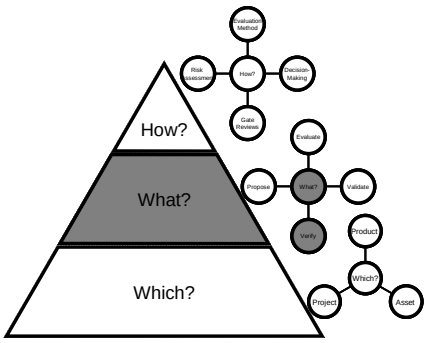
4. Verification of the Social Sustainability Assessment Framework



The chapter discusses the verification of the proposed social sustainability assessment framework. The proposed framework has to be verified to ensure the completeness thereof, i.e. to ensure that all the social aspects relevant to an operational initiative's life cycle are included in the framework. The life cycle approach followed therefore implies that verification should address the three asset life cycle phases that can have social impacts [see Figure 2-8 and section 2.5]. Since the need for case studies arose out of the desire to understand complex social phenomena [220], a case study approach is followed for the verification. A Detailed Case Study Protocol has been developed (refer to Appendix F) to assist with the reliability of the research approach.. Different sets of case studies were studied for each life cycle phase (See Figure 4-1 for verification structure). The objective with these case studies is descriptive in nature and thus the general analytic strategy is to describe the social aspects in relation with the proposed framework and to identify any social aspects that cannot be classified into the framework. In the Operational phase archival analysis of sustainable development reports are also used to ensure comprehensiveness. Information within the public domain was used as far as possible. Where such information was unavailable, the company names are withheld to protect privacy.

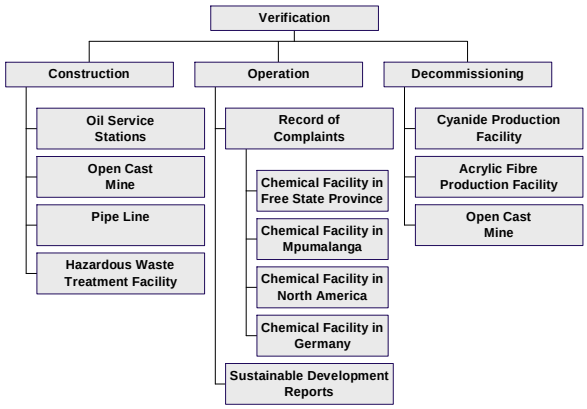
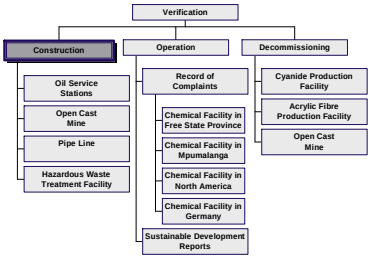


Figure 4-1: Case Study Approach for Social Sustainability Framework Verification

4.1 Framework Verification Part 1: Construction Phase

" *From the time of the earliest announcement of a pending policy change or a rumour about a project, both hopes and hostilities can begin to mount; speculators can lock up potentially important properties, politicians can maneuver for position and interest groups can form or redirect their energies. These changes occur by merely introducing new information into a community or region*" [162]



The unit of analysis for this part is the construction project of a new operational initiative. The project progresses through the normal project life cycle phases and concludes when the operational initiative complies with the set standards of production and is handed over to a business unit. The following four construction projects will be investigated:

- construction of oil service stations - this is one large capital project consisting of various smaller projects. Some of these smaller projects have been completed, while others are still ongoing. All projects follow the same approach;
- open cast mine - this project was terminated due to public resistance and legal problems. The project progressed to the feasibility/basic development phase;
- natural gas project - the project consisted of sub-projects which focused on developing gas fields and constructing a pipe-line from one country to another for transportation of gas. The project also included projects aimed at converting current chemical plants and networks to use the gas as feedstock. These sub-projects are, however, excluded from this case study and the study will therefore only focus on constructing the pipe line and developing the gas fields in Mozambique; and
- hazardous waste treatment facility - although the project completed the feasibility phase, the preliminary Environmental Impact Assessment (EIA) study was rejected and the project subsequently terminated.

These four projects have been chosen due to the unique social character of each, namely:

- the Oil Service Station projects are executed within society's direct living spaces as oil service stations are built in suburbs;
- the open cast mine project is an example of a project that was stopped due to pubic resistance;
- the Natural Gas project serves as an example of a Greenfield project within a country in which the company has no current operations; and
- the hazardous waste treatment facility project demonstrates the impact of social perceptions on projects.

Below follows a discussion on each of the projects' background information, where after any relevant social issues or problematic social issues are classified in terms of the proposed social sustainability framework. Appendix F contains the detailed case study protocol, which explains information sources

and field procedures. The case studies aim to both identify social aspects relevant to the project as well as to classify these aspects within the proposed framework.

4.1.1 Oil Service Stations

4.1.1.1 Background to the Project

The case study investigated the construction of oil service stations by a South African petrochemical company. The Main Supply Agreement and the Blue Pump Agreement between the company and other oil companies in South Africa expired on 31 December 2003. However, when the company gave notice of its intention to end these agreements in 1998, it also gave notice of its intention to enter the retail and commercial fuel market [221]. Together with a Black Economically Empowerment (BEE) service station group, the company started a project to ensure that the merged entity would have 300 service stations by middle 2004, i.e. 150 each. The Oil Service Station project's indicated cost was R410 million. The project's envisioned completion date was December 2004 [222].

4.1.1.2 Project Methodology

The main project, i.e., to ensure 300 operational service stations by the middle to the end of 2004, progressed through the company's stage-gate project management model. Once the project reached the execution part, constructing the individual service stations was handled as small projects on its own. These projects followed the principles of the stage-gate project management model, but not necessarily the specific phases. These projects can be viewed as consisting of six phases, namely:

- the suspensive conditions phase, which entails meeting the zoning requirements, the EIA study, financing pre-conditions and ensuring that accesses are approved, etc.;
- the registration phase, which entails registrating all legal documents;
- final alignment, which takes the form of a meeting before construction to ensure that all requirements from EIA, access approvals, etc., are adhered to and that all role-players in this phase are aligned. This ensures timeous completion of the construction phase;
- execution, i.e. constructing the service station and training the employees;
- merchandising; and
- operation, which is when the site starts pumping and operating as a business entity [223].

The individual projects have a holistic focus that looks beyond the electronic forecourt system to include all fast-moving-consumer-goods activities expected to take place at the service stations [221].

4.1.1.3 Social Issues Relevant to the Project[7]

The social issues relevant to the smaller individual projects are depicted in Figure 4-2. The issues specifically addressed in the individual projects were mostly been addressed pro-actively. The reasons

[7] All information with regards to social issues has been retrieved via personal communication with project team members unless otherwise stated.

for addressing these issues varies from legislation requirements, public pressure as well as lessons learnt from similar projects. The issues are not necessarily addressed in the same phase through-out all the projects, as the phase rather depends on the service station project's specific location. The general rule nevertheless advises project teams to not only address the social issues as soon as possible but also to address the aspects pro-actively rather than reactively. Approximately only 2% of a service station construction budget is spent on addressing social issues

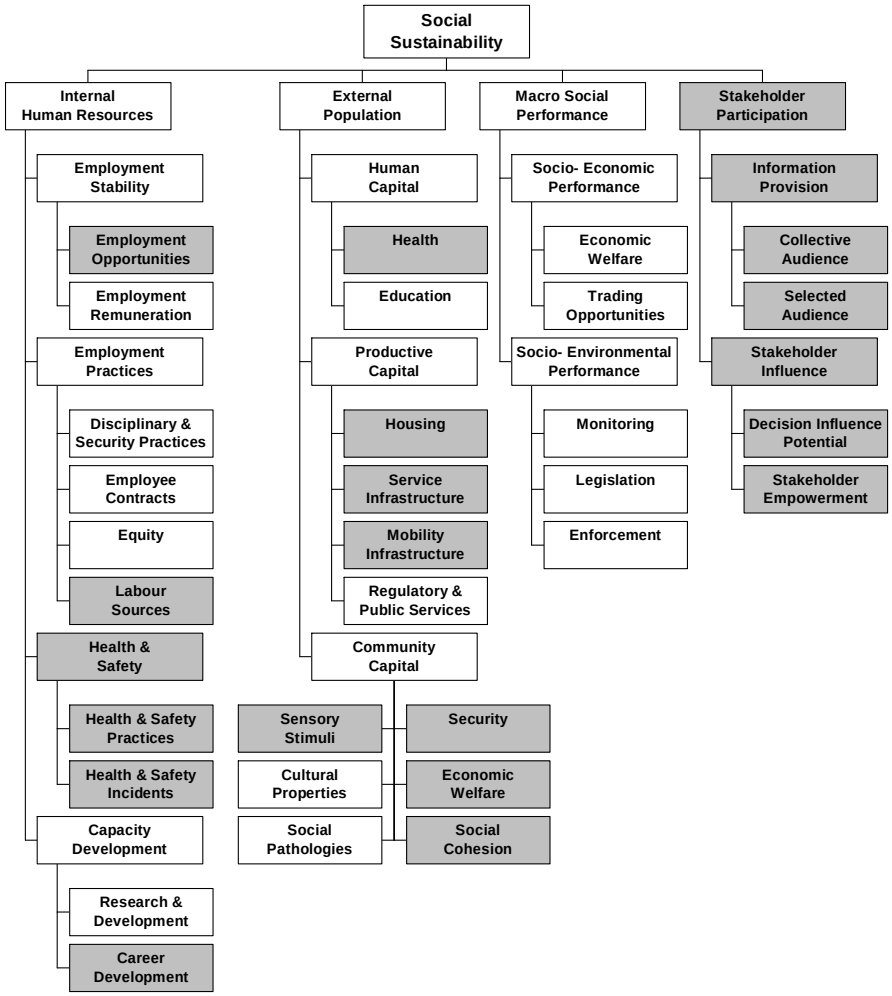


Figure 4-2: Social Issues Relevant to the Construction of Individual Service Stations

a) Employment Opportunities & Labour Sources

Each service station offers 24 permanent job opportunities. Temporary job opportunities are also created during the construction phase. Construction is, however, normally outsourced to contractors who might have permanent construction crews. The social issue of job opportunities is one of the project's benefits to society. This issue is addressed in all EIAs, since it is a requirement to investigate socio-economic impacts. The construction contractor are also encouraged to use local labour as far as possible.

b) Health and Safety

Health and safety considerations are taken into account during the design phase. These issues are addressed in all EIAs on a case-by-case basis. Several generic issues exist and are incorporated as a rule, while others are project specific. The Occupational Health and Safety (OHS) Act, all relevant regulations and local bylaws regarding health and safety serve as a baseline.

c) Career Development

The individual projects involved extensive training of the permanent personnel. The company's facilities in the Free State province were used for the training [221]. The training programme focused on customer service as well as worker safety when handling dangerous substances. The Occupational Health and Safety Act requires that all employees be suitably trained to perform the job expected of them while ensuring that their own safety is not at risk.

d) Health

A generic study, focusing on the health impact of Volatile Organic Compounds (VOCs) on the community of the proposed projects, was undertaken. The study was made available to all stakeholders and was included as part of the individual sites' EIAs, especially to manage wrong community perceptions with regards to health. The main results of this study indicated that neither the community nor the personnel was at risk from organic vapours emitted from a service station.

e) Housing

Although this criterion was not addressed in all individual projects, it was in some cases either necessary or demanded by stakeholders. The issue was not the availability of houses, but rather the impact of the planned development on real estate prices in nearby residential areas. Specialist studies indicated that the proposed developments would positively impact real estate prices in the long-term and thereby addressed the problematic issue.

f) Service Infrastructure

The criterion was addressed pro-actively. For a developer to go onto site and start construction, all relevant services, i.e. water, electricity, refuse removal, etc., have to be in place. Usually these services are sourced from the local municipality. A service station normally occupies three stands. It uses approximately 1,500 liter water per day, which is higher than three households' average water use. Boreholes are used where water is not readily available. The service station also uses more electricity than three households and generates more waste. The service station would use contractors to manage waste and the electricity proposed no problem. The service station thus contributes to the electricity and water loading on the local municipality's service infrastructure.

g) Mobility Infrastructure

Where required, this criterion was addressed reactively in all provinces except the Gauteng province. The Gauteng province has stricter legislation and the EIA process requires a study showing the proposed development's impact on the traffic flow patterns.

h) Sensory Stimuli

The impacts on noise levels and air pollution were studied as part of the EIA. The impact of lights on the nearby community members' sensory stimuli has also been studied.

i) Security

The oil industry's security standards must be adhered to under all circumstances.

j) Economic Welfare

Economic welfare is relevant in this project, since the existence of a new service station can have an impact on other economic activity. In the Gauteng province, guidelines stipulate that new service stations should not be constructed within a three kilometre radius of existing service stations.

k) Social Cohesion

The criterion is relevant, since the zoning requirements (phase 1 of the project, see section 4.1.1.2) consider both the desirability of the development as well as the community's need for the development. At that stage, community members can also object to the proposed development.

l) Stakeholder Participation

Stakeholder participation is addressed by following the normal stakeholder participation process as required by the EIA study.

4.1.1.4 Problematic Cases

In certain cases, some social issues have become problematic. These issues are dealt with by either having public meetings or ignoring it if not deemed as truly relevant. In extreme cases, some individual projects have been stopped due to public resistance against the proposed development. In one specific case, the project has also been stopped because the impact on the mobility infrastructure was viewed as unacceptable.

4.1.2 Open Cast Mine next to the Vaal River

4.1.2.1 Background Information

In 1996, Sasol publicly announced the company's intention to develop an open cast strip mine on the banks of the Vaal River, a project referred to as the North West Mine Project. The project's motivation base was that the Sigma Colliery's reserves had reached the end of its economic life. This posed a

threat to the future of Sasol Chemical Industries (SCI), based in Sasolburg, as the mine supplied SCI since 1952. Ultimately, a threat to SCI's existence was a direct threat to Sasolburg's existence [224].

In response to the proposed project, a Non-Profit Organisation Save the Vaal Environment (SAVE), was formed in June 1996. SAVE had the following objections regarding the project:

- all alternatives to supply SCI with feedstock had not been investigated;
- the proposed mine would damage a wetland irreparably;
- the proposed mine would have an impact on property values due to the impact on/loss of sense of place in the surrounding area;
- the project would have a negative impact on job creation in Zamdela, as house workers would loose employment if river properties' owners no longer visited the area;
- the proposed development could have a negative impact on tourism; and
- the independent consultants' independence was also questioned [225, 226].

Sasol believed the project's real challenge to be *"the distinction between true environmental issues and the concerns about the reduction of residential property values along the Vaal River"* [227]. The dispute between Sasol and SAVE ended in a court case. The court case was, however, not about environmental issues but about determining the role of Interested and Affected Parties (IAPs) in all activities of the mining industry [227].

The Minerals Act 50 of 1991 contained incremental decision-making [228]. The mining authorisation procedure involved firstly granting a mining license in terms of section 9 of the Act, and thereafter granting authorisation to commence mining in terms of section 39 of the Act if all prerequisites are met [227]. Environmental concerns were traditionally not taken into account when deciding whether to granting a mining license (section 9) and it was perceived to be the Departments of Minerals and Energy's (DME's) screening process involving departmental officials only [227].

Although SAVE contended that they was entitled to oppose the application for a mining license, the Director - DME informed SAVE twice that it would not consider environmental objections for granting the mining license, since it was premature in the process. DME consequently issued a mining license to Sasol on 22 May 1997 [229]. SAVE, however, won their court case as well as the appeal.

4.1.2.2 Social Issues Relevant to project

Classification of the social issues of concern to the project was based on the proposed sustainability framework (Figure 4-3).

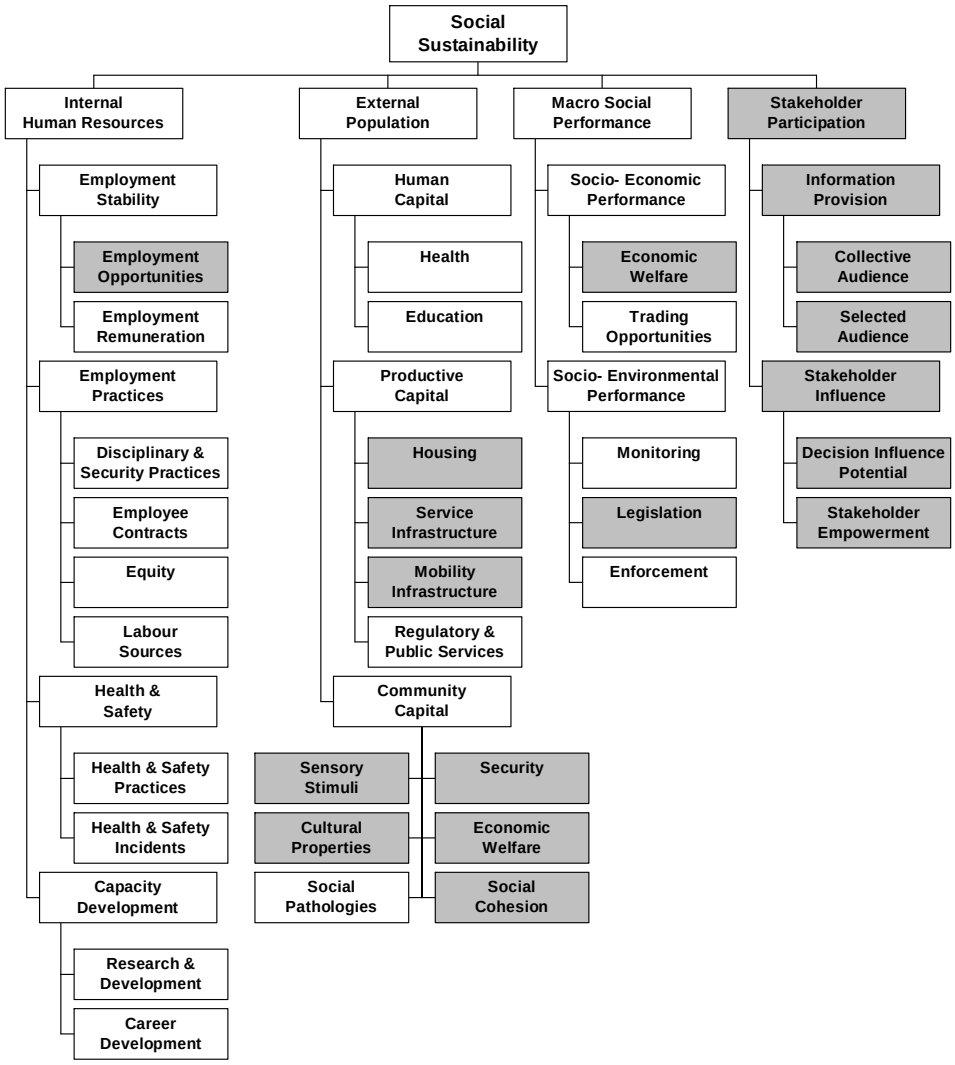


Figure 4-3: Social Criteria Relevant to the Construction of the North West Mine

a) Employment Opportunities

The proposed mine would employ 300 people over its 20 year life-span [230:121]. These new employment opportunities would have helped migrate employees from the Sigma underground mine, which faced closure due to economic reasons. Approximately 650 to 700 miners would, however, still face retrenchments with possible employment opportunities in Secunda. A moderate negative impact had been predicted [230: 256]. SAVE claimed that the impact on the criterion would be even more negative, given lost employment opportunities for, amongst others, house workers, would property owners decide not to return to their properties and tourism decreased [226]. The opening of the mine would also result in the loss of 20 jobs for farm workers currently employed on farms that would form part of the proposed mine [230:265]. The criterion is even more relevant in this specific case, since the no-go option for the project implied that SCI might face closure, which would destroy 3,000 employment opportunities [231,232].

b) Housing

The criterion is very relevant in the specific project. Some observers believed property prices were the true reason for the community's objection The announcement of the project had an immediate low to moderate negative impact on the property values in the area, with a predicted short to medium-term highly negative impact on the property values. Over the long-term, i.e. after the mine's closure, the mine was predicted to have no impact on property values [230:258].

c) Service Infrastructure

The new proposed mine would add an additional burden to the community's service infrastructure, although the overall impact of the mine closure and new mine might have resulted in a net-effect of a lesser burden on the infrastructure. However, current electricity lines would have to be dismantled and rerouted. A new power grid would also have to be installed [230: 150].

d) Mobility Infrastructure

In the short to medium-term, a low to moderate increase in traffic on certain roads would occur, as workers would have to be transported according to the three shift cycle on which the mine would operate over 24 hours. Not only is the burden on the mobility infrastructure increased, but the growing traffic could also result in a low inconvenience factor for residents [230: 260 and 270].

e) Sensory Stimuli

The proposed mine would change the aesthetics of the river area. It was proposed to construct berms to mitigate the negative impact. While the berms would be constructed, a low to very high negative visual impact would be experienced. Some residents argued that berms would not mitigate the impact. In addition, the proposed mine would result in a low to moderate increase in ambient noise levels, an increase in dust, particles as well as vibrations. The vibrations were likely to have a high negative impact on the fish. Although all impacts are below legal limits, residents did not receive the sensory stimuli impacts well, for example:

"It's irrelevant to me whether the noise impact is 2 dB or 5 dB. The point is that there would be a mine operating over there, and knowing that would completely change how I feel about the area. It would ruin the feeling of the place." [230:262]

f) Security

The proposed mine would result in an increase in the opportunities of crime in the area, due to increased human and vehicle traffic. The security criterion is thus relevant and influenced negatively [230: 261 and 270].

g) Cultural Properties

The criterion is relevant in the project, since a conveyor would have to be constructed over an "iron age site". In addition, two grave yards are situated on one of the proposed development sites. However, environmental consultants believed that the impact could be mitigated by relocating the grave yards and taking "*mitigatory measures*" when constructing the conveyor [230: xi].

h) Economic Welfare (External Population) and Economic Welfare (Macro Social Performance)

The impact assessment concluded that the status quo regarding direct economic impacts on regional and national level would be maintained. Although Sasolburg would experience short-term job turnovers, the region's Gross Geographic Product (GGP) would remain consistent and might experience a small gain after five years. Indirectly, the economic profile would, however, be changed by the loss of agricultural land. The economic welfare would also be influenced by house prices decreasing. If the project did not proceed and no alternatives were found, scaling down SCI would result in a lost of approximately R2.5 million per month to the Sasolburg economy and between R87,380.00 and R218,450.00 per month to the regional economy. In addition, the national economy would experience a decline of between R46,260.00 and R115,650.00 per month [230: 145].

i) Social Cohesion

The residents claimed that the proposed mine would destroy the special "sense of place" that the area had. The impact assessment referred to this as intrinsic value and stated:

"*The intrinsic value of the ambience of this stretch of the Vaal River cannot readily be quantified … as it has intuitive rather than rational parameters." [230: 263]*

Social cohesion is also relevant when classifying the negative impact on bird-watching and water sports in the short and medium-term.

j) Legislation

Legislation is relevant in this project, given the project's involvement in court cases surrounding mineral legislation.

k) Stakeholder Participation

Stakeholder participation is very relevant to the project. When the project started, there was no good solid relationship between the company and all of its stakeholders due to ignorance on both sides. Both parties believes that better stakeholder relationships could have resulted in a different ending of the project. Stakeholders believed that the company was withholding information. This was, in fact, the case, given the restrictions around the disclosure of sensitive information. Stakeholders consequently felt excluded from the decision-making processes [227]. The project highlighted that stakeholder

participation is an on-going process and that it is important to get to the root of stakeholder concerns. Regular public meetings were implemented after the project. Sasol states that one of the lessons learnt is to move from *"rights-based to interest-based negotiations"* [233].

4.1.3 Natural Gas Project

4.1.3.1 Background Information

The natural gas project aimed to bring natural gas from the Inhambane province in Mozambique via a 865 km pipeline to the Mpumalanga province in South Africa [234] (Figure 4-4 shows the route of the pipeline [235]). To achieve the above, the project also involved the design, construction and commissioning of the infrastructure needed to clean and compress the natural gas before piping it to customers and petrochemical plants in South Africa. Approximately US$1.1billion has been invested in the 20 month project.

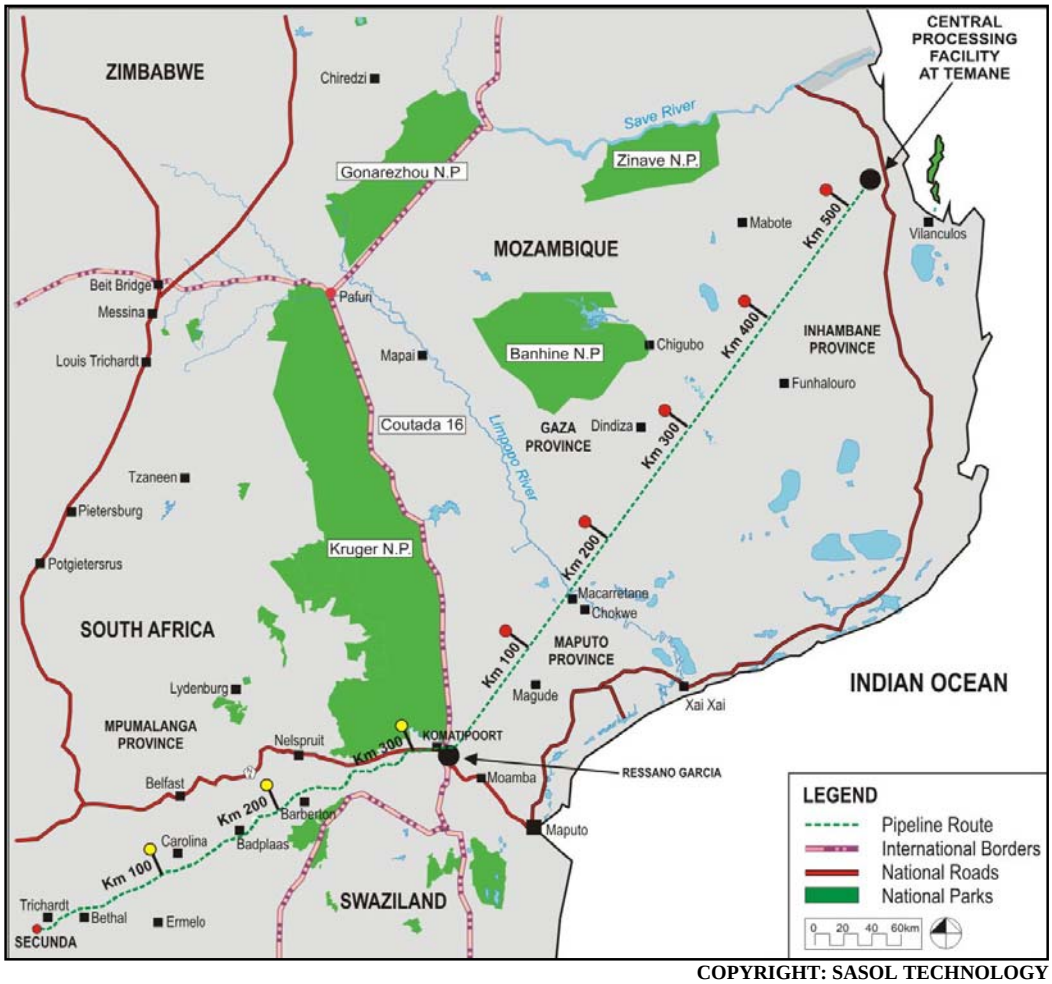


Figure 4-4: Route of Pipeline [235]

The project consisted of eight sub-projects, namely:

- Temane/Pande Gas Field Exploration;
- Temane/Pande Gas Field Development - Central Gas Processing Facility;
- Temane - Ressano Garcia Pipeline: Mozambique;
- Komatipoort-Secunda Pipeline - South Africa;
- Secunda Interface;
- Secunda Plant Expansion;
- Sasolburg Plant Conversion; and
- Natural Gas Network Conversion [234].

Sasol funded part of the project, while international funding contributed approximately 30% of the project's funding [234]. The international funding organisation required that certain policies and procedures be followed or implemented during the project. The project had to meet certain obligations and commitments regarding social development. A social development fund was therefore created to execute specific social development projects identified and requested by the communities [236]. The natural gas project is an excellent example of the benefits of pro-actively addressing social aspects and establishing transparent stakeholder relationships. Various interesting strategies and best practices followed by the project can be used for benchmarking purposes. Since the aim of the case studies is to identify relevant social aspects, these strategies and practices as well as other project management related aspects will not be discussed in detail.

This case study will not cover the entire project but will only focus on these two sub-projects:

- Temane/Pande Gas Field Development, and
- Temane - Ressano Garcia Pipeline: Mozambique.

4.1.3.2 Case Study Approach

For each sub-project, EIA reports and Environmental Management Plans (EMP) were developed. Some generic reports applicable to the entire project were also generated. Figure 4-5 depicts the project's document structure and highlights the documents studied. More details on the specific elements of the individual EIAs and EMPs studied are provided in Table 4-1. The case study approach was to study these documents and to conduct personal interviews with project team members.

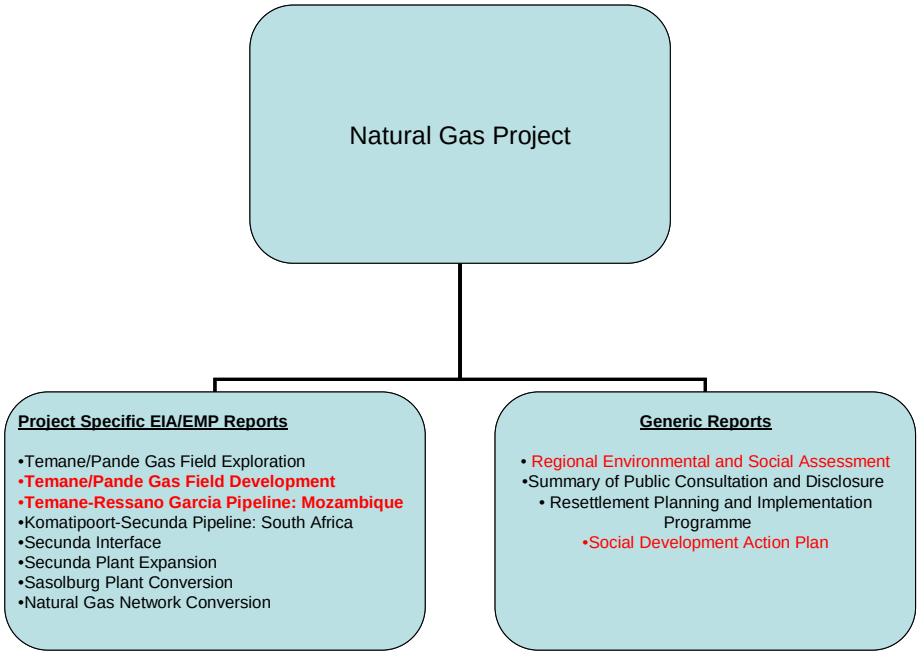


Figure 4-5: Document Structure of the Natural Gas Project [235]

Table 4-1: Documentation Studied

Temane/Pande Gas Field Development	Temane - Ressano Garcia Pipeline: Mozambique
Specialist Report 05: Impact on Socio-Economics	Specialist Report 04: Socio-Economic Impacts
Specialist Report 07: Impact on Public Health and Social Pathologies	Specialist Report 05: Impact on Cultural Heritage
Specialist Report 09: Impact on Public Safety	Specialist Report 06: Public Health and Safety
Specialist Report 10: Impact Noise	
Specialist Report 11: Impact on Sense of Place	

4.1.3.3 Social Issues Relevant to Project

Figure 4-6 shows the social issues identified as relevant to the project, mapped on the proposed social sustainability assessment framework. The project followed a pro-active approach to addressing social aspects.

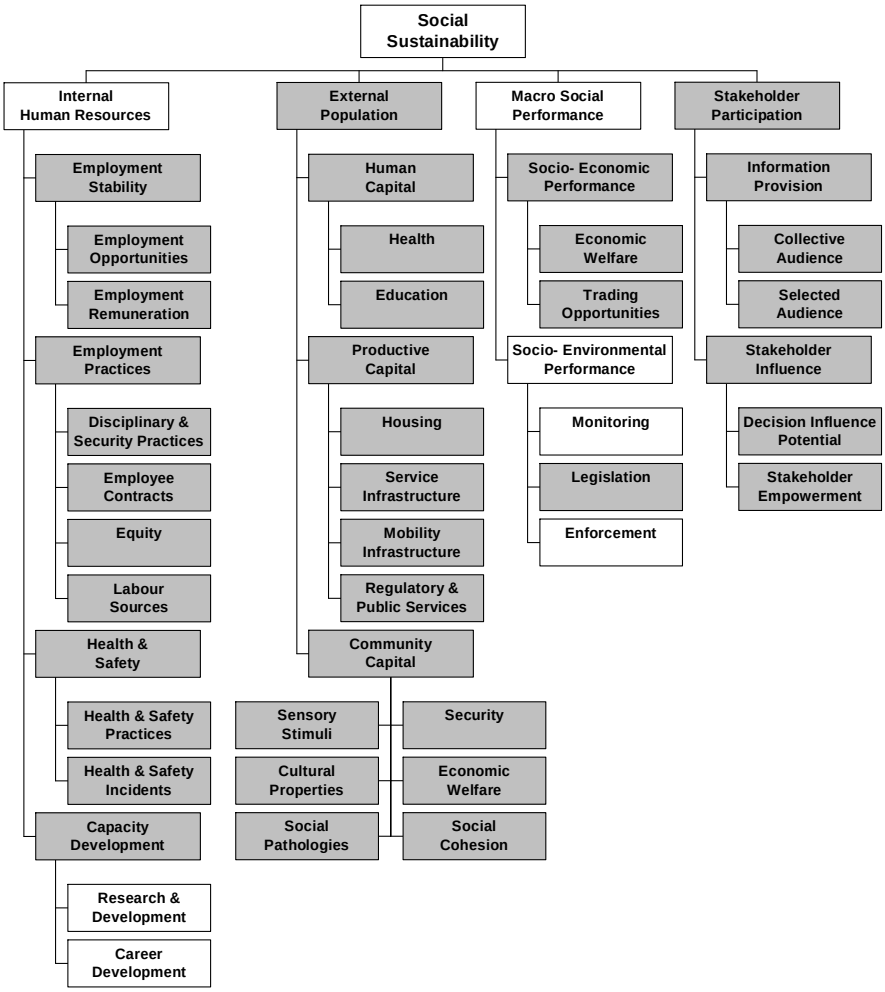


Figure 4-6: Social Issues Relevant to Project

a) <u>Employment Opportunities</u>

IAPs raised employment opportunities as an issue in both EIAs, i.e. developing the gas fields and building the Mozambique section of the pipeline. Although IAPs acknowledge the lack of skilled and semi-skilled labour, local communities expected unskilled employment opportunities to be available. Table 4-2 summarises the expected employment creation in the gas fields' construction phase [237]. However, once operational, only 80 employment opportunities would be available to local people [234]. A number of these opportunities would be permanent and other contract.

Table 4-2: Estimated Employment Creation During Construction of the Gas Fields [237]

Construction (Type of Employment)	Number of Employees	Period of Employment (in Months)	Labour Profile		
			Wage Bill (per Annum)	Foreign (Persons)	Mozambique (Persons)
Unskilled	160	17	± $400,000	-	160
Semi-skilled	160	15	± $1.247 million	60	100
Skilled	150	12	± $4.27 million	120	30
Management	60	17	± $4.4 million	50	10

The gas field development EIA highlighted employment opportunities as a possible area of concern. Although employment creation benefits the community and promotes good stakeholder relationships on the one hand, it also has the potential to cause disputes and lasting divisions. Critical aspects were the importation of outside labour sources and community perceptions regarding employment conditions and terminating temporary employees. The same applied to employment creation during pipeline construction. The number of employment opportunities for local people would depend on the extent to which the use of local contracting companies was encouraged [238]. In hindsight, the project exceeded the employment creation estimates. An average of 1,500 people was employed at any specific time. During the peak period, approximately 3,200 people were employed.

b) Employee Practices and Labour Sources

The potential controversy around employment opportunities made the criterion labour sources extremely relevant. The use of local labour sources was specified and specific employment procedures had to be developed to ensure that local labour sources were used. These procedures were communicated to community leaders and others [234]. Effective communication could also reduce a positive influx of people.

A concept of labour pools was implemented, which resulted in local chiefs in the area providing candidates for either skills training (see Capacity Development) or unskilled labour. Recruitment of unskilled labour occurred out of that specific pool and contractors were encouraged to employ semi-skilled workers from similar labour pools. The company also followed a local content policy, which was considered in the contractor selection processes.

c) Employee Contracts

The criterion is relevant since special care had been taken to communicate the temporary nature of certain employment opportunities. A Project Labour Agreement (PLA) was signed with the trade unions. In accordance with the PLA, construction workers recruited on a temporary basis signed a Limited Duration Contract (LDC), which clearly defined the job group, category and all other

conditions regarding employment. Termination was carried out in terms of the demobilisation procedure as agreed in the PLA [235].

d) Capacity Development

The criterion's relevance is derived from Sasol sponsoring:

- a skills training programme attended by all new and potential employees;
- induction programmes explaining the specific conditions of employment governing the work as well as the contractor's rules, regulations and requirements.

The above minimised the importation of labour [235]. The skills training programme was developed for a two week training period. During the first week, the language barrier was addressed to ensure familiarity with English concepts, as Portuguese is most local people's mother tongue. The second week focused on training in specific skills. The skills training programme provided training to more than 700 local people. The local chiefs nominated these people based on an agreed number of people from different villages per training programme.

e) Employee Remuneration, Disciplinary and Security Practices, Equity, Health and Safety Practices as well as Health and Safety Incidents

The project was a greenfield project in a new regulatory environment for the company. All the above criteria are therefore relevant, as current company practices might need to be adopted to adhere to regulation within the country. Where country legislation is more lenient than current business practices, the company will have to decide on the minimum level of corporate responsibility it will adhere to. Health and safety aspects relevant to the project have been dealt with in a detailed Safety, Health, Environment and Security (SHES) plan [239]. The company also had to address the possible health risks to employees, given the project environment. Malaria control procedures had to be implemented.

f) Health and Social Pathologies

These criteria are relevant, since both can be impacted on by the influx of people. The project would result in an influx of people for a temporary period. However, the need for clinics was highlighted and addressed by the social development action plan [236]. The medical facilities on site would also co-operate with local facilities to enhance the availability of services [239]. Table 4-3 shows possible impacts in the construction and operation phase of the gas fields. Public health risks regarding the pipeline were investigated and are within internationally recognised limits. It is believed that risks can be mitigated by open communication with the settlements in close proximity to the pipeline [234].

Table 4-3: Possible Impacts on Health and Social Pathologies of the Gas Fields Project [239]

Issues Driven Assessment of the Effects on Public Health and Social Pathologies on the Population at a Local, Regional and National Level With Mitigation/Management							
Construction							
Impact	**Status**	**Extent**	**Duration**	**Intensity**	**Probability**	**Confidence**	**Significance**
Induced migration	Negative	Local	Medium-term	Low	Probable	Medium	Moderate
Potential increase in malaria cases of the population	Negative	Local	Medium-term	Medium	Probable	High	Moderate
Potential increase in STD and HIV/AIDS incidence rates	Negative	Local to national	Permanent	Low	Highly probable	High	Moderate
Increased access to health care facilities	Positive	Local	Long-term	Low	Probable	Low	Moderate
Improved accessibility	Positive	Sub-regional	Permanent	Medium	Definite	High	High
Potential increase in alcohol and drug use	Negative	Local	Long-term	Low	Probable	Medium	None
Operation Phase							
Impact	**Status**	**Extent**	**Duration**	**Intensity**	**Probability**	**Confidence**	**Significance**
Potential increase in malarial incidences due to standing water from project activities	Negative	Local to regional	Long-term	Medium	Highly probable	Medium	Moderate
Increased access to health care facilities	Positive	Sub-regional	Long-term	High	Definite	High	High
Induced migration	Negative	Local	Medium-term	Low	Improbable	Medium	None
Potential increased transmission of HIV/AIDS, STDs and other diseases/infections	Negative	Local to national	Permanent	Low	Probable	High	Moderate
Potential increase in social pathologies such as crime and drunkenness	Negative	Local	Long-term	Low	Probable	Medium	None

g) Education

This criterion is relevant to the project, since the social development action plan include projects focussing on education and skills training [236].

h) Productive Capital

This criterion is relevant, since productive capital would be influenced. Individual impacts on infrastructure and services are discussed below. However, the project would also have an impact on agricultural land. It has been estimated that 30 hectare of arable land would be permanently lost by the development of the gas field [234]. The pipeline construction might have temporary impacts on soil that can be mitigated. Loss of crops during the construction period would also be compensated [234].

i) Housing

This criterion is relevant, as the project involved resettling homesteads, a number of households all residing on the same property, including all buildings but excluding machambas, as well as machambas, i.e. subsistence farming plots. For the gas field, 384 machambas and 11 homesteads were resettled. The pipeline itself resulted in 164 machmbas and three homesteads being resettled [240]. Affected parties were compensated based on fair and equitable compensation calculation formulae agreed with government and all parties involved. The project also constructed an entire village to house employees as well as contractors and to accommodate office and utility buildings due to the remoteness of the plant. This village is approximately 60 kilometres from Vilankulos.

j) Service Infrastructure

This criterion is relevant to the project. Not only would the project rely on existing service infrastructure, but it would also implement service infrastructure to benefit the communities. During the gas field's construction period, a negative impact on water and sanitation infrastructure was predicted [239]. Numerous social development action plan projects focuses on providing drinking water to residents by means of bore holes [236]. Plans have also been made to establish gas pipelines to Maputo to provide gas to possible users [235].

k) Mobility Infrastructure

This criterion is relevant to the project. In the operation phase of the gas field and pipeline, the project would have a positive impact on the mobility infrastructure, since the road networks in the region would be improved drastically [239]. The access created by the project can nevertheless result in negative environmental impacts, as certain forest areas, etc. will be more accessible. In addition, the social development action plan identified three different needs of communities for road infrastructure [236]

l) Regulatory and Public Services

The criterion is relevant, since the greenfield nature of the project demands a detailed understanding of the regulatory structure. Traditional chiefs have been included in the communication structure. The criterion is also relevant, since some of the social development projects focus on public services, for example garments for cultural events [236].

m) Sensory Stimuli

This criterion is relevant to the project, as the proposed development of the gas fields would result in air pollution, dust and noise that will impact on inhabitants living in close proximity to the site. The noise impact has been rated as highly significant definite impact over the long-term [241]. During the construction phase of the pipeline, residents living in close proximity of the route might endure dust and noise. The visual impacts of the proposed development of the gas fields would be "absorbed" by the landscape [242]

n) Security

The influx of people can result in an increase in crime and security problems in a region. As a mitigation measure, it has been proposed that security personnel should be employed at the construction camps and development site to control criminal activities and to reduce pressure on local police services [239].

o) Cultural Properties

This criterion is relevant to the project. Archaeology surveys found no archaeological sites or sites of cultural significance in areas affected by the project infrastructure [234]. However, the construction could contribute to Mozambique's archaeological heritage, as previously inaccessible areas would now become accessible, thus increasing the likelihood of archaeological findings [243]. No archaeological sites were found along the pipeline route within the zone in which construction damage is most likely [244]. Nine graves had to be relocated due to the development of the gas field and the construction of the pipeline [240].

p) Economic Welfare

The local communities' economic welfare would benefit from the project by:

- the direct employment opportunities and the indirect spin-offs in the local economy, for example agricultural product markets, etc.;
- infrastructure being provided and upgraded, leading to greater accessibility; and
- improved road access could result in more tourism opportunities [242].

Over the long-term, the development would create new business opportunities that could improve the local economic welfare [237]. During the pipeline's construction, certain communities' economic welfare might be negatively impacted, due to loss of housing, crops or community

infrastructure [238]. These affected parties will be compensated. In hindsight, total salaries of approximately US$ 5 million were paid in Mozambique during the construction period.

q) Social Cohesion

The criterion is extremely relevant, since the communities' social cohesion would definitely be impacted on. The influx of people [237, 238, 239] as well as the resettlement of certain homesteads [240] might result in a change in the social structures and thus in a change in the perceived social cohesion. Although the project's impact is rated low, the project would also definitely have an irreversible impact on the "sense of place" [242].

r) Socio-Economic Performance: Economic Welfare and Trading Opportunities

The project has major socio-economic benefits for the region and can even be a potential catalyst for development in the Southern African Development Community (SADC) [234]. Mozambique as a country benefits from the project's employment creation, infrastructure development as well as the additional revenue from royalties and taxes paid by the venture [234].

s) Legislation

As this is a greenfield project, the legislation criterion is relevant. The project team needed to familiarise themselves with Mozambique's legislation and adapted company practice, for example executing the EIAs to align it with legislative requirements.

t) Stakeholder Participation

Stakeholder participation has been crucial to this project. Various communication forums have been established with internal as well as external stakeholders. In Mozambique specifically, the stakeholder participation together with information sharing has been a high priority, mainly because there was no previous relationships between these stakeholders. A Mozambique office was established in Maputo. Road shows were co-ordinated from there, which attempted to familiarise targeted stakeholder groups with the project. Community liaison officers were appointed to deal directly with specific affected communities and to assist in scoping workshops held as part of the EIA process. In addition, all complaints were centrally handled in Maputo, where a complaint register was constructed. Complaints were captured, reviewed and registered, where after the specific project team was contacted to investigate complaints and take corrective actions where applicable. Feedback was provided to communities.

A monthly community workgroup forum was established. These monthly meetings took place in Maputo. The meetings aimed to report on progress and discuss complaints as well as future actions. The community workgroups were the interface between the company and society and followed a systems approach by distinguishing between six workgroups, namely:

- communications/public relations workgroup;

- labour workgroup;
- resettlement and compensation workgroup;
- environmental management workgroup;
- local content workgroup; and
- social development workgroup.

Members of the various workgroups visited communities and interacted with these stakeholders. Media releases were distributed frequently to enhance the project's transparency.

4.1.4 Hazardous Waste Treatment Facility Project

4.1.4.1 Background Information

Late in 1998, a Cape Town-based company, Peacock Bay Environmental Services (PTY) Ltd, and a United States of America (USA) environmental consulting and engineering company, Roy F. Weston International Holdings, Inc. (WESTON®), started investigating the feasibility of establishing a commercial hazardous waste treatment facility in South Africa. The study was motivated by the fact that South Africa did not have a commercial hazardous waste treatment facility and either exported tons of waste to such facilities in Europe or alternatively used landfills sites to handle the waste, which is not the best option from an environmental view. The US Trade and Development Agency (TDA) funded the detailed feasibility study and strategic planning analysis, which included the evaluation of:

- potential candidate waste sources;
- alternative waste treatment technologies; and
- alternative locations [245:1-1].

The feasibility study identified a rotary kiln thermal oxidation system as the best technology to pursue and that a brownfield site in Sasolburg, Free State province would be the best location. An EIA study was undertaken, including extensive public participation. The scoping report was submitted to the Free State's Department of Environmental Affairs and Tourism (DEAT) in November 2001. The project was met with a lot of resistance from national environmental Non-Government Organisations (NGOs). The Free State's DEAT rejected the proposal in October 2002, based on the following three factors:

- IAPs parties objected to the development;
- Peacock Bay Environmental Services (PTY) Ltd failed to submit a health risk report; and
- the application failed to indicate the development's cumulative effects [246].

The record of decision was appealed, but the appeal was upheld as the Free State's DEAT believed that since the potential effects could be beyond provincial matters, national DEAT should review the application. However, the Minister of DEAT referred the review back to the provincial DEAT, since it was not viewed as a national matter. The Free State's DEAT finally rejected the proposal and appeal. The lengthy process took four years and the foreign investors lost interest, after which the project was stopped [247].

4.1.4.2 Social Issues Relevant to the Project

The social issues relevant to the project were classified in terms of the social criteria. The relevant criteria are depicted in Figure 4-7.

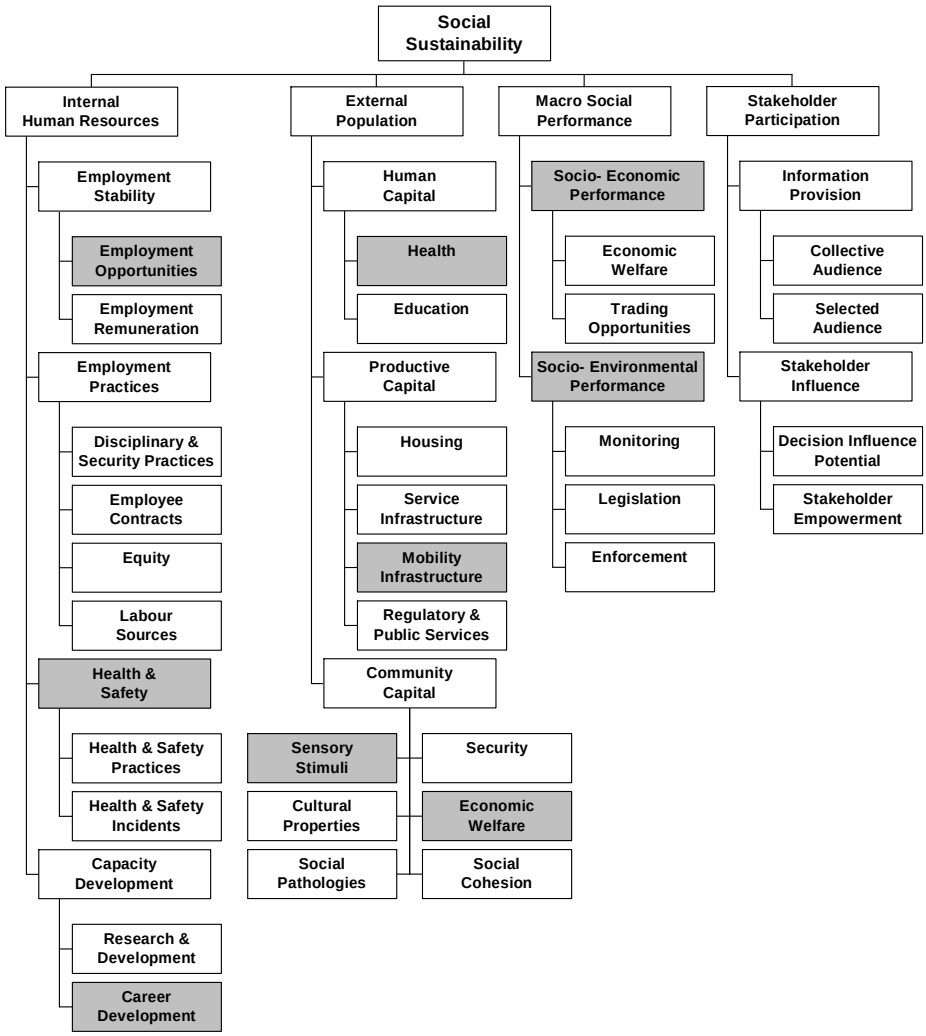


Figure 4-7: Social Criteria Relevant to the Hazardous Waste Treatment Facility Project

a) <u>Employment Opportunities</u>

The proposed project created short-term and long-term employment opportunities. In the short-term, i.e. estimated to be a ten month period, 250 employment opportunities would have been created by the construction of the site [248:6-33]. Once operational, the facility would have employed 65 permanent employees over its 20 year life cycle. Fifteen employment opportunities required skilled employees, 25 required semi-skilled employees and the remaining 25 employment opportunities required unskilled employees [248:6-34].

b) Health and Safety

This criterion is relevant to the project, since no hazardous waste treatment facilities existed in South Africa. Therefore all employees would receive extensive training. The preliminary EIA rated health and safety's significance as low [248: 8-56] and stated that no human health risks were expected on site. However, employees' health and safety were one of the main concerns raised by environmental groups [247].

c) Career Development

The scoping report mentions numerous training initiatives that would be pursued. All employees would receive in-house training on operational health and safety aspects.

d) Health

The preliminary EIA stated that "*Facility operations will all be conducted to minimize or eliminate potential human health and ecological risks associated with the potential effect of site operations on adjacent communities. Stack emissions will all be controlled to achieve health (protective) emissions standards and guidelines"* [248: 8-13]. However, environmental groups stated that the project proposed a landfill site in the sky that would release cancer forming emissions, thus having a negative impact on the community health [247].

e) Mobility Infrastructure

The project would influence the area's mobility infrastructure in the short and long-term. In the short-term, i.e. construction period, an increase in road traffic, especially in trucks would be experienced [248:5-5]. In the operational phase, a small increase in road and rail traffic would be experienced, since raw material, i.e. waste, for treatment, would be moved to the facility via road or rail [248:8-15]. The impact could also influence regional traffic [248:8-63]. Potential transport incidents could also occur.

f) Sensory Stimuli

The preliminary EIA stated that the facility would use state-of-the-science air pollution equipment, which would result in emissions rarely exceeding permits [248:8-38]. However, environmental groups rated air pollution, especially the production of dioxins and furans by the incinerator, as a serious concern. These groups therefore believed that sensory stimuli would be impacted on negatively [249].

g) Economic Welfare

The preliminary EIA estimated that the possible direct and indirect employment opportunities would total 240 to 300 if the rule of three is used [248: 8-73]. The community's economic welfare would thus be influenced positively.

h) Socio-Economic Performance

It was estimated that the project's construction and development would involve a direct investment of $20 million (R160 million)[8] [248-72]. The investment would have a positive effect on the region's economy. The project also received grants from foreign investors in the region, the United States of America (USA) TDA. However, the termination of the project resulted in the USA funding being stopped, which had a negative impact on the socio-economic performance.

i) Socio-Environmental Performance

The safely management and disposal of hazardous waste is an issue of great concern in the industrialised areas of South Africa [250]. The project was motivated, as South Africa had to address the problems surrounding hazardous waste. Treatment facilities were not available locally. From a certain perspective, it was believed that the project would have improved South Africa's socio-environmental performance, as it would have given South Africa the waste treatment expertise that it did not have. From another perspective, the project would have increased pollution and offered unsustainable waste management techniques, which would have had a negative impact on the region's socio-environmental performance.

4.1.5 Conclusion

All social aspects which manifested in the four case studies could be classified into the criteria framework. The social aspects identified by the case studies are shown in
Figure 4-8. The only criteria that failed to manifeste in any of the case studies are:

- research and development;
- monitoring; and
- enforcement.

Possible reasons might be:

- research and development normally manifest either early in an asset life cycle's design phase [251] or during the operation phase;
- none of the projects involved building additional monitoring stations. Although the aspects did not manifest clearly, they can manifest during design and operation; and
- enforcing environmental standards is a business strategy and although it might be the companies' strategy, no specific evidence could be found to indicate that environmental standards were enforced in the supply chain. Since, two of the projects did not enter the final execution phase, the criterion could not manifest.

No social issue or aspect could be found in the case studies which could not be classified in terms of the proposed framework.

[8] A R/$ exchange rate of R8 for $1 was used in the preliminary EIA.

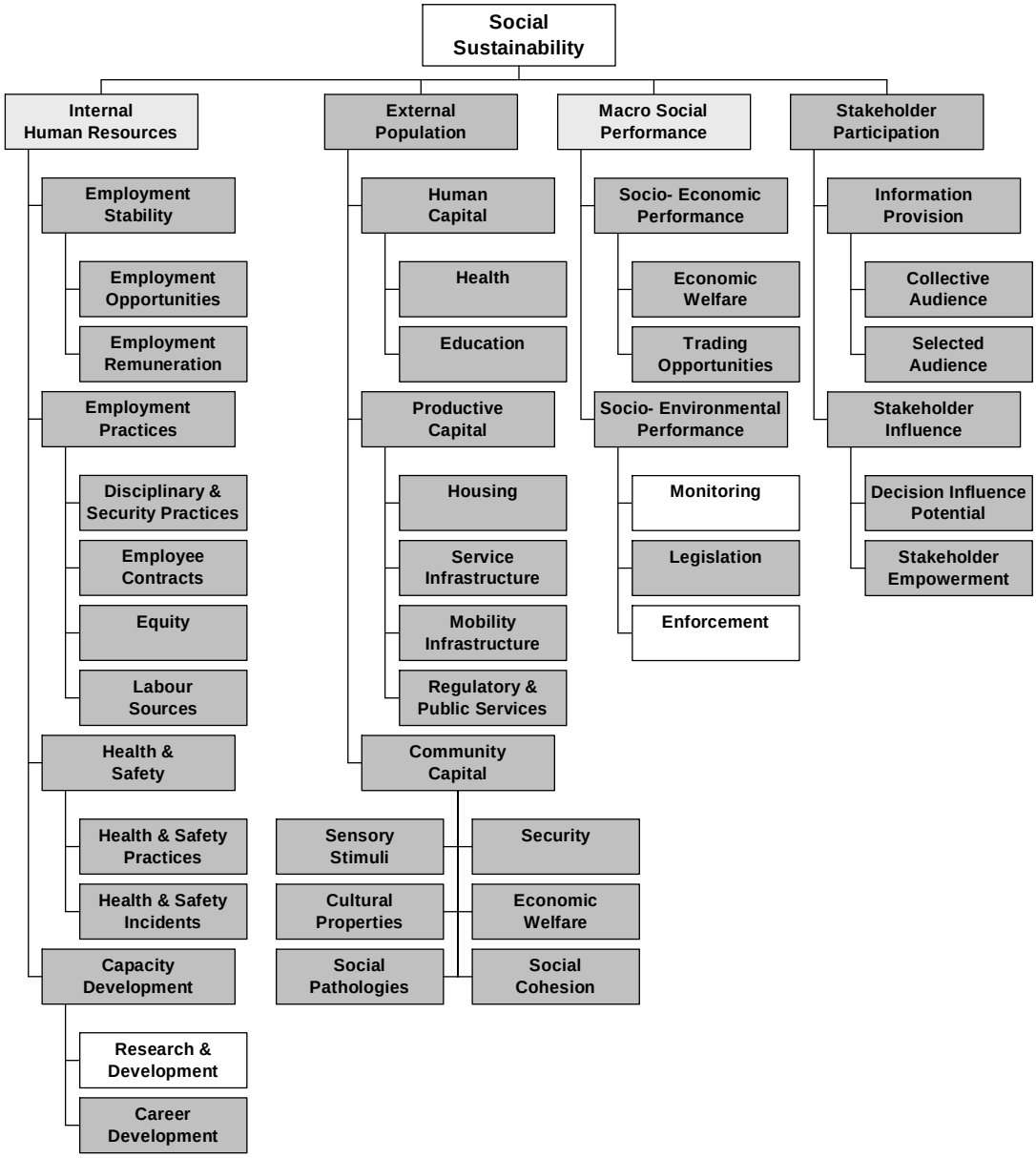
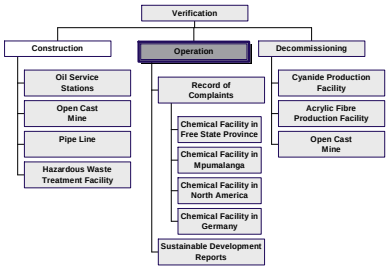


Figure 4-8: Social Aspects Relevant to Construction

4.2 Framework Verification Part 2: Operation Phase



The operational phase is verified in two separate sets of case studies. The unit of analysis for both are the operational plant manufacturing products. The following different information sources are, however, used:

- record of complaint - companies' record of complaints are investigated. The aim is to investigate records of complaints for at least the last two years for four different chemical facilities. Two of the facilities operate in developed countries, namely the USA and Germany. The other two operate in the same developing country, namely South Africa. The facilities' ages are summarised in Table 4-4.

Table 4-4: Age of Chemical Facilities

Chemical Facility	Time in Operation
USA	± 45 years
Germany	± 80 years
South Africa A	± 50 years
South Africa B	± 25 years

These four facilities are chosen in order to compare developed and developing countries. Two facilities from each type are chosen to compensate for any region specific nature of complaints. The case study relies on two information sources, namely archival records and interviews. Interviews are conducted personally or telephonically and take approximately 20 to 30 minutes. The detailed case study protocol is attached in Appendix F. The main groupings[9] used for analysing complaints are:

- Human Capital - any complaint dealing with community members' health or the community's education facilities have been classified as human capital complaints;
- Productive Capital - any complaint related to the community's housing, mobility or service infrastructure, e.g. complaints about pollution on vehicles or environmental incidents that resulted in community grounds being polluted, have been classified as productive capital complaints;
- Community Capital - any complaints regarding odours, noise, vibrations, aesthetics or other sensory stimuli have been classified as community capital complaints. In addition, any complaints regarding security, community cohesion, i.e. migration of workers, or cultural properties have also been classified as community capital complaints; and

[9] The criteria have the same definition as in Chapter 3.

- Human and Community Capital complaints - in certain cases, community complaints could not be classified as purely belonging to one of the three main groups. A complaint about an odour that caused eye irritation or headaches can be classified as a human capital complaint as well as a community capital complaint. Therefore, all complaints that can be classified as both have been grouped together as the fourth main criterion.

- Archival analysis of the sustainable development reports of companies - eight sustainable development reports were analysed to determine the scope of issues reported on. The reports are analysed on the following points:
  - annual turnover;
  - number of employees;
  - use of social indicators; and
  - indicator used.

4.2.1 Record of Complaints

4.2.1.1 Chemical Facility in South Africa in the Free State Province

4.2.1.1.1 Background Information

The chemical facility is located on a 181Ha industrial site in the Free State. Construction started in the early 1950s and portions of the plant started production in 1954. By the end of 1955, the plant was fully operational. The chemical facility manufactures diverse solvents, alcohols, waxes, acids, alkali's explosives and fertiliser by-products. The facility employs approximately 3600 permanent employees. The facility contributes approximately 12% to the region's geographical economy [252].

4.2.1.1.2 Complaint Process

The region in which the chemical facility is situated also hosts various other chemical industries. The industries have developed a collective process to deal with external complaints. The process is shown in Figure 4-9.

The chemical facility also has a formal site procedure in place to describe the actions that must take place in the event of an internal or external complaint as well as in case of environmental incidents. A dedicated telephone line is available all hours of the day to allow stakeholders to complain. Complaints are captured on a standardised form and are followed by an investigation. The average feedback time on a complaint is less than two hours and aims to provide feedback within 30 minutes. Complaints can be made anonymously and all complaints have been captured in a record of complaints, starting 1994.

Monthly community workgroup meeting are also held, during which complaints can be raised and feedback as well as additional information distributed to the community.

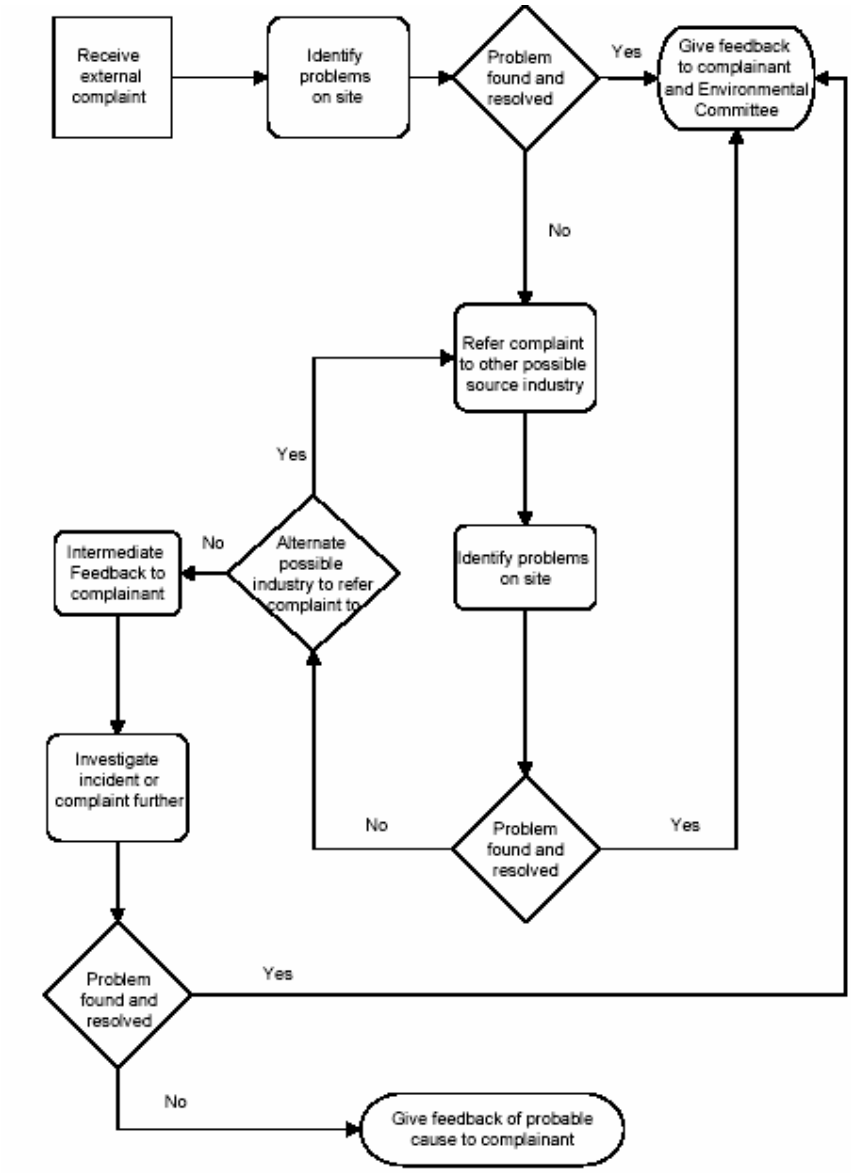


Figure 4-9: Inter-company External Complaint Response Procedure

4.2.1.1.3 Analysis of Complaints

Internal and external complaints for the period starting July 2001 and ending January 2004 have been analysed. There were 360 complaints in total, 70.28% thereof were internal complaints, while the other 29.72% were external complaints. All of the external complaints were classified as social in nature, with 76.64% thereof pure sensory stimuli complaints and an additional 14.02% sensory stimuli health related complaints. Since the complaint register contained data of possible root causes responsible for the complaints, the aspect was also analysed. Figure 4-10 shows the distribution of social complaints between the various main criteria as well as the breakdown of these complaints by possible sources that could have caused the condition causing the complaint.

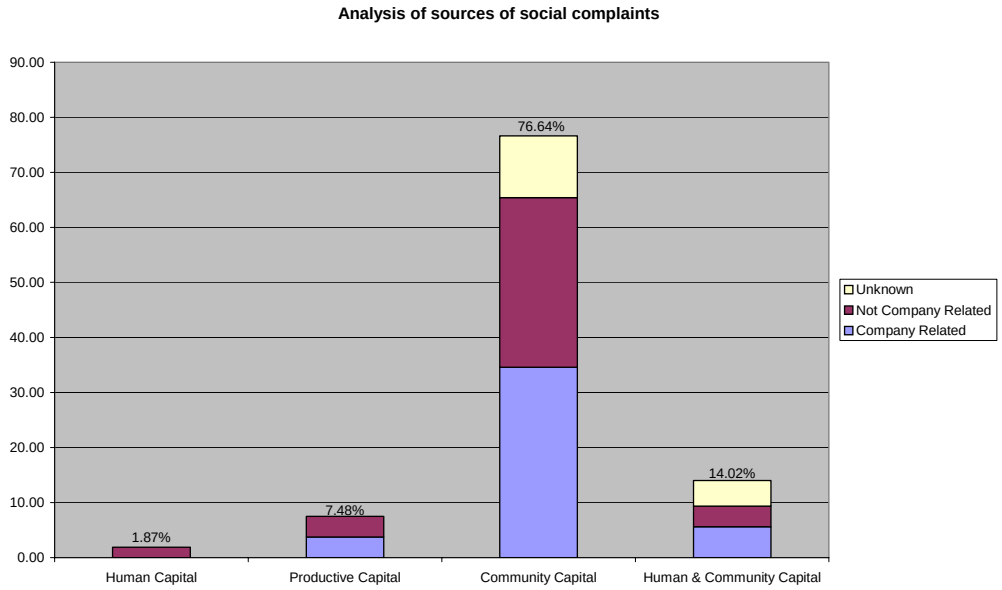


Figure 4-10: Analysis of Sources of Social Complaints

Figure 4-10 clearly indicates that 40% of all external complaints received have not been related to any of the company's activities. The main reason for not finding the source of approximately 16% of the complaints is the time lag between the incidents and reporting thereon. The sensory stimuli external complaints have been analysed further (see Figure 4-11). Odour seems to be the main reason for social complaints, since approximately 80% of all external complaints are about odour, with 15% thereof also stressing the health impacts of the odour, e.g. burning eyes, throat and chest irritations.

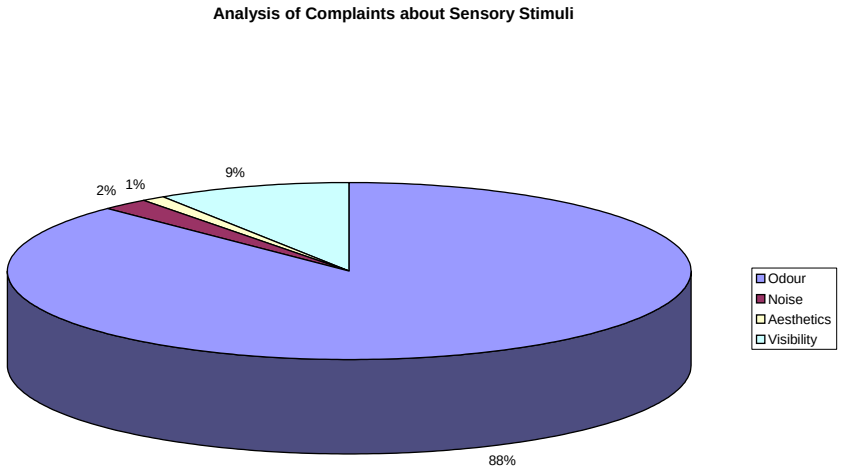


Figure 4-11: Analysis of Complaints about Sensory Stimuli

The detailed nature of the complaint register made it possible to analyse the company's reaction to external complaints. All of the external complaints have been investigated thoroughly with various outcomes (see Figure 4-12). In case of a once off problem or a sensory stimuli problem due to a specific weather condition, no corrective action was taken. In all instances where action was taken, the actions focused on replacing equipment.

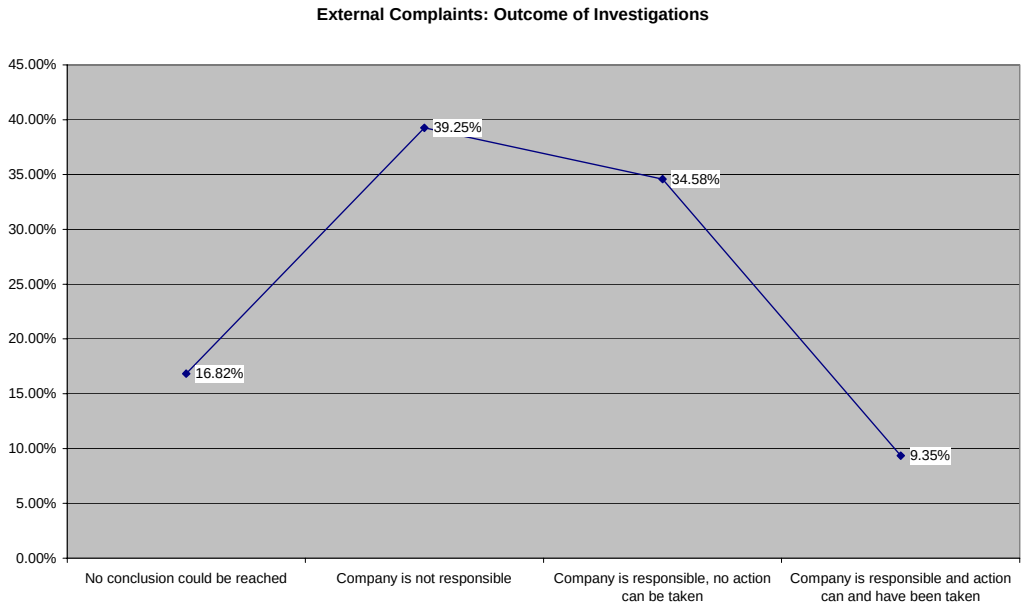


Figure 4-12: Analysis of External Complaint Investigations

The internal complaints have also been analysed. Social incidents accounted for 45% of all internal complaints, with 37% of complaints being environmental incidents. The social complaints concerned mainly employment practices and working conditions (88%). The majority of these concerns related to odour in the workplace. The other 12% of social complaints dealt with health issues due to odours.

It can therefore be concluded that most of the internal and external complaints related to the facility's impact on people's sensory stimuli, with odour being the biggest single-issue complaint. The company is busy implementing a project to address the odour problem. Odour related complaints are therefore expected to decrease dramatically.

All of the complaints analysed dealt with aspects accounted for in the proposed sustainable development framework. The secondary impact of the 37% of internal complaints regarding environmental incidents were, however, not analysed. Secondary impacts of these incidents can relate to productive capital of society, for example transport incidents influencing the mobility infrastructure, while spillages can influence service infrastructure. Nevertheless, the company implemented sufficient procedures to respond to these incidents. The impacts are also mostly short-term.

4.2.1.1.4 Community's Perception of the Complaint Process

A questionnaire to evaluate the community's perception on the complaint process was distributed at one of the monthly community workgroup meetings. Sixty community members completed the questionnaire. The group mainly represented citizens of one of the nearby towns. Thirty-one of the respondents (51.67%) indicated that they have complained to the company before. The frequency of these complaints is shown in Figure 4-13.

The fact that 38% of the respondents indicated that they use the monthly meeting to raise complaints adds further weight to the frequency response. The other most popular method of complaining was via the telephone (27% of the respondents).

Twenty-eight of the 60 respondents (47%) indicated that they were aware of the dedicated telephone line to complain, but only 12 individuals (20% of the whole group and 39% of people who have complained to the company before) have used this service in the past. The response time of the people who has used the telephone line is shown in Figure 4-14. The large majority of no responses can be ascribed to public telephones being used to complain from. No contact number is therefore provided.

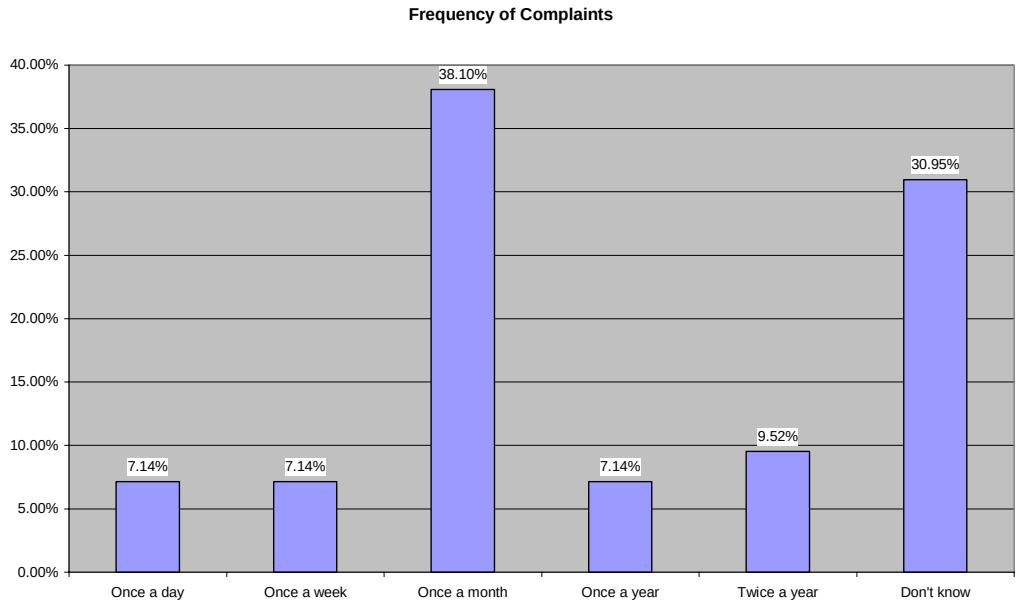


Figure 4-13: Frequency of Respondents' Complaints

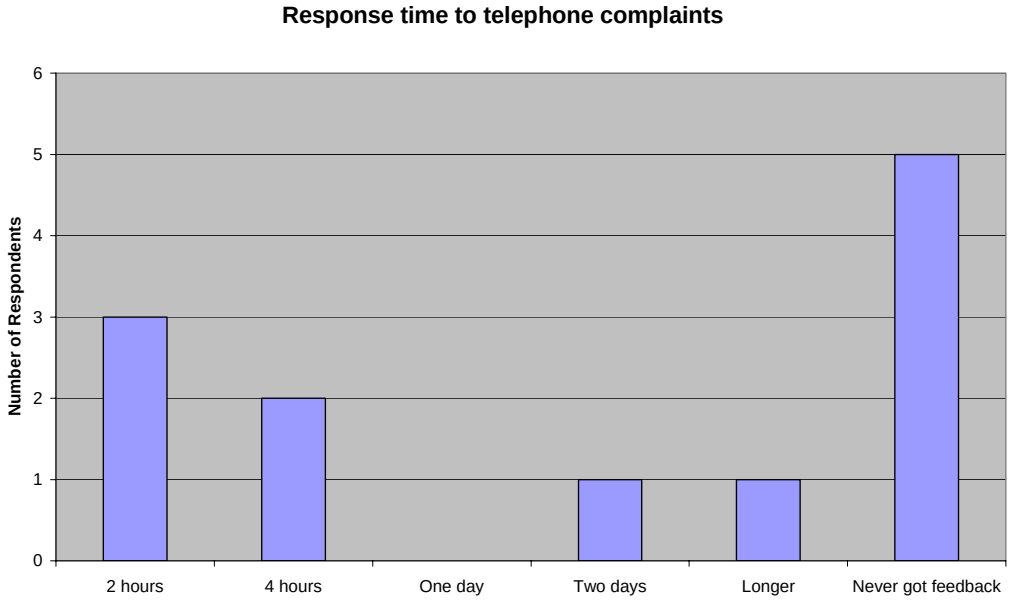


Figure 4-14: Response time of telephone complaints.

When asked what their major complaints were, responses were as follows:

- eight respondents (13%) did not answer the question;
- three respondents (5%) indicated that they had no complaints;
- four respondents (7%) listed complaints regarding the local government; and
- forty-five respondents (75%) listed company related complaints.

The responses from the last 45 respondents were analysed and are depicted in Figure 4-15.

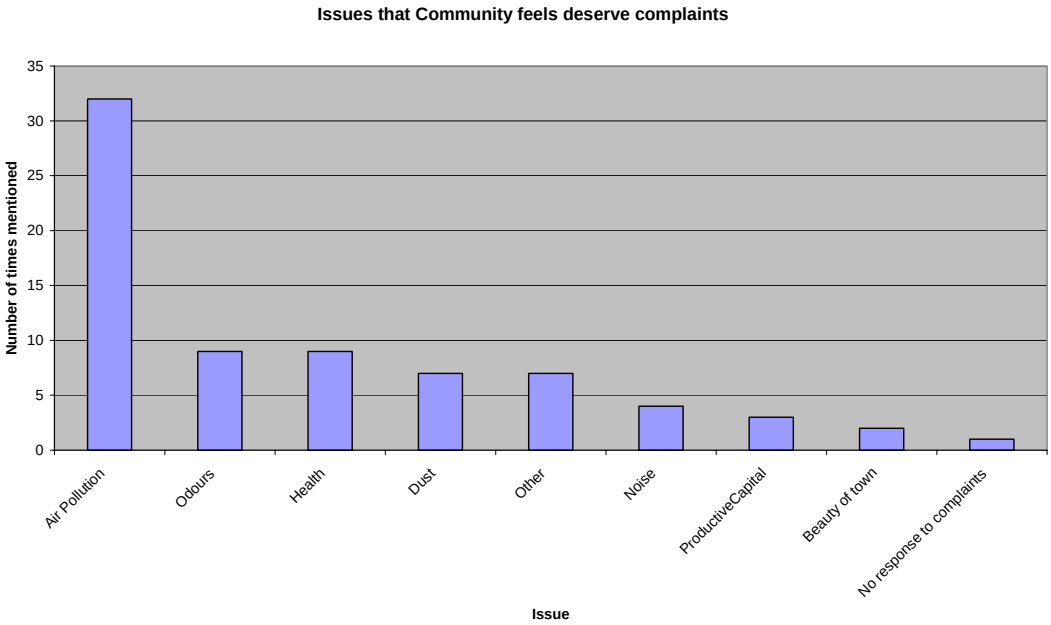


Figure 4-15: Major Complaints According to Respondents

The community sources of complaints are similar to the analysis of the complaints in the complaint register. The questionnaire clearly indicated that the monthly community workgroup meetings are fulfilling an important role in ensuring effective communication between the company and the community. Another conclusion reached is that telephone lines might not be the most effective complaint mechanism for the specific community group. The company indicated that other complaint mechanisms were made available, namely an additional complaint register at the community hall.

4.2.1.2 Chemical Facility in South Africa in the Mpumalanga Province

4.2.1.2.1 Background Information

The chemical facility is located on a 6798 Ha industrial site in the Mpumalanga Province. The construction of the site started in the early 1970s and was finished in 1980. The chemical facility manufactures diverse solvents, fuel alcohol, petroleum gases, polifins, alpha olefins and other chemical products. The facility contributes 13% to the geographic economy of the region [252].

4.2.1.2.2 Complaint Process

The plant has a toll-free telephone number that community members can phone to log complaints. All internal and external complaints are captured within the record of complaints and the aim is to provide feedback within 24 hours. A formalised data storage system is used to capture complaints. All individual divisions have access to the system. Complaints can be made anonymously.

4.2.1.2.3 Analysis of Complaints

Internal and external complaints as well as incident reports for the period starting 31 January 2000 and ending 31 January 2004 were analysed. In total, 508 complaints and incidents have been analysed, 47% of which was internal in nature, 48% external and 5% maintenance related.

The analysis of the external complaints indicated that 98.8% of all external complaints could be classified as complaints about social aspects, with the remaining complaints all dealing with environmental issues or alerts. The sources of the social complaints have been classified according to the proposed framework (see section 4.2.1.1.3 for definitions). Figure 4-16 illustrates this classification. The majority of complaints are caused by community capital being endangered, specifically the sensory stimuli. The majority of sensory stimuli complaints dealt with odours (96%), with the remaining 4% dealing with aesthetics.

Most of the internal complaints could be classified as dealing with environmental aspects (64%). Of the remaining complaints, 20% dealt with social aspects, specifically sensory stimuli aspects influencing working conditions. The last 16% of internal complaints were classified as other, since it dealt with maintenance issues and are more of an information sharing nature than a true complaint.

Similar to the chemical facility in the Free State province, most external complaints dealt with sensory stimuli aspects, while internal complaints seemed to focus on environmental aspects. These complaints' possible secondary impacts have not been analysed.

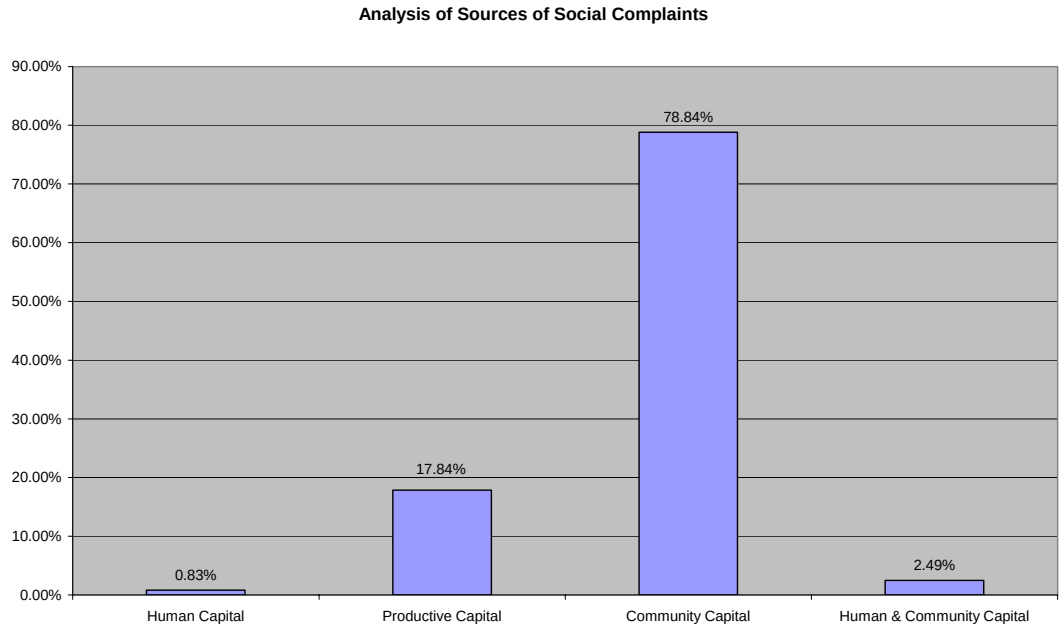


Figure 4-16: Analysis of Sources of Social Complaints

Since the information made available did not include follow-up actions or complainants' names, the aspects were not analysed or studied.

4.2.1.3 Chemical Facility in North America

4.2.1.3.1 Background Information

The chemical facility is located on a 400 acre industrial site in southwest Louisiana. Approximately 280 acres is used for the six manufacturing units and support buildings. The first unit on the site reached operational status in 1961. The complex manufactures seven product lines and employs approximately 450 permanent employees and between 150 and 200 contractors. It is one of the top five industrial employers in southwest Louisiana and the facility's economic impact on the region is estimated to be $110 million annually.

The facility initiated their community information and complaint line in 1992. The community complaint line once handled an average of 120 complaints per year. After two voluntary projects that reduced community impacts, these complaints have been reduced to an average of two per month.

4.2.1.3.2 Complaint Process

The facility does not handle internal and external complaints in the same way. External complaints can be made anonymously. One of the following mechanisms can be used to complain:

- a 24-hour call line, which is promoted in the community by means of refrigerator magnets and listings in telephone books;

- through the website;
- by writing a letter to the company, and
- Community Advisory Panel (CAP) meetings.

Community complaints coming through the call line are captured in a database. Initial response is given to the complainant within 20 minutes and where an investigation is required, follow-up feedback is provided within two days. The process is shown in Figure 4-17. Complaints in writing and those made through the website are handled in the same manner. Complaints made during a CAP meeting are either addressed in the meeting or if a more thorough investigation is required, feedback is given at the next CAP meeting. CAP meetings are held once every other month.

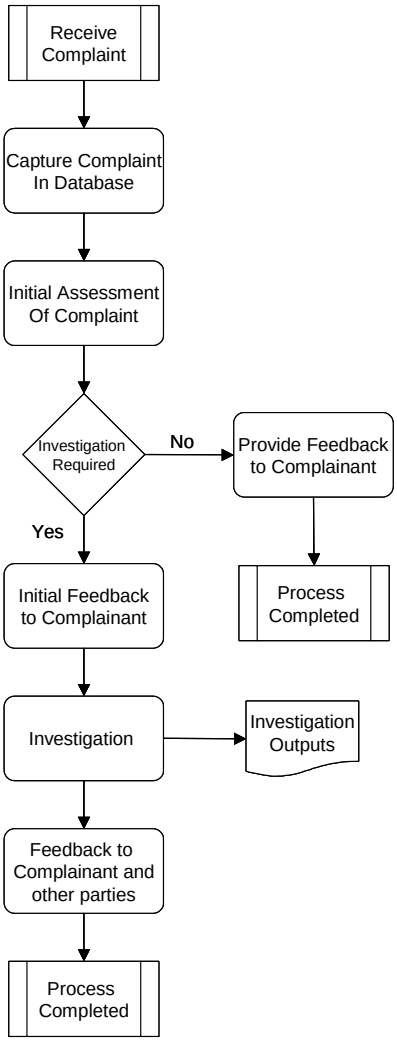


Figure 4-17: Complaint Process

There are a variety of mechanisms in place to accept and address facility internal complaints. These are:

- direct complaints to supervisors;
- direct complaints to union representatives;

- complaints through the community services office; and
- the intranet's "Ask the President" option.

The union representatives can address the complaints received at the monthly union/management safety committee. If the nature of the complaint is not health and safety related, the union can handle the complaint in the following three ways:

- general discussions between union and management;
- initiating a grievance procedure; or
- initiating contract negotiations.

All health accusations, whether through internal or external complaints, are, however, handled through a regulatory process.

4.2.1.3.3 Analysis of Complaints

The internal complaints are not captured in one central database. Analysing these complaints would therefore be very anecdotal. The analysis thus focuses merely on external complaints. In total, 117 complaints for the period starting January 1999 and ending October 2003 have been analysed. Of those complaints, 91% can be classified as social in nature, with 9% classified as other. The complaints classified as other mostly deals with requests for information regarding property purchases of the company in the local community. Of the complaints regarding a social nature, 99% belonged to the community capital criterion and its sub-criteria. The other 1% was classified as mobility infrastructure, since it dealt with accidents on roads maintained by the company. A total of 99% of the community capital complaints, which equals 90% of all external complaints, are classified as sensory stimuli complaints. The nature of these complaints have been analysed further and are summarised in Figure 4-18.

It can be concluded that most of the external community complaints are on the facility's impact on the community's sensory stimuli. Except for the specific complaints about property purchases of the company, all other social complaints could be analysed within the proposed sustainable development framework.

The community's complaints influenced company operations to such an extent that voluntary projects were undertaken. It is also evident that the complaints about sensory stimuli decreased dramatically after the voluntary projects that changed the flaring operations. In 1999, 34 complaints dealing with sensory stimuli were lodged, mostly about flaring operations. In 2003, three complaints dealing with sensory stimuli were lodged. Not one of these complaints dealt with flaring operations.

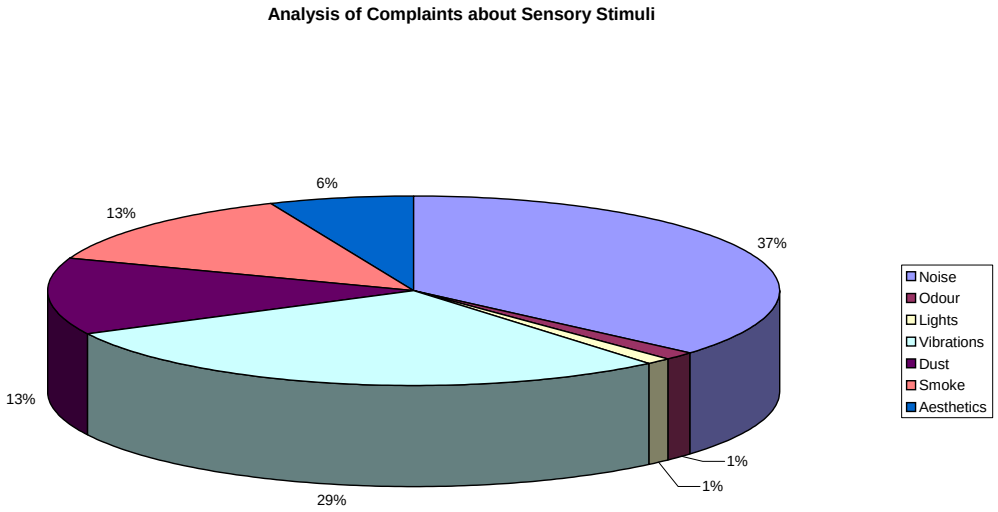


Figure 4-18: Analysis of Complaints about Sensory Stimuli

Unfortunately data regarding actions taken due to complaints was not available for analysis.

4.2.1.4 Chemical Facilities in Germany

4.2.1.4.1 Background Information

The company has five production facilities in Germany, where fatty alcohols, inorganic speciality chemicals, such as high purity aluminas, oxygenated solvents and a variety of oleochemical products, are manufactured. Some of these facilities date back to the early 20th century, with the youngest facility starting production in the 1960s. The company is signatory of Responsible Care®[10] and sustainable development is a priority throughout their activities.

4.2.1.4.2 Complaint Process

Complaints can be made 24 hours a day and are mostly captured in a logbook by the Fire Department. The public can use designated telephone lines to complain. The emission commissioners, specialising in waste, safety and water, are responsible for investigating complaints. Depending on the nature of complaints, feedback is given immediately or within an hour. Complaints can also be made directly at the relevant authorities. Legal requirements stipulate that the company must report on complaints annually.

[10] Responsible Care® is a worldwide initiative by the chemical industry, which strives to improve performance in safety, health and the environment within individual companies as well as the larger industry.

Internal complaints are captured in a central system, i.e. SAP, which have already been installed at two of the five production facilities.

4.2.1.4.3 Analysis of Complaints

The company distinguishes between valid and invalid complaints. Complaints are regarded as valid if:

- the investigation indicates that the company is responsible for the cause or source of the problem being complained about; and
- if the company is exceeding its legal emission limits when the cause of the problem is emission related.

In the 2002/2003 financial year, the company had four valid complaints, which were all noise related. Additional complaint information was not available for analysis. Company personnel were, however, interviewed. Most complaints received dealt with sensory stimuli aspects, especially with noise, odour and light from flaring operations. The company also reports emission information directly to government.

It is evident that complaints are not as numerous as in South Africa This might be due to the long history of environmental legislation in Germany (the legislation dates back to 1489). Compliance is also audited more stringently. This could result in a better-informed public with more trust in government permits.

4.2.2 Analysis of Sustainable Development Reports

Eight sustainable development reports have been analysed to determine the scope of issues reported on. Four South African companies were chosen as well as four international companies with business operations in South Africa. The Financial Mail's Top Companies 2002 report was used to choose the South African companies. The four top companies based on turnover, excluding financial institutions, have been chosen. These companies are Billiton, Anglo American, Sasol and Sappi [109]. The 2003 Fortune list of most admired companies were used to choose the international companies. Due to the process industry focus of this document, two companies in the chemical division and two companies in petroleum refining division were chosen. These companies are Dow Chemical, Bayer, BP and the Royal Dutch/Shell Group [253].

All of the companies except Sappi have published sustainability or environmental, health, and safety reports or societal reports. The following seven reports were analysed:

- BP Environmental and Social Review - 2002 [254];
- The Dow Global Public Report - 2002 [255];
- The Shell Report - Meeting the Energy Challenge - 2002 [256, 257];
- Anglo American Report to Society - Towards Sustainable Development - 2002 [258];

- BHP Billiton Health Safety Environment and Community Report - Policy into Practice - 2002 [259];
- Sasol Sustainable Development Report - Share it with Sasol - 2002 [260]; and
- Bayer Sustainable Development Report - 2001 [261].

Except for the Bayer report issued in 2001, all reports were issued in 2002. This was the most recent report released by Bayer at the time of the analysis. Table 4-5 shows the social indicators reported on.

Table 4-5: Analysis of Seven Sustainable Development Reports

ANALYSIS OF SUSTAINABLE DEVELOPMENT REPORTS								
Question Number	Name of Company	BP	Dow	Shell	Anglo American	Billiton	SASOL	Bayer
1	**Annual Turnover ($ Million)**	180186	27609	235598	15,145	17778	5996	27101 *
2	**Number of Employees**	115250	50725	116000	127000	51000	31100	116900
3	**Are social performance indicators used?**	Yes	Yes	Yes	Yes	Yes	Yes	Yes
4	**List of Indicators found in reports:**							
	Company Internal / Company Practices							
	-Number of Employees	x	x		x	x	x	x
	-Diversity Profile of workforce by gender and nationality	x	x	x	x	x		
	-Non discrimination facts e.g. percentage of previous disadvantaged people in management			x	x		x	
	-Number of Fires, explosions and releases						x	x
	-Number of Leaks, breaks and spills						x	x
	-Indicators with regards to Health & Safety e.g. fatal accident rate; number of fatalities; lost time injury frequency, recordable case rate	x	x **	x	x	x	x	x
	-Indicators with regards to Wages		x	x	x	x		
	-Indicators with regards to Child labour			x		x		
	-Indicators with regards to Contracting and Procurement			x				
	-Indicators with regards to worker training e.g. training hours or training expenses		x		x			x
	-Indicators with regards to dismissals or staff turnover and reasons why	x			x			
	-Indicators with regards to ethics e.g.number of ethic workshops	x	x					
	-Indicators with regards to Union and staff - membership, involvement and forums and grievance procedures			x	x			
	-Indicators with regards to worker empowerment and internal complaints		x				x	
	- Indicators with regards to the use of Security Personnel			x				
	- Indicators with regards to Research & Development Expenditure					x		
	- Indicators with regards to accreditations	x		x	x	x	x	x
	Society							
	-Indicators with regards to community outreach forums						x	
	-CSI Investment/Community Spending	x	x	x	x	x		
	-Public Favorability Scores							
	-Indicators with regards to Transportation Incidents							x
	-Number of External Complaints					x	x	
	-Indicators with regards to economic distribution to regions, or taxes or by type		x		x	x		
	- Indicators with regards to Political payments, competition cases and bribery cases			x				

* Turnover is equal to €30275, the average $/€ exchange rate for 2001 was used to do a conversion ($1 = €1.1171) [178]
** The key performance indicators were listed under the environmental dimension of the report.

Where possible, the social indicators reported on have been associated with criteria in the proposed sustainability assessment framework (see Table 4-6). It is evident that sustainability reports have a strong internal focus and reports extensively on the internal HR criterion and its sub-criteria. The external dimension is, however, not really reported on and most external indicators focuses on corporate social investment or environmental related issues, e.g. road incidents. Two additional criteria have been found in literature on which companies are encouraged to report, namely:

- enforcement; and
- monitoring.

The GRI guidelines [60] have a section on indicators to report on suppliers' performances, which can be linked to enforcing environmental standards down the supply chain. In addition, companies take

part in various monitoring activities (see section 3.4.4.2) during the operation phase, which are currently not accounted for in their sustainable development reports.

Table 4-6: Matching Indicators and Criteria

Indicator	**Criterion Involved**
-Number of Employees	Employment Opportunities
-Diversity Profile of workforce by gender and nationality	Equity
-Non discrimination facts e.g. percentage of previous disadvantaged people in management	Equity
-Number of Fires, explosions and releases	Health & Safety Incidents
-Number of Leaks, breaks and spills	Health & Safety Incidents
-Indicators with regards to Health & Safety e.g. fatal accident rate; number of fatalities; lost time injury frequency, recordable case rate	Health & Safety Incidents
-Indicators with regards to Wages	Employment Compensation
-Indicators with regards to Child labour	Labour Sources
-Indicators with regards to Contracting and Procurement	Economic Welfare
-Indicators with regards to worker training e.g. training hours or training expenses	Career Development
-Indicators with regards to dismissals or staff turnover and reasons why	Employment Stability
-Indicators with regards to ethics e.g.number of ethic workshops	Employment Practices
-Indicators with regards to Union and staff - membership, involvement and forums and grievance procedures	Selected Audience
-Indicators with regards to worker empowerment and internal complaints	Stakeholder Influence
- Indicators with regards to the use of Security Personnel	Disciplinary & Security Practices
- Indicators with regards to Research & Development Expenditure	Research & Development
- Indicators with regards to accreditations	Health & Safety Practices
Society	
-Indicators with regards to community outreach forums	Collected Audience
-CSI Investment/Community Spending	N/A
-Public Favorability Scores	N/A
-Indicators with regards to Transportation Incidents	Mobility Infrastructure
-Number of External Complaints	N/A
-Indicators with regards to economic distribution to regions, or taxes or by type	Economic Welfare
- Indicators with regards to Political payments, competition cases and bribery cases	Regulatory & Public Services

4.2.3 Conclusion

All social aspects which manifested in the case studies and archival analysis could be classified into the criteria framework. The social aspects identified by the analysis are shown in Figure 4-19. It appears that some criteria manifest more strongly in the phase, especially the Internal Human Resources criterion and its sub-criteria.

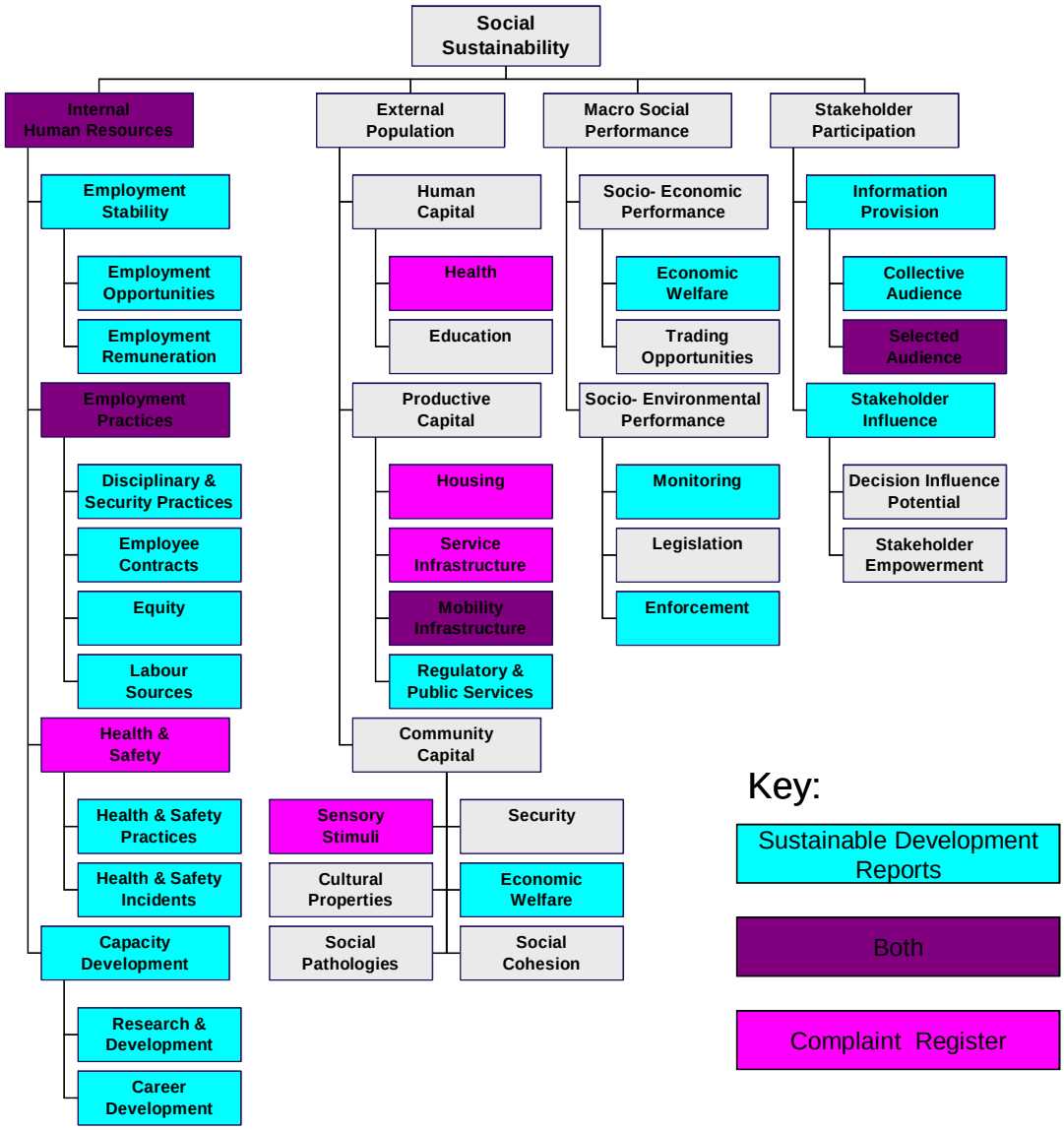
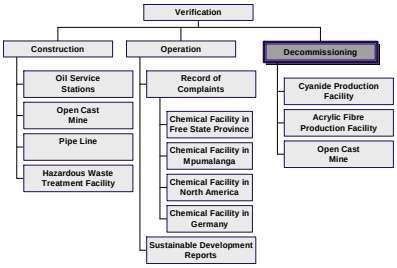


Figure 4-19: Social Aspects relevant in Operational Phase

4.3 Framework Verification Part 3: Decommissioning Phase

"The social impacts of decommissioning begin when the intent to close down is announced and the community or region must again adapt, but this time to the loss o f the project or an adjustment to policy change. Sometimes this means the loss of the economic base as a business closes its door."[162]



The unit of analysis for this part is the decommissioning and rehabilitation of an operational initiative. Decommissioning and rehabilitation are normally undertaken as a project. Three decommissioning projects or sites are studied, namely:

- a cyanide production facility - the production facility has been active for nearly 65 years and has changed ownership a few times during its life. The decommissioning followed its main customer closing down;
- an acrylic fibres production facility - the production facility operated for nearly ten years before economic reasons forced the facility to close; and
- an open cast mine - the mine operated for 14 years before it became uneconomical to continue mining the reserves.

These sites are chosen for the following reasons:

- the cyanide production facility is a decommissioning project within an industrial area and represents an example of the decommissioning of relative small industrial facility;
- the acrylic fibres production facility is a decommissioning project within a problematic social area; and
- the open cast mine decommissioning is chosen due to the extensive nature of social impacts associated with mine closures as well as the increase attention in South Africa on decommissioning of mines [262].

The background of each facility is discussed below, after which social aspects that manifested in the project or became problematic are classified in terms of the proposed social framework.

4.3.1 Cyanide Production Facility in Mpumalanga

4.3.1.1 Background on Production Facility

In 1937, a site in Emalahleni, Mpumalanga province was developed for producing Calcium and Sodium Cyanide (Aero Brand Cyanide), which are used in the gold extraction/processing industry. Various additional facilities were developed on the site in the period 1937 until 1983, namely:

- additional cyanide furnaces in 1956, 1976 and 1983;
- production facilities for Calcium Cyanamide in 1953 - 1956;

- production plant for insecticides in 1951;
- fermentation plant for the production of antibiotics (tetracyclines) in 1964;
- fermentation plant for the production of Ethambutal in 1977; and
- additional production plants in 1971, 1973 and 1974.

In the beginning of 1993, the site was sold to new owners. At that time, only the Aero Brand Cyanide plant was still in production. The remaining plants had been decommissioned. The workforce of 700 had thus been gradually reduced to 140.

4.3.1.2 Background on Cyanide and Cyanide Market in South Africa

Calcium Cyanide ($Ca(NC)_2$) is manufactured through a chemical process with main raw material Calcium Cyanamide and rock salt. The process is a dry process and does not require any water. Calcium Cyanide is mainly used in the gold extraction and processing industry. The main clients of the manufacturing facility were a mine in Zimbabwe and East Rand Gold and Uranium (ERGO). ERGO, who buys 95% to 99% of all production, uses the Calcium Cyanide in their core process, which is recovering gold from old gold-mine tailings. In July 2004, ERGO started depleting the last of its payable reserves and expected to cease operations at the end of 2004. In June 2002, the decision was taken to decommission the cyanide production facility, rehabilitate the site and sell the whole site by June 2004. This decision was economic based, given the declining market for the end-product.

4.3.1.3 Social Issues Relevant to the Project

South African law does not require completion of an EIA or social impact assessment study when a plant is decommissioned. Figure 4-20 identifies the social aspects relevant to the decommissioning project.

a) <u>Employment Opportunities</u>

A major social impact of any decommissioning project is the loss of employment opportunities. In June 2002, the production facility had approximately 140 employees working in three shifts. These shifts were gradually reduced to one shift. In June 2003, approximately only 40 employees were left. At the end of December 2003, the last employees left the site. Some of the 140 employees resigned. In the end, 91 employment opportunities were made redundant and the redundancies were dealt with in three ways, namely:

- 4.4% of the employees retired and are enjoying full pension benefits;
- 92.3% of the employees were offered retrenchment packages; and
- 3.3 % of the employees were transferred to other operations of the company in another town and/or province in South Africa.

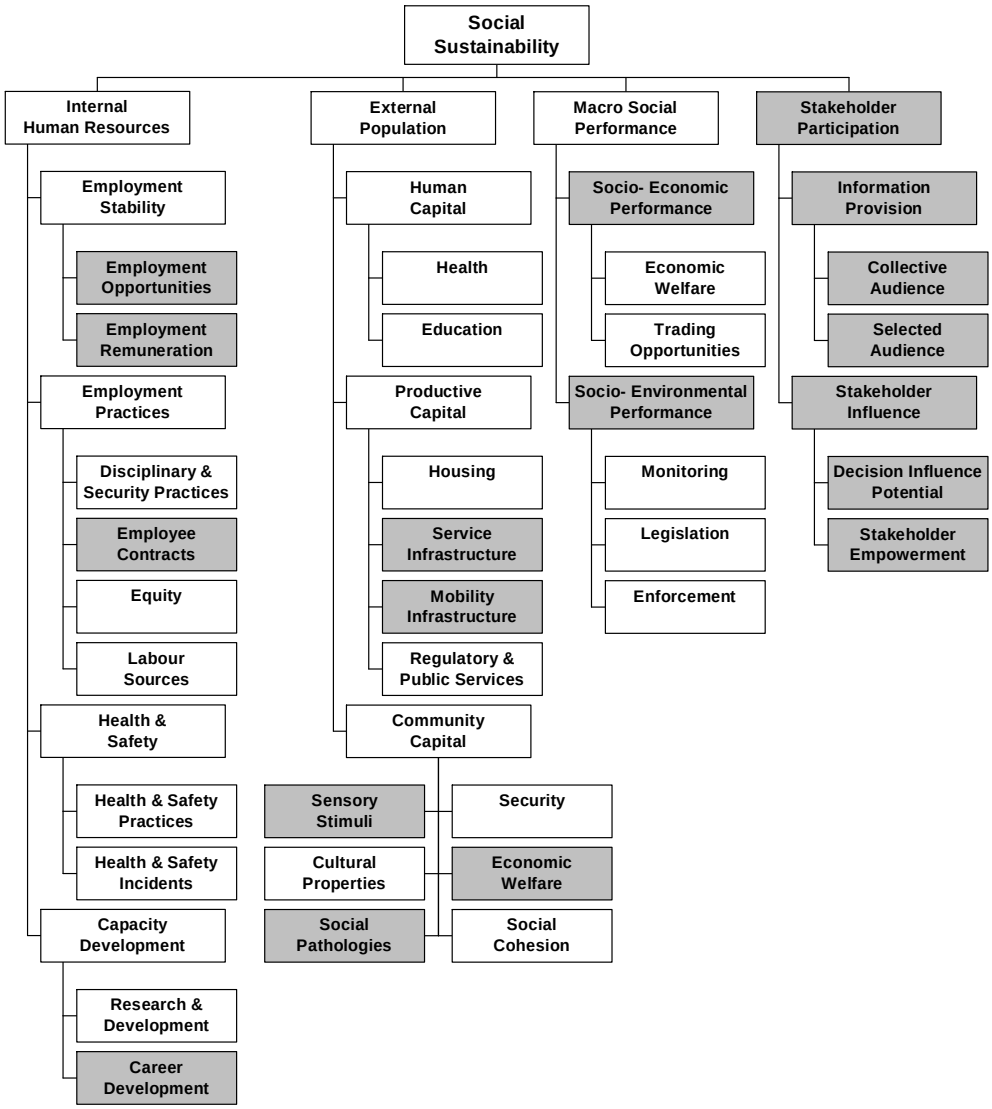


Figure 4-20: Social Issues Relevant to the Decommissioning of the Cyanide Plant

b) Employment Contracts and Employment Remuneration

Employment contracts had to be terminated. Retrenchments happened in four intervals, with workers receiving four months notice in each case. Retrenchment packages were paid to employees.

c) Career Development

The company did assessments in terms of prior learning and registered some employees under the skills development programme of the Chemical Industries Education and Training Authority (CHIETA). All employees were also offered an opportunity to undergo external skills training to become more marketable.

d) Service Infrastructure

The production facility used on average 861MWh of electricity a month. That constitutes 0.017% of the total electricity usage in Emalahleni. Since the production process is a dry process and no water was required, the water usage was minimal, i.e. approximately 200m^3 per month. The decommissioning of the facility thus resulted in a small quantity of electricity and water available for monthly use. The quantities did, however, not result in the closure of facilities and is therefore not a negative impact.

e) Mobility Infrastructure

The decommissioning of the facility had no drastic influence on Emalahleni's mobility infrastructure. The facility mainly relied on railway transport to transport their products. The only other burden on the mobility infrastructure was transporting employees to and from the facility. During the decommissioning process, there might have been an additional burden on the mobility infrastructure with the transportation of material necessary for rehabilitation. However, all of these burdens are negligible compared to the burdens other facilities in the industrial area place on the mobility infrastructure.

f) Sensory Stimuli

The closure of the chemical plant resulted in a positive impact on sensory stimuli. Since the plant was situated in an industrial area and had minimal air pollution affecting sensory stimuli, the positive impact is negligible.

g) Economic Welfare

The retrenchments raised Emalahleni's unemployment rate from 24.99% to 25.04%. The decommissioning thus influenced the local community's economic welfare. The company also no longer pays local taxes, which will indirectly influence the community's economic welfare.

h) Social Pathologies

The occurrence of social pathologies in an area is related to the area's unemployment rate. The increase in unemployment therefore influenced the occurrence of social pathologies in the Emalahleni area. Since no detailed study was undertaken, the information is not available to comment on the scale of this impact.

i) Socio-Economic Performance

The production facility had a monthly turnover of between R4 and R10 million. It contributed less than 1% to the annual turnover of the company that bought it in 1993, and 0.15% to the province's Gross Domestic Product (GDP). The decommissioning of the facility thus had a negligible impact on the region's social economic performance. The closure might have had an influence on the suppliers of raw material but no information was available to analyse the impact.

j) Socio-Environmental Performance

The production facility participated in air quality discussions on a cross-industry and regional level. Nevertheless, the facility's contribution to macro environmental performance was negligible due to their size and the relative small impact of their operations. It can therefore be assumed that the decommissioning would also have had a negligible impact on social environmental performance.

k) Information Provisioning

The decision to decommission the facility was communicated to the employees as well as the facility's suppliers. The communication started in February 2002. The impact on the larger community was viewed as insignificant. The larger community was therefore not specifically targeted to be informed of this decision.

l) Stakeholder Influence

The decision to close the facility was a purely economic decision, since it would not have been viable to keep the facility open after ERGO closed down. It can thus be said that the facility's customers influenced the decision to decommission. No other stakeholder groups was, however, involved in the decision-making process.

4.3.2 Acrylic Fibre Plant

4.3.2.1 Background Information

In the early 1990s, the Industrial Development Corporation of South Africa (IDC) and an industry partner entered into a 50:50 partnership to establish an acrylic fibre plant in South Africa. The decision was based on the fact that no such plant existed in South Africa, while the raw material for such a plant, Acrylo Nitrile (ACN), was available from local suppliers. The partners chose Ethekwini in the KwaZulu-Natal province of South Africa as the location for the plant, since the fibre and textile industry is strongly based in and around Ethekwini. This strategic choice meant, however, that the plant was more than 600 km away from its raw material suppliers.

A second-hand plant of Courtaulds PLC of the United Kingdom (UK), which operated in Calais, France, was dismantled and relocated to a 10 hectare site in the environmentally sensitive Durban South basin. The industry partner managed the construction project and brought in experts from Europe to assist with the commissioning. The plant had a production capacity of 36,000 tonnes per annum and operated four production lines. It was the only acrylic fibre producer in Africa and employed 250 people. Members of the initial construction project team stayed on in the operational phase. The plant became operational in 1993 and operated within the relative legal limits. In 1999, the company received ISO 14001 as well as ISO 9002 certification and by 2000 the company had a four-star safety rating from the National Occupational Safety Association (NOSA).

The decision to decommission the plant was taken in February/March 2002. The plant produced its last products in May 2002, which were sold in August 2002. The plant was dismantled and the site cleaned by March 2003.

4.3.2.2 Reasons for Decommissioning

In 2000, the raw material supplier decided to decommission their ACN plant, which forced the company to start importing the raw material. The ACN market was, however, extremely volatile, with prices increasing from $315 per ton to $960 per ton. In addition, the local demand for acrylic fibre decreased from 40,000 tons per annum in the early 1990s to 13,000 tons per annum in 2000, while the international acrylic fibre market was experiencing an over-supply. The company also did not enjoy protection from duties on imports. Since the plant's start up, it struggled to return a net profit after depreciation. In 2000, the company started making cash losses.

In March 2001, the industry partner confirmed its intention to exit from the partnership, but agreed to allow the IDC to investigate alternative options to keep the company alive. The IDC tried finding a suitable strategic partner for replacement and negotiated with four international groups. The IDC also investigated the option of converting the plant to produce carbon fibre instead. The negotiations did not advance much, as all the parties indicated that successful application for import duty protection would be a pre-requisite for becoming strategic partners. The IDC applied for import duty protection on behalf of the company, but the application was rejected.

In February 2002, both partners agreed to dissolve the partnership, dispose of the assets and to decommission the plant and rehabilitate the site. Soon after this decision, the SACTWU Investment Group made an offer to buy the company, subject to the IDC providing funding. In March 2002, the group's proposal was rejected. In April 2002, a structure for decommissioning and closing the plant was approved. The structure stated that the company management, together with five workgroups, would be responsible for executing the closure plan. The five workgroups were dedicated to specific areas, namely legal, financial, technical, labour and environmental.

4.3.2.3 Social Issues Relevant to the Project

The possible social consequences have been classified. The social aspects identified as relevant in the decommissioning project are illustrated in Figure 4-21.

a) <u>Employment Opportunities</u>

The plant employed 250 employees [263] and the decommissioning thereof resulted in the loss of most employment opportunities. The current employees were, however, responsible for dismantling the plant. The loss therefore occurred rather gradually over the period of the decommissioning project. The industry partner relocated less than 5% of the workers to other existing employment opportunities. The low relocation percentage can be ascribed to the lack of open employment opportunities within the

industry partner's operations at that time. The industry partner's other operations are also located more than 600 km away from Ethekwini. Approximately 4% of the employees accepted the early retirement option.

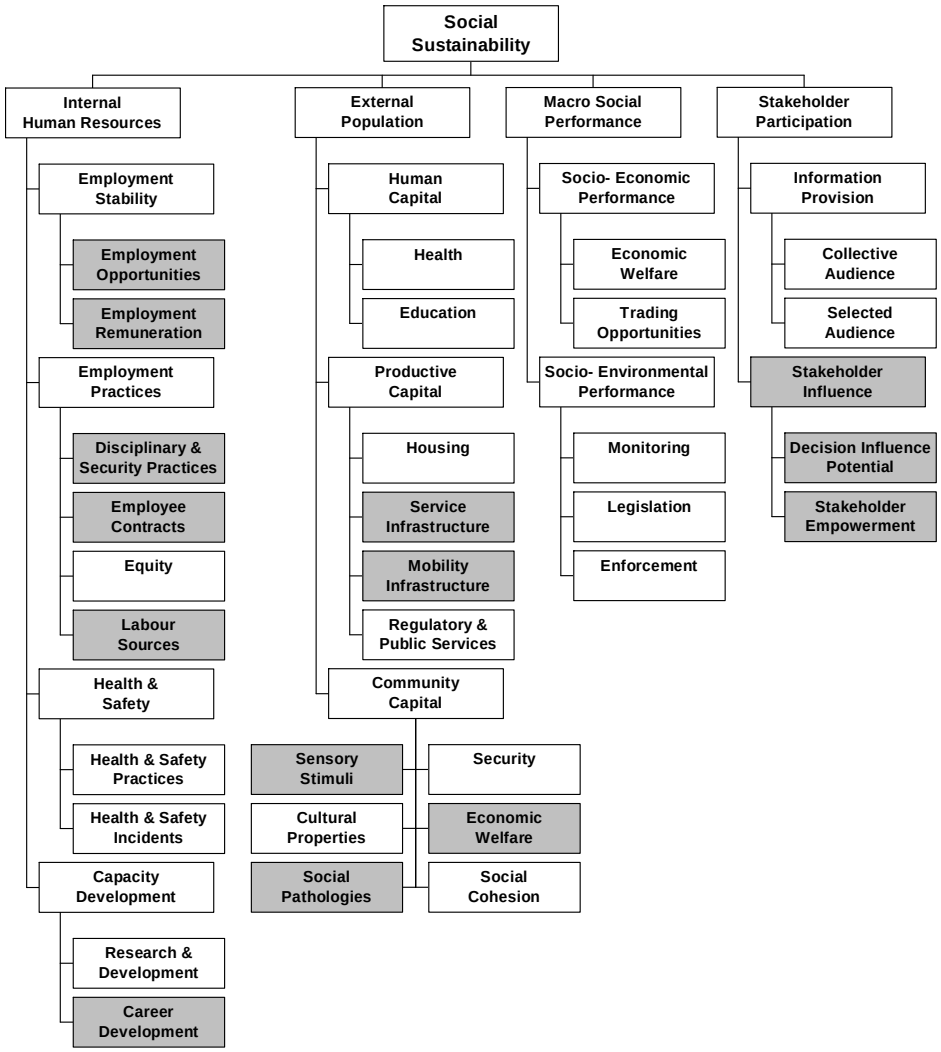


Figure 4-21: Social Aspects Relevant to the Decommissioning of the Acrylic Fibre Plant

b) Employment Compensation

Employees had to be compensated for the loss. The company offered retrenchment packages worth three times the legal requirement, i.e. one week's pay for every year in service.

c) Disciplinary and Security Practices

Security practices had to be improved at the plant after announcing that the plant would be dismantled. The incidents of theft and fraud increased dramatically in the decommissioning period and disciplinary actions were taken.

d) Employee Contracts

Employee contracts had to be terminated. To ensure that the right personnel were available in the different stages of dismantling, all contracts were not terminated at the same time. All employees received three month's notice of termination, but at various times in the decommissioning period.

e) Labour Sources

This criterion is relevant, since the company decided to use the employees to de-commission the plant, although dismantling was done by contractors. The decision lengthened the employees' employment period

f) Career Development

The company offered a single monetary contribution to employees' training as part of the retrenchment packages. The employees had to apply for this contribution and the company had to approve the training or education course the employee wanted to pursue.

g) Service Infrastructure

The company purchased water and electricity from the local municipal council. On average, the company used 4.03 GWh of electricity per month and 119 100 ML of water. These calculations are based on energy and water usage figures per kg of production reported on in the sustainable development report, assuming a production output of 80% of total production capability. Detail calculations are shown in Appendix P. The annual water and electricity usage is, however, less than 1% of the annual usage of the Ethekwini Municipal Area.

h) Mobility Infrastructure

The impact of the decommissioning on the mobility infrastructure during the project was marginal. After completing the project, the impact was positive, as the risk of spillages and explosions associated with transporting the raw material was eliminated.

i) Sensory Stimuli

The closure of the plant resulted in a positive impact on sensory stimuli, since pollution would be eliminated. This impact was, however, marginal because the plant was situated in an industrial area and the plant's contribution to the area's pollution was marginal. The plant's emissions contributed 1% of the sulphur dioxide loading in the area's atmosphere and volatile emissions constituted less than 0.01% of the estimated volume of VOCs emitted into the area's atmosphere [263].

j) Economic Welfare

The area has a high unemployment rate. Decommissioning the project increased the rate. The community's economic welfare would thus be influenced. The company also no longer paid local taxes to the municipality, which indirectly influenced society's economic welfare. Both the company's

suppliers and clients were negatively impacted on by the decommissioning. At the time of decommissioning, it was believed that certain of these companies had to close down due to loss of business. No substantial evidence could, however, support the claim.

k) Social Pathologies

The project had an indirect impact on social pathologies, since there was a direct relationship between economic welfare and social pathologies.

l) Stakeholder Influence

Stakeholder influence was relevant to the decommissioning project. The company informed the employees about the partners' decision in March 2002 and advised them that the plant would be shut down. Workers were informed about the retrenchment packages as well as the guidelines, i.e. phased-out employment. Company personnel handled the information sharing process with the employees. The company did not officially inform the community about the decision. but presented all environmental information and studies to the community at a community workgroup meeting.

4.3.3 Open Cast Mine

4.3.3.1 Background

The open cast mine was situated in the grassland district of the Mpumalanga province in South Africa and produced approximately 7 million tons of low quality coal annually. It began operations in 1989 and had a 20 year designed life. Extreme cost pressures and geological difficulties forced an unexpected mine decommissioning in 2003. A project team was assembled to drive the decommissioning and rehabilitation of the mine. The project team spent time on agreeing and aligning the values that had been used to drive the project with a strong ethical propensity.

4.3.3.2 Social Issues Relevant to the Project

The social issues identified as relevant to decommissioning the open cast mine are depicted in Figure 4-22. Each of these is discussed in more detail.

a) Employment Opportunities

The mine employed operational, administrative and support personnel. At the end of March 2003, it employed 342 people. Although these employment opportunities were lost during decommissioning, the company mitigated the impact. In a related mining reserve deal with another company, 205 employees were re-allocated to the partner. The remainder of the personnel were retrained and redeployed to underground mining operations or offered the alternative of appling for employment opportunities within the company's other affiliations. A very small minority of the personnel accepted retirement packages.

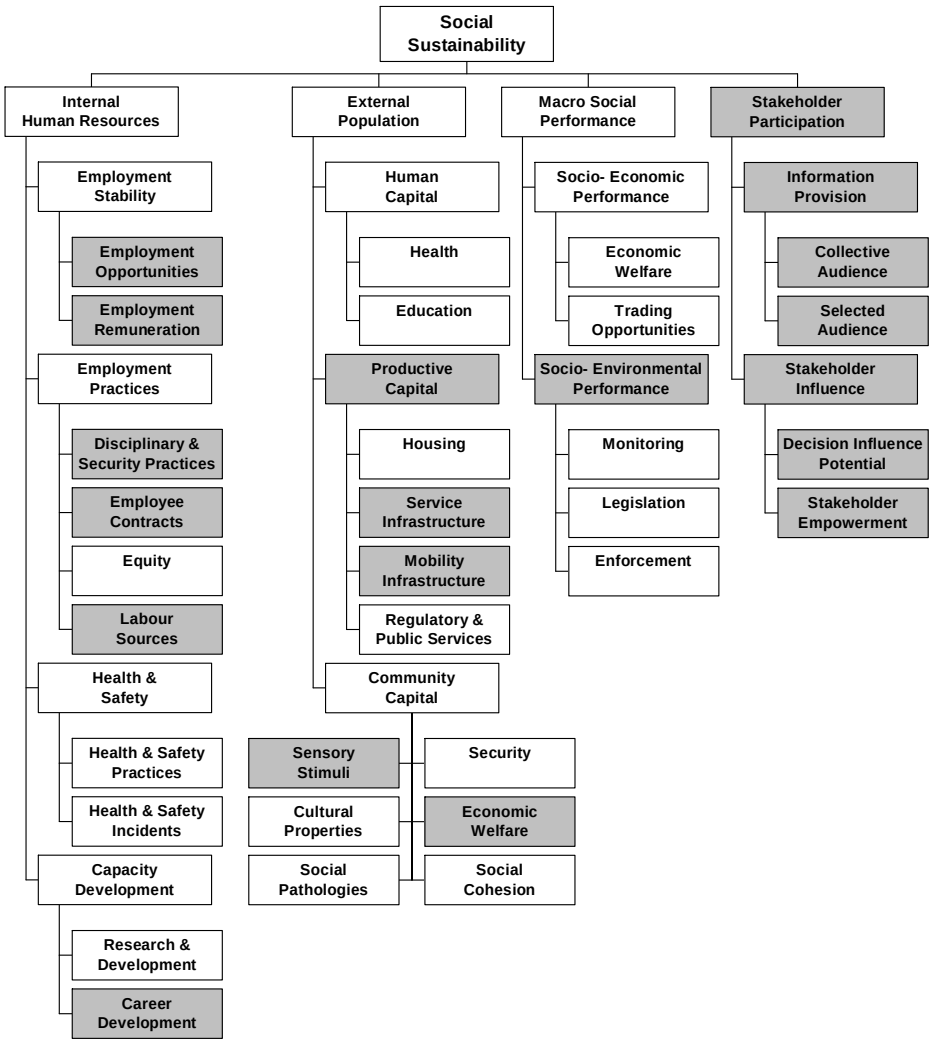


Figure 4-22: Social Issues Relevant to the Decommissioning of the Open Cast Mine

b) Employment Compensation

Although there were no retrenchments, the criterion is still relevant to the project. The move of personnel from one company to another resulted in extensive investigations into salaries and additional benefits, e.g. medical, pension, etc.

c) Disciplinary and Security Practices

Additional security practices were implemented in an attempt to minimise the theft of assets. These practices were intensified in the rehabilitation period.

d) Employee Contracts

Certain employee contracts had to be terminated, while other contracts had to be agreed on regarding the transfer of people from one company to the other.

e) Labour Sources

The mine's personnel performed the rehabilitation with the help of contractors. Contractors were requested to use local labour as far as possible, except where expert labourers were required and not locally available.

f) Career Development

Personnel were offered the option to be retrained in order to enhance their employability and to increase their suitability for positions at the company's underground operations or within other affiliations of the company.

g) Productive Capital

The mine was situated in an agricultural district and consumed 20 km^2 of agricultural land. The land was mainly used for cattle grazing. The closure and rehabilitation of the mine could thus enhance the available land area for agricultural use in future.

h) Service Infrastructure

Water for the mine is supplied directly from Rand Water via a pipeline. Although the open cast mine is closed, the underground operations will still use the pipeline. Electricity is supplied via the Eskom network. Although the closure of the mine made water and electricity available, it is estimated that the potable water use of the underground operations will increase by 30%, while power demand from Eskom is also expected to increase due to the expansion of the underground operations and the electricity that will be supplied to the partner in the related mineral reserve deal.

i) Mobility Infrastructure

The rehabilitation of the mine resulted in an increase of traffic over the short-term. Opening the additional underground shaft, i.e. a direct result of the mine closing, also increased the traffic.

j) Sensory Stimuli

The closure of the open cast mine had a positive impact on the sensory stimuli as observed by the nearby community with regards to aesthetics. The open cast operation also generated a large amount of dust which, depending on various factors, could influence visibility. Those impacts ceased to exist with the closure.

k) Economic Welfare

The mitigation of the loss of employment opportunities resulted in a minimal to no impact on economic welfare. However, since contractors assisted in the rehabilitation, economic welfare has been influenced positively over the short-term.

l) Socio-Environmental Performance

The closure of the open cast mine resulted in the opening of an additional underground shaft as well as the enlargement of other existing open cast mining activities in the area. The criterion is thus relevant, since the decommissioning changed the region's environmental impact profile.

m) Information Provision

The project team thoroughly addressed the information provision aspects. Since October 2002, extensive discussions with authorities on a national as well as regional level took place. IAPs were identified and information meetings as well as closure presentations were held. Information provision to employees started long in advance and increased in frequency to weekly meetings. The related mineral reserve deal implied that shareholders of the companies involved were also provided with information.

n) Stakeholder Influence

The company empowered their employees to be part of the process by involving trade unions and following an open approach to the redeployment options.

4.3.4 Conclusion

All social aspects which manifested in the three case studies could be classified into the framework. However, some other aspects that might manifest in decommissioning with examples thereof have been identified from literature cases and appear in Table 4-7. Figure 4-23 combines the results of the literature study and case studies.

Table 4-7: Other Criteria than can be Relevant in Decommissioning projects

Criterion	Explanation of Relevance in Decommissioning Projects
Health and Safety	If production facilities or mines exposed employees to dangerous substances that can cause long-term medical aspects, the employees' health and safety are an aspect that must be addressed in decommissioning. For example, Asbestos cases [264].
Health	Production facilities that had a negative impact on the external community's health can be held accountable after decommissioning. In such cases, the criterion should be addressed [265].
Housing	In cases where workers received housing as part of their remuneration, the criterion becomes relevant in decommissioning, since the sudden sale of numerous company houses can influence the value of house prices in an area.

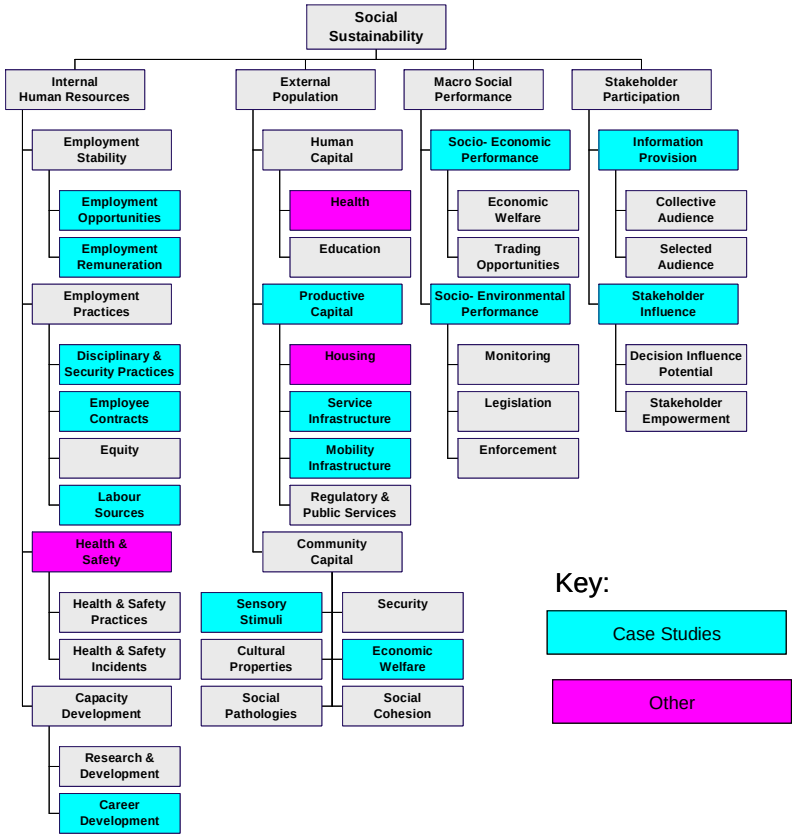


Figure 4-23: Social Aspects Relevant to Decommissioning

4.4 Conclusion

In case study research it is not easy to generalise from case study results to the general population since statistical generalisation can not necessarily be applied. Cases are not sampling units [220] and cannot be treated as such. The conclusion is reached that no aspect could be found that could not be classified into the criteria framework. In addition, all criteria did not manifest in each asset life cycle phase set of case studies. However, there might still be social aspects that did not manifest in either the case studies or the framework. Nevertheless, the basis on which the individual case studies have been chosen makes these cases adequately representative of the current social environment in which construction, operation and decommissioning takes place in the process industry of developing countries. It is subsequently concluded that the framework is complete enough to be used as an initial basis to incorporate social sustainability in project management methodologies.