major problem in many of the areas (scoring between eight and 10 out of 10 in Merwent, Austerville and Jacobs - where 10 is the worst score); however, due to the more close-knit nature of the communities in the Barracks and Assagai, crime in these areas was not seen as such a problem (both areas scored two out of 10). The lack of crime and the close-knit nature of the community in the Barracks meant that this area also scored well on "community feel" despite the poor housing and living conditions. In Wentworth, however, living and housing conditions in the Barracks were identified as particularly bad (scoring 10). And in Isipingo, for example, housing conditions were identified as particularly bad in Malakazi. In Umlazi, formal and informal settlements were clearly marked on the map. The quality of the formal housing ranged from three to eight.

If we look at Merebank, the areas of the Ridge and Central are both seen as areas where people might want to live due to their close proximity to local facilities, whereas Navy is seen as being somewhat isolated from other parts of the community and from the local facilities. The proximity to local facilities was also identified as important in Umlazi, where the area close to the industrial park and shopping complex, and also areas more convenient to railway stations and bus stops were seen as scoring better than those areas where people had to travel further to get to any local facilities.

Proximity to industry affects how people living in different areas of the different communities prioritize pollution. These variations are apparent, for example, in Umlazi and Isipingo, areas

close to and far from the hazardous waste site. In Merebank, scores for different types of pollution, such as noise and smell, varied from 10 (worst) in areas close to heavy industry to two in areas far from industry. For air pollution, the scores were more evenly spread although those areas close to industry still felt the impact more than those areas far away. These variations will need to be taken into account when monitoring the impact of industry in different areas and when identifying locations in which to monitor impact.

An analysis of the scoring of different issues in the different areas can help to understand the variations in social and environmental issues within areas. This analysis can usefully feed into the development of indicators, to compare issues across areas in the Assessment.

b. Indicators for Monitoring and Evaluating Industrial Activity

Table 3 summarizes the findings of the group interviews specifically with regard to the industry's impact - environmental, social and economic - on neighbouring communities. These results were derived in part from the broad based quality of life concerns but mainly from the groups identifying industries they were aware of and listing the positive and negative aspects of those industries.

The first category of industrial impact concerns relates to the different types of industry and associated pollution. The types of industry in south Durban are many and varied. They range from oil refineries and paper production plants to paint producers, lead based product manufacturers, drum recyclers, small-scale panel beaters, mechanics and transport operators. All residents' groups mapped out the steady increase in the type and number of industries over the last 40 years. Local residents are well aware of the range of industrial activities and have specific concerns associated with each. These concerns relate to all the industries and to all stages of the production process, from transportation and storage of inputs to the production process itself, the storage, distribution and transportation of the finished product, and the disposal of by-products and waste produced as a result of the activity.

A major concern of all groups was air pollution, in particular SO_2 which is detectable by smell and irritation on inhalation, and is widely perceived as causing many respiratory ailments. The major emitters of SO_2 in the areas under study are the two oil refineries and the paper production plant. Another concern is particulate deposits from the oil refineries. Residents from the Bluff, Merebank and Wentworth all reported regular sticky, oily deposits on their cars, roofs, washing and kitchens which they attribute to the two oil refineries located in their midst.

In Merebank, residents were concerned with deposits of ash (a waste product from the combustion of coal to power the boilers) from the paper production plant, although the situation has improved over recent years with the installation of sprinklers.

Table 3: Industrial Impact Concerns

Category	Concerns
Types of pollution from different stages of the industrial/product cycle and different types of industry	Air pollution (SO_2); particulates; dust; ash. Water pollution (canals and sea) Odour Noise and light pollution - train shunting at night Fumes and vapours from paint sprayers Emissions reduction programmes Recycling projects Vibrations Soot Mitigation measures
Environmental risk	Tanker accidents and spillages Explosions Traffic Children drowning from sandmining
Health impacts of pollution	Asthma from air pollution Skin and other ailments associated with toxic waste Headaches
Employment and working conditions	Differing employment policies Local employment Training opportunities Health and safety at work Checks for drug abuse Role of labour brokers Women's employment Spin-offs from industry - multiplier effect
Community involvement participation	Underhand management practices to divide community and insincerity Lack of information forthcoming from industry (hiding behind Key Points Act) Industry funded community programmes Sponsorship of community events Civic inputs and meetings with industry Accountability of industry to civics Community involvement in process of SEA Involvement of community in development of indicators for monitoring and evaluation Training and education centre

Water pollution is a widespread concern throughout the residential areas, both of canals and rivers, and the sea. In Isipingo and Umlazi, pollution of the local river is of great concern. Residents believe that the hazardous waste site located in Umlazi (but now closed down on the directive of the National Department of Water and Forestry) has led to the leeching of toxins into the river which is now dead (no living organisms are found in the river). In Isipingo, residents also noted that people who wade through the river get lesions on their legs. Pollution of the canals and rivers is attributed by residents of all areas to the oil refineries, the magazine and newspaper producers, and the many small-scale auto-sprayers and car workshops. Industrial pollution of the sea is a major concern for residents in the Bluff.

Noise pollution and vibrations are a major concern for residents living close to industry. In particular, the shunting of inputs and final goods - which often takes place 24 hours a day - causes much distress to local residents in both the Bluff and Wentworth, leading to sleep deprivation and stress. Light pollution, again throughout the night, also concerns residents. One of the oil refineries was referred to as "the ship that never sails", referring to the lights illuminating the stacks and housing.

Residents acknowledge the positive steps being taken by some industries to reduce the levels of pollution and, in particular, the efforts to reduce SO_2 emissions by some plants are welcome. One criterion for assessing the performance of industry is the extent to which industries are implementing emission reduction programmes. Recycling projects (paper) are also welcomed by residents as an indication that industry is addressing environmental issues.

The second category of industrial impact concerns relates to environmental risk. Of prime concern is the risk perceived by the residents of the Bluff with regard to the Island View storage area, where a cocktail of highly inflammable and toxic chemicals is stored before being transported to the industrial plants either via pipelines or tankers. The perceived risk comes from the storage area itself and from the transportation of materials. Many residents cite examples of tanker spillages of corrosive and inflammable materials, and pipe leaks. More generally, residents from all areas voiced concern over the risk of traffic accidents with the movement of tankers through residential communities (particularly in Wentworth and Merebank), and gave examples of children dying as a result of being caught up in vehicles' wheels. Those living close to large industrial plants are worried about the risk of explosions and the threat that this poses. Again, examples abound of explosions that have occurred in the plants and the stress that these have caused to those outside.

In Umlazi, residents were concerned about the risk to children from unregulated sandmining that results in deep pools being created in the river, where sand has been removed. There have been several cases of children drowning in such pools.

Another category of concerns relates to health impacts, which was cited in all communities as the ultimate concern from industrial activity. Asthma and respiratory ailments, headaches from fumes, vapours and odours emanating from factories, skin complaints and birth defects were all perceived to be the result of the levels and types of pollution from local industry. Many residents perceive pollution related disease, particularly respiratory disease, as being greater in south Durban than elsewhere.

Employment and working conditions (the next category listed in Table 3) were regarded by all residents' groups as an important dimension in assessing the performance of local industry. Issues concerning the extent of local employment, employment opportunities for women, terms and conditions, and methods of recruitment featured highly. Many residents expressed concern that industry does not employ adequate numbers of workers from the local area. The perception is that, over time, there

has been a decline in local employment opportunities, no apparent benefits to local people and, with this, an increasing hostility to industrial pollution. There has been an increase in offers of temporary - rather than permanent - contracts which results in reduced job security, together with reduced benefits and rights. Associated with this is the increasing role of labour brokers, who act as middlemen between workers and industry, in recruiting labour for fixed-term contracts. Residents expressed concern about the unethical methods of some labour brokers in selecting workers and arranging remuneration packages. Community based assessments of industry are influenced by all the above criteria.

Health and safety at work were also regarded as important criteria for assessing industries. Community members differentiated between industries in terms of their accident record. Some came under much criticism because of very poor records, with residents citing examples of explosions, gas leaks and chemical spills within the workplace, leading to injury and death. Of particular concern was the secrecy with which such incidents are dealt with and the inadequacy of compensation for those affected.

Drug abuse was cited as a major social problem in many areas and this phenomenon also appears in the workplace. Industries that had effective checks to prevent drug abuse at work were praised. Many residents recognized the potentially dangerous working conditions given the types of machinery and materials used and the need for workers to have clear heads.

The final category of industrial impact concerns is "community involvement and participation" which relates to the **process** of community involvement in decision-making. For many years, the majority of residents involved in the study had been excluded from participating in local development but the situation changed in 1990 with the end of apartheid and the election of the ANC to government. Residents highlighted a fundamental change in the process of development that has occurred since the end of apartheid. In Wentworth, residents said that it was only now that people could take up the fight against pollution through the civics; in the past, protesters would certainly have been imprisoned. In Isipingo, it was only after the change of government that residents were successful in lobbying the national government for the closure of a toxic waste site located in Umlazi, adjacent to Isipingo Secondary School. In Merebank, residents highlighted Nelson Mandela's visit to a local oil refinery in 1995 as a turning point in the struggle against industrial pollution. President Mandela had come to open expanded production facilities and was met by local residents' demonstrations against the oil refinery. In response, the Minister for the Environment set up a task force to look into community concerns with regard to pollution in the area.

Post-apartheid local government is expected to take full account of community concerns about local development issues, in particular with respect to planning applications for industrial expansion. Councillors representing the communities in south Durban can be lobbied.

Specific industries were assessed in terms of residents' views on their links with local interest groups. Some were seen as employing devious and underhand tactics which serve to divide community groups and obscure the real issues. Others were praised for their genuine approach and openness in communications with local groups. Of particular concern to residents living close to Island View storage area, is the apparent reluctance on the part of management to release information on the chemicals, and the storage and transportation facilities. The Key Points Act, passed under apartheid to protect strategic industries such as the petrochemical sector, disallowed any divulgence of technical and process information to third parties. Residents are concerned that industry continues to apply this law which was passed specifically to address the isolation of South Africa during apartheid.

Process indicators of industrial performance also include the degree to which specific industries are active in the local communities with regard to sponsoring community events, funding children at school, and training and education for adults. Industries are also assessed by local residents in terms of the extent to which they engage in dialogue with community representatives and their relative accountability to local groups.

Meaningful and inclusive participation in the Strategic Environmental Assessment is an important issue for residents in the study area. All perceived the need for the Assessment and the potential benefits which could accrue but residents also voiced concern over the process of the Assessment and their exclusion from what they regard as key elements in the exercise. There are two issues of particular concern. The first centres around the role that community groups have in guiding the direction and approach of the Assessment. Part of this concern relates to the extent to which community groups have an input into drawing up indicators for monitoring and assessing industrial performance.

The second issue concerns the status of on-going and new proposals for industrial expansion before the Assessment is completed. On-going proposals include the expansion of activities at a paper production factory, and the upgrade and expansion of facilities at a chrome plant. Future development proposals for the area include a major expansion in the petrochemical sector. These types of issues are of serious concern to residents and effective process requires residents' inclusion in decision-making concerning them.

V. IMPLICATIONS FOR THE ASSESSMENT AND FUTURE WORK

IT IS EVIDENT that people in the local communities around the South Industrial Basin of Durban have a great deal of local knowledge and expertise which is invaluable to the Assessment and it is important that all stakeholders are involved in the identification of indicators to monitor industry and quality of life in

the area. This means that it is integral to the Assessment process that civic organizations and people from local communities are regarded as experts, and that their concerns are fully understood and fed into the development of appropriate policies and practical programmes.

In the participatory work that has been carried out, issues relating to the impact of local heavy industries were always prioritized in the top half of the ranking of the concerns expressed. It therefore confirms that this must be a high priority for local government. Thus, the Local Agenda 21 and Assessment should be supported as long as the concerns of the local people are systematically taken into account in a process that involves true participation by members of the community. This means that the other stakeholders in the process, namely government and industry, should be accountable to the local people to show how their concerns have been incorporated into decision-making. The process of developing local indicators and monitoring quality of life, and the impact of industry over time will be central to this.

Although in some areas, such as the Bluff and Merebank, pollution was identified as the most immediate concern, in poorer areas of Wentworth and Umlazi, the most immediate problems were seen as living conditions, infrastructure, local facilities, and crime and safety. This has implications for the priorities within the Durban Metropolitan Authority, and practical programmes for addressing these concerns have to be considered alongside measures to improve the impact of local heavy industry. It is still important to recognize, however, that different types of pollution and health impacts were seen as an integral part of the local analysis of poverty and quality of life in the South Industrial Basin.

Pollution in Wentworth, although still high on the list of priorities, was noted as being harder for individuals to work on as the solutions seemed longer-term and expensive. The role of the civic groups was therefore seen as being crucial in this area in order to inform people about the details of what was happening in government and industry, and to enable and empower people to work towards a better living environment. It seems appropriate for the Assessment to take advantage of the existing institutional framework and to work through the different civic groups in south Durban. It should also be recognized, however, that, although the groups work together throughout the area, for example under the umbrella South Durban Alliance, there are conflicts between some of the groups and power relations between them which need to be taken into account. It is therefore important to work with a wide range of groups and also some individuals who are not necessarily part of these groups.

This participatory research has shown the range of indicators that needs to be developed within the Assessment process. These initial concerns which have been identified will need to be further developed to ensure that they are realistic and measurable indicators. Some of the concerns can be directly translated into indicators, for example, using crime statistics and information on local facilities, and selecting key priorities identified to de-

scribe living conditions, such as a tin roof, ratio of space or rooms per person and the existence and level of electricity supply. Some of the indicators will have to be developed for levels of pollution and acceptable environmental risk and the details given in the section on impacts of industry can be used for this. In addition to measuring levels of SO_2 and noise, locally monitored indicators which show increases or decreases over time of the presence of sticky dust on laundry and in kitchens, of oil on cars and pools, and of odours should be developed. The concerns listed in Table 3 give a level of detail which can be used to develop both qualitative and quantitative specific indicators for each area of concern. However, the indicators developed in this paper should not be regarded as a substitute for indicators developed elsewhere. For example indicators that measure emissions at source will be an essential component of an effective monitoring system.

The development of a set of specific and measurable indicators will require the full involvement of the community groups. The indicators they develop can then be set alongside other suggestions from industry and local government departments to develop a baseline of data on quality of life and impact of industry and provide an on-going monitoring system for the South Industrial Basin. This will also require further prioritization by people from the different communities, to identify a set of indicators which can be used but which doesn't overburden either them or the system but which adequately addresses their concerns.

More work will have to be done to identify gender specific indicators which should be incorporated and to ensure that in the development of indicators and their prioritization, gender concerns are taken into account more fully.

In order to establish an effective and systematic monitoring system, it is important to understand the variations within the south Durban area so that the appropriate decisions can be made about where to locate monitoring sites. Some of the output measurement must be carried out at source but some of the local impacts would be monitored in different places depending on proximity to the different types of industry. It is also important to identify who monitors what: some indicators may be monitored by people in the local community, others by government and some by industry itself. The information must then be fully transparent and available to the different stakeholders in the Assessment process and in development within south Durban.